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Front page: Videotape reconstruction of a 250-kg airplane bomb that penetrated six floors of the Vukovar Medical Center on October 5, 1991 (Photo by Z. Jurčević). More details on the destruction of the Vukovar Hospital are presented on pages 120-128. The photograph in the background is of the Vukovar main street (Photo by *Vjesnik*).

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Editorial: A Physician and the War

"War is the most serious of all threats to health". This statement by the World Health Organization in 1985 has determined my life since September of 1988. From that time I have devoted all my work to the fight against this most serious threat to the health. During the last three and a half years, I was not doing it either in theory or in some faraway country - this battle against war and the striving for peace takes place in my own country, Croatia, and concerns its people and all other peoples of the region - Albanians, Slovenians, Serbs, Muslims, Montenegrins, Macedonians, Hungarians etc. My specialty is social medicine, primarily human rights, medical ethics and health care policy. This professional view has also determined to a large extent my involvement, experience and conclusions. This Editorial is based on crude data and analysis, but surely presents the most extensive war experience of a social medicine expert in Europe since the World War II. In the near future, I will present a more thorough analysis.

The present war in Croatia and the rest of former Yugoslavia and the Balkans is the first war in Europe in the last 45 years. During this period, there has been a significant development in different forms of destruction, but also a whole philosophy and technology of peace.

Since 1945, a whole family of United Nations organizations was founded, including UNICEF and UNESCO. A number of other peace and human rights organizations were constituted, such as Physicians against Nuclear War, Physicians for Human Rights, Medecins sans Frontieres, Medicine du Monde, Helsinki Watch. The unification of Europe has gone further than ever before. Key international documents were developed and accepted as a part a process of universal thinking and responsibility. They are the Charters of the United Nations, Universal Declaration of Human Rights and fifty other human rights documents, protocols added to the Geneva conventions of August 12, 1949, Helsinki Documents, Paris Documents, Targets for Health for All and many other. Since 1945, the work of some of the greatest people in history in the field of human rights and peace became widely known: Gandhi, Martin Luther King, Mother Theresa, Anwar el Sadat. The struggle against inequity and for human rights, against war and for peace, against pollution and for ecological thinking, against oppression and for freedom, have been very painful but also created the enormous experience of modern humanism. New technologies in information systems, communications, negotiations, social organization and others were developed. This was the technology of peace and human rights on which I based my approach and introspections. Based on these instruments, experiences and introspections, here are some of the basic observations and conclusions.

This war is neither the one between Serbians and Croatians nor one between Serbia and Croatia, but the third Balkan war in which the Yugoslav republic of Serbia, in coalition with the Yugoslav Federal Army (YFA) and parts of the Serbian population in other republics and regions is trying to liquidate even the remnants of the rights of all other nations and create the so called "Greater Serbia". This activity was made public in Kosovo in 1988, when Slobodan Milošević said that "Nobody is allowed to beat Serbs". The war itself started in January 1989, 1 km under ground, in the *Stari Trg* mines, when Albanian miners were tricked in negotiations by Serbs who did not keep their word and that is when the first tanks rolled against the Albanian people in Kosovo. It continued throughout 1989 as mass fascist rallies and later the formal renewal of fascist groups (Chetniks) in Serbia and among Serbian population in other republics occurred. The war and the expansion continued as an *anschluss* of Voivodina, destroying its autonomy and persecuting the Croatian and Hungarian minorities, as well as the native Serbian population which had been develop-

ing their autonomy for hundreds of years and belonged more to the Western world. At the end of 1990 and the beginning of 1991, Serbia imposed a military-political fascist organization of life on the Serbian population outside of Serbia itself, and continued transforming the YFA from Serbian-dominated to an exclusively Serbian army with the strategy of creating a "Greater Serbia". In June of 1991, Serbia used the YFA to perform the amputation of Slovenia and free more troops for the occupation of Bosnia and Herzegovina, and begin the occupation of Croatia through staged, "national" conflicts, and finally, through devastatingly brutal aggression in the summer of 1991.

For all the above reasons I consider this war the third Balkan war of Serbian neocolonialism. It has been transpiring for more than three years.

During these three years, I was personally present at the places of conflict, from *Stari Trg* to Eastern Slavonia and Dubrovnik, as well as at a number of key social and political events and meetings in Croatia and abroad. Altogether, I was present in more than 40 crisis points in the former Yugoslavia: *Stari Trg*, Priština, Dakovica, Skopje, Kruševo, Belgrade, Subotica, Dalj, Aljmaš, Vinkovci, Županja, Tenja, Tenjski Antunovac, Ernestinovo, Laslovo, Osijek, Slavonski Brod, Virovitica, Durdevac, Zagreb, Sisak, Petrinja, Banski Grabovac, Dvor na Uni, Vojnić, Petrova Gora, Vrlika, Civljani, Drniš, Knin, Potkonje, Topusko, Srpske Moravice, Plitvička Jezera, Opatija, Rijeka, Split, Dubrovnik, Šipan, Lopud, Zaton, Mokošica, Rožat, Sustjepan, Srd, Cavtat, Konavle, Morinj. Internationally, I visited a number of European countries and the United States in a search for peace.

I was present when people were killed, was personally under fire more than a dozen times, visited jails and prison camps, lived in occupied territories, joined refugees when they were driven from their homes, and later in the camps. I also witnessed the destruction of hospitals, churches of all major religions, graveyards, cultural institutions and homes. I suffered with the children and the old, men and women, different national groups, refugees. My experiences include ecological warfare on Slavonian wheat fields, burning of Trsteno arboretum and the whole region of Konavle and Župa near Dubrovnik, as well as 50 days in besieged Dubrovnik without water, electricity or heating.

As a personal witness, I have to call this war the War against Three Crosses: on the grave, in the church and on the hospital. In this way, Serbian aggressors and the YFA tried to destroy Croatian roots, spirit and social support.

My socio-medical activity included work with the Red Cross, human rights organizations, health and social care organizations, political parties, civil protection, media, Croatian Army and Navy, as well as the YFA. A whole set of socio-medical tools were used - planning, organizing, leadership, information systems, interviewing, negotiating, supporting... On the basis of direct application of socio-medical, peace and human rights know-how, I am positive that this war has developed new understanding of civil, health and human rights support during armed conflict.

It should be emphasized that in all of the experiences during these three years, the Serbian side continuously became more brutal and barbaric, while Croatians grew from victims to an organized army and people. So many people showed their greatness at critical moments that I will always cherish the time we spent together.

Finally, this war has been waged against the Croatians and all the peoples of the former Yugoslav state, but it is bringing to them more freedom than ever; the war against churches, graves and hospitals has led to spiritual growth and development of health organizations; the destruction of human rights and freedom has led to the highest reverance for human rights and democracy.

In the end, I would like to challenge the reader with the following questions: Why did the international community, especially WHO, show such an unbelievable level of inability to understand what had to be done and what was needed? How shall we present all of our tragic experiences and newly gained knowledge to the international community so that it can be used to curtail future suffering? How shall we return 700,000 refugees to their homes, employ 300,000 jobless, care for 600,000 who are retired? How shall we renew our fields and forests, churches and hospitals, roads, factories and schools, cities and villages? The world is looking at us, neither respecting nor trusting us enough even in the midst of our suffering. The next five years will show all the world in spirit and in deeds that our renewal will be based on human rights, ecology, social medicine, and all other tools of a civil society, that will create life without fear and with dignity and well being for all people in Croatia.

The challenge of this war is enormous, and tragic for us, but we are passing it. The challenge of peace is no smaller, for "the peace is not just the absence of war. It is also a positive sense of well-being and security for people of all countries, implying the opportunity to freely determine their own destiny and fully utilize their human potential. It assumes the possibility of all nations actively participating on a basis of equality and in a true spirit of solidarity and reciprocity in the development of a more satisfying world for all people".

Slobodan Lang

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Invited Paper

Nuclear Terrorism

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Human use of nuclear technologies has been incredibly creative: for the good and the bad. This allowed us to harness fission to produce energy and cure cancer while simultaneously developing weapons of mass destruction.

The latest twist in human creativity is *nuclear terrorism*. Nuclear terrorism is defined as attacks against nuclear devices or facilities by non-military forces.

Nuclear terrorists can use different tactics against an opponent's nuclear facilities. One tactic is a real or threatened paramilitary attack against such facilities. Another tactic of nuclear terrorism is infiltration of an opponent's nuclear facilities by force, espionage or intimidation. Other tactics are also possible.

Several consequences of real or threatened nuclear terrorism can modify the terrorist's or victim's behavior. The most obvious is to confer potential nuclear destructive capability on an aggressor lacking nuclear weapons. Another consequence is to deprive the target nation of electrical output thereby decreasing industrial productivity and ability to wage war. Civilians whose lives are disrupted by nuclear terrorism might pressure national leaders to end the conflict by acceding to opponent's demands. Finally, the expressed or perceived threat of a counter-attack on the nation's nuclear facilities might cause its leaders to reconsider a conventional military or political course of action.

Many types of nuclear facilities including nuclear weapons sites, commercial and research reactors, fuels reprocessing plants, waste storage facilities are potential targets of nuclear terrorism. However, the extensive military security around nuclear weapons and safeguards to prevent unauthorized use make them unlikely targets. Of the remaining facilities, commercial nuclear power stations are the most attractive target for several reasons. One is that destruction of such a facility immediately ends electrical production[1]. Another is that these targets have the greatest potential for harming civilians. A third consideration is that nuclear power plants often represent a nation's most concentrated fiscal investment.

Let us next consider the potential adverse health consequences of acts of nuclear terrorism. Risks to humans occur when radiation is released from the reactor complex into the environment. Consequently, two important determinants of medical consequences are the design of the reactor and of the containment structure.

Radiation can be released into the environment from an event initiated outside or within the reactor complex. For example, the reactor and/or

1 Although this objective can also be achieved without attacking the reactor, such as by destroying the plant's turbo-generators or high-voltage electrical transmission lines.

containment can be disrupted by an explosive device, such as a conventional bomb or rocket or even a nuclear weapon. Alternatively, these structures can be disrupted by an explosion in the reactor core, usually from overheating of the fuel.

Factors influencing the magnitude of injuries from radiation include the amount and types of radionuclides released and their physical-chemical form. Commercial reactors are usually fuelled with enriched uranium-235. However, after operation they contain hundreds of radioactive fission products. Some of these, like xenon and krypton, are released as gases that rapidly diffuse into the atmosphere. Consequentially, they pose little health risk. Of the remaining radionuclides, four are of special concern: iodine-131, cesium-135, strontium-90 and plutonium-239. These radionuclides cause different health consequences. For example, iodine-131 poses the greatest risk to the thyroid whereas plutonium-239 affects predominantly the lung and bone.

The period of time over which these radionuclides affect human health also varies considerably. Iodine-131 has a physical half-life of 8 days compared to 30 years for cesium-135 and 24,400 years for plutonium-239. Because these isotopes remain dangerous for about 10 half-lives, effects of plutonium persist for almost a quarter of a million years.

Several other factors influence the potential health consequences of a radiation release including characteristics of the radioactive plume discharged from the containment structure, meteorological conditions, and population density around the facility. For example, effects on large population centers near reactors depend on wind speed and direction at the time of the release and whether or not it was raining.

There are several ways to estimate the potential health consequences of a radiation release from a nuclear facility. Although a detailed discussion of these is beyond the scope of this article, some observations are of interest.

Assume a terrorist act results in a major radiation release from a 1,000 megawatt (electrical) commercial nuclear reactor. Also assume that evacuation of persons living near the reactors is delayed 24 hours.

In this scenario, persons living within 7 kilometers of the reactor would receive an average radiation dose of about 5 Sievert (Sv), whereas those residing within 15 kilometers would receive more than 2 Sv. This dose would result in about 40% early deaths, predominantly from bone marrow damage, within the 7-kilometer zone, and about 30% deaths within the 15-kilometer zone. A few deaths may occur as far as 40 kilometers from the reactor under these circumstances. Obviously, the medical consequences of such an incident could be worse depending on weather conditions and the speed of evacuation. More precise estimates of how many persons would be injured or killed following an act of nuclear terrorism are possible by studying population density maps surrounding nuclear facilities and considering possible meteorological conditions.

The most important aspect of the medical response to a radiation release is the need for evacuation and/or sheltering of the population at risk of radiation exposure. Prompt distribution of organic iodine can prevent thyroid damage from iodine-131. Persons exposed to high doses of radiation need immediate medical attention. Treatment strategy depends on dose; its range is from supportive care through hematopoietic growth factors to bone marrow transplants. In the scenario being considered, deaths could be reduced to about 30% in the 7-kilometer zone and about 15% in the 15-kilometer zone with supportive measures. Even more lives could be saved with sophisticated medical interventions.

Another issue to be considered is the potential long-term consequences of a radiation release resulting from nuclear terrorism. These effects are economic, social and medical. Reasonably large land areas might be contaminated by radiation. In some scenarios, areas of several thousand square kilometers might be uninhabitable for 50 years or more. This would result in displacement of persons residing in this area and loss of agricultural or industrial productivity. Long-term consequences of radiation exposure are predominantly excess cancers and genetic abnormalities. The magnitude of these would depend on the amount of radiation released and numbers of persons exposed.

In medicine, prevention is always better than treatment. The same is true for nuclear terrorism. It was once believed that pressure from the international community and the perceived rules of international war would prevent nuclear facilities from becoming military targets. Attacks against Iraqi nuclear facilities by Iran, Israel and the United States over the past 10 years show this notion to have been naive[2].

Three strategies that may help prevent nuclear terrorism can be envisioned. The first involves policies designed to control national behavior by international law. A second approach is to develop physical means to prevent or reduce con-

2 Iran and Iraq were at war when this attack occurred. Buildings under construction that did not contain radioactive materials were targets. The Israeli attack against the Osirak reactor during Iraq's unilateral declaration of war against Israel was based on international suspicion of the reactor's role, recently confirmed, in Iraq's nuclear weapons program. This attack also occurred before nuclear materials were introduced into the facility. The US attacks occurred during war. Targets were reactors suspected of being involved in weapons research. Several had been certified by the International Atomic Energy Agency. They contained radioactive materials at the time of the attack.

sequences of nuclear terrorism. Examples include designing safer reactors and sitings and developing evacuation plans. A third strategy is regulation of nuclear exports and related technologies.

Nuclear terrorism is an important issue that deserves wider attention, particularly in light of the global diffusion of nuclear technologies and increased regional conflicts. This risk is especially great in Eastern Europe and the Soviet Union, politically and economically unstable regions with diverse nuclear facilities. The Middle East and Korean peninsula are not far behind. As world energy demand increases, more and more countries will depend on nuclear energy, increasing the numbers of potential targets of nuclear terrorism. Recent attempts by countries like Iraq, Iran and North Korea to acquire nuclear weapons technologies, often aided by otherwise responsible nations, can only worsen the situation.

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Psychologic Sources of the Serbian Aggression against the Croats

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Abstract. The source of Serbian aggression should be looked for in their predominantly regressive behavior in relations with other nations. Social inheritance and unsuccessful suppression of the regressive behavior have entailed further expansion and intensification of such a behavior. Projection and projective identification as defense mechanisms, as well as increased suicidality of the group observed, represent the starting points for understanding the present logically inexplicable and unjustifiable aggression against anything non-Serbian, especially Croatian.

Key words: *aggression; Croats; hate; Serbs; war*

Definition of Aggression

Some authors (1) differentiate between aggression and aggressiveness. Aggressiveness is a tendency to aggression, i.e. a tendency to exhibit aggression. Aggressiveness is a feature encountered in aggressive actions. Furthermore, aggressiveness is an inclination toward displaying one's own interests or ideas as opposed to the opposition; it is an initiative which excludes the presence of opposition. And finally, aggressiveness is a tendency to gain domination over a social group (1). The latter statement has been extensively present in Serbs, not only over the last year but for already 150 years, to be more precise, since the advent of Ilija Garašanin's *Načertanije* in 1844. A primarily liberational aspect of *Načertanije* actually works out in detail the idea of the Serbian expansion to the neighboring countries (2).

According to the biologic definition, aggression is a hostile activity aimed at inducing fear to be followed by flight as a reaction in the others, or leading to so-called violent contact. One of the dimensions of the "psychologic equivalent" of the aggression, i.e. the man's experience of it, is an attempt to destroy or seize another man's property (1). This English' definition comprehensively delineates the actions of the Serbian aggressor done all over Croatia, devastating towns and villages, killing and massacring the civilians, looting both private and public properties, and declaring the occupied parts of Croatia their territories.

According to Adler, aggression is a manifestation of the "will for power" (3). By its very name and especially by its program, the Great-Serbian ideology clearly tends to such a manifestation. Its nature can best be delineated by psychoanalytic theories on aggression. Thus, Laplanche and Pontalis describe aggression as a tendency to do harm to the other, to destroy the other, to compel the other to do something harmful for himself, to humiliate the other, etc., all this actually done, or at least imagined (4). Most commonly, aggression is realized by forceful and destructive motor acts. Freud considers aggression a manifestation of death pulsion (5), which appears to at least partially clarify the abundant presence of death and killing in this war of conquest waged by Serbia against Croatia.

Many psychologists and psychoanalysts include frustration among the basic etiologic factors of aggression. According to Fairbairn, frustra-

tion is related to the biologic source of aggression. Thus, aggression exists in each person as a biologic inheritance, but remains disguised until the individual encounters some frustrating experience. Then, the aggression is "activated" in order to protect the ego. In every person, too early and too frequent activations of aggression in childhood create a model of behavior which will become habitual later in life (6). We are, however, trying to answer the question of the sources of frustration in the Serbian nation that have accumulated enormous aggressive energy which, in turn, is also a sort of frustration the imperative of which is to discharge.

Frustrating Experiences amongst Serbs

Prior to looking for frustrations that have formed the structure of the personality of most Serbs, we should try to answer the question of how that aggressiveness could have become so widespread and dominant over generations.

Identification at both horizontal and vertical levels provides an answer to the question. The horizontal level includes mutual identification of the representatives of the same group, in this case the Serbian nation. Intensity of such identification is allowed for by their tendency toward restricting communication to the equinational frame. The vertical level refers to the tradition transfer from the parents to their children, a phenomenon called *social inheritance* by sociopsychologists.

Orientation of this ethnical group toward their "fathers' and great-grandfathers' sainthood" is vividly confirmed by many Serbian folk songs and customs.

In Serbs, *regressiveness* prevails over progressive psychic tendencies. A *progressive* psychic development implies adoption of the capacity for *sublimation*. Sublimation is a feature of personal maturity, implying delayed fulfilment of impulse requirements and the use of impulse energy for a socially acceptable activity. This is a pathway to and a condition for civilization at the same time. In Serbs, regressive tendencies can be recognized in their inclination toward oral and other bodily pleasures they like to emphasize as their specific folklore feature. Their business partners are frequently surprised by this regressiveness when attempting to establish usual business communication with them.

A regressive person is closer to his own uncontrolled impulses than a person capable of sublimation. In view of Freud's statement that aggression is part of the subject's biologic reaction, aggression is more frequently found in regressive persons than in those who have adopted some more progressive psychic models of behavior (7). It is beyond doubt that perception of the mentioned features will frustrate such an individual, thus further intensifying his aggressive reaction.

Deep regression evokes reactions from very early childhood which, according to M. Klein, belong to the *schizoparanoid position* (8). It is a position of the *object* and the *self* split to the good and the bad. Incapacity of integration of the good and bad parts of the self and the object also prevents the final integration of the personality. This disunion of the personality causes great fear. Freeing from fear can be accomplished through *projection*. At first, such a regressive unintegrated and scared person projects the bad parts of his self and his previously introjected objects toward the outside. It is practically manifested as accusing the others and transferring to them all his own negative characteristics. Through such accusations, the subject frees himself from fear and a feeling of guilt (9). Present projections of the Serbian negative emotions into the Croats have a *paranoid character*. Mass accusations of being endangered are an expression of collective paranoia. It is by no means easy to give a projection up. Its gratifications manifest as "throwing out" of the bad contents from one's own personality, which in turn eliminates fear. No logical proofs can convince such persons in the opposite. Actually, there should be no real insight, since it would make them realize that everything projected belongs to the subject making accusations, which would result in reappearance of fear and guilt.

As a projective material of the accuser, accusations of the others, in this case the Croats, have another curiosity. These accusations reveal the accusers' intimate personalities. All that is projected to other nations, represents their own psychic contents; their accusations actually accuse themselves. Thus, they provide us with their own attitudes and intentions through their mass media. It is known in psychology that attitudes are studied by evaluation of the presence of particular topics, for instance, in newspapers. Each study subject will find the topic he is interested in to be most frequently present (10). The same mechanism is used by a subject projecting the features found in himself to his "enemy". We should not forget that this is an unconscious psychic process.

A great part of the Serbian people projects the very split in their personality to the Croats and other non-Serbian nations. As mentioned above, the Serbs are not capable of integrating the self. Their self is disintegrated. A projection of this disintegration is seen in their tendency to massacre the Croats. What do they get by this? Once again, elimination of fear. By massacring the others' bodies, they "throw out" from themselves, i.e. project, their disintegrated soul, reassuring themselves as follows: "It is he who is torn to pieces, not I".

Like any other ethnic group, the Serbian nation is characterized by group phenomena. They have been described in detail by E. Klain (11). It should be emphasized that the negative regressive occurrences are intensified by a group. In a group, the presence and occurrence of the so-called *projective identification* in its centrifugal form, are particularly interesting.

Projection of one's own ego ideal (possessed by every person) to a leader impoverishes one's

own personality (12), hence the impoverished personality exists in most Serbs, with simultaneous idealization of a leader, i.e. creation of the personality cult. Therefore, such a person acquires an illusion of power by identifying himself with the leader (13). An experience of the sense of power is quite frequently converted into a sense of omnipotence. This is also an expression of deep regression. A little child who still cannot differentiate between his own self and the objects surrounding him, experiences himself as an overall, oceanic or space unity with *oceanic omnipotence*. The idea of Greater Serbia, thoroughly worked out in Vuk Karadžić's article *Srbi svi i svuda* (Serbs All and Everywhere) (2), describes with arguments the author's *delusions of grandeur* and indicates deep regression to the level of the oceanic omnipotence mentioned above.

It should be emphasized again that any regression, and so the regression present in the majority of Serbs, is always partial. Along with it, there is always an observing, critical part of the personality which becomes dissatisfied when observing his own regression. An experience of dissatisfaction is another term for frustration. As stated above, the reaction to frustration is aggression. Why is this aggression directed just against the Croats?

Croats - the Object of the Serbian Aggression

It should be stressed out that the Great-Serbian aggression is aimed at most or all non-Serbian peoples. However, the Croats have always been the most frequent object of their aggression. Why?

Assuming that aggression is most frequently caused by frustration, the question is how the Serbs have been frustrated by the Croats. The capacity of sublimation is an important trait of the Croatian nation. Their readiness to resolve conflicts in a peaceful way illustrates this feature of the Croats. In each individual, sublimation is an effort, since it includes a change in psychic phenomena from the original biologic-psychologic to an overtly psychologic structure (9). Such a change is, undoubtedly, a very strong frustration (14). Emotional support of the environment provides conditions for mutual identification, facilitating adoption of the change. The persons of Serbian nationality have no support in terms of favoring sublimation. The more so, the support provided by the group they live in legalizes a more regressive behavioral pattern. In contacts with the other group, i.e. the Croats, who have much more successfully mastered the capacity of sublimation, a representative of the group of Serbian nationality feels guilt and envy. Comparing the cultural heritage of his own people to that of the Croats, he realizes that sublimation to a considerably higher level than his own is possible. Such an experience of frustration would be positively resolved by conscious acceptance of sublimation, i.e. greater frustration, but this is very difficult, almost impossible within the frame of a deeply regressive group. Therefore, their only reaction is tendency to destroy the source of frustration; hence the source of destruction and the impulse to demolish everything that is related to the Croats. Likewise, we are astounded by extermination of Croats and by leveling of Croatian settlements to the ground. Such a behavior follows the laws of logic. Every conqueror usually tends to preserve the values of the area conquered and the lives of those he wants to govern. For the members of the Great-Serbian group, however, it is more important to eliminate and destroy those who are better, the sublimated persons, as sources of frustration, than to make use of the conquest. In history, similar jealousy and envy were present in the Romans who did not only conquer but also demolished Carthage, and fallowed and pelted with salt the very soil where Carthage had been.

The Croats belong to the western culture. Their capacity of sublimation corresponds to the prevailance of God's laws over personal impulses, i.e. they respect a categorical imperative in their psychic space. The Serbian nation is, due to their regressiveness and diminsihed capacity for sublimation, prone to proclaim a human a saint and lift him above God's laws. Similarly to shamanism, their god should serve the man and justify their (mis)deeds. There is no repentance or recognition of sin and guilt. Such intimate religiosity justifies any crime. God is their servant, not their master. There is no categorical imperative, only formal justification for the environment they depend upon, and this system of excuses has been worked out to virtuosity. Hence such an abundance of lies and half-truths in their statements and communications. The Serbs have got a rich experience in making puns, aimed at excusing their misdeeds, to an enviable level that can hardly be reached by other nations. However, recognition of such a form of communication and timely undertaking of activities neutralizing the effects of their lies can improve the situation.

Autoaggression

Aggression should never be considered only as an unidirectional impulse running from a subject toward an object. When the object is lacking, aggression is, like libido, directed toward its source, i.e. against the subject (15). The purpose of each impulse is reduction of its own energy potential or, briefly, a discharge. The pleasure thus induced is the aim of every impulse. The same holds true for aggression. Realization of aggressive tendencies is stronger than preservation of one's own integrity (15). In case of aggression, it could be expressed as follows: "It is essential to kill, no matter whom, even oneself". In 1902, Nikola Stojanović published his article entitled *Do istrage vaše ili naše* (Until Extermination, Ours or Yours) in the journal *Srbobran* (Serbian Protector) and in 1911, Dragutin Dimitrijević Apis

founded the organization *Ujedinjenje ili smrt* (Union or Death) in Belgrade (2). The very titles illustrate the Great-Serbian group's readiness for aggression in which they may become the victims themselves.

The Great-Serbian autoaggression, i.e. suicidality as its end-point, is daily seen as the lack of organization in the conduct of war against Croatia, where many of their group members are killed on the battlefiled. Such cases are then rationalized as bravery. Their homocidal impulse or, to be more precise, croatocidal impulse, is by no means reduced by their suicidality.

The Croatian Mistake

Responsiblity for the Serbian aggression and its eventual realization, i.e. destruction of lives and properties of other nations, should partially be also searched for on the part of the Croats as well. It is known from developmental psychology that the process of sublimation in a child is realized through the presence of a castrative father forbidding the regressive behavior. A child is incapable of achieving maturity, primarily including the capacity of sublimation, by itself (9,16). It is too great a frustration for the child. Respecting the principle of graduation and through the parents' offer of the secondary and tertiary forms of gratification, the child will give up its primary pleasures (12).

Just like a child, a regressive group needs help from others. Such help can only be provided by persons or a group who have achieved a certain degree of sublimation (12). In the Serbian case, these are their neighbors - the Croats. Instead of imposing restrictions to the regressive group, however, the Croats respected their regressive demands. Like in the educational process, strictness and resoluteness would have been appropriate responses of the Croats to the regressive behavior of the Great-Serbian movement.

Interestingly enough, some Serbian group leaders are psychiatrists who have acquired psychotherapeutic training. Instead of taking a stand of mature and sublimated persons and imposing themselves as models of identification, they show a fundamental psychotherapeutic mistake. They play the group's game instead of sticking to the principle that a psychotherapist should always play his own game (17). They have actually legalized the regressive behavior of the group thereby and are the most responsible factors for expansion of the Great-Serbian aggression in its enormous intensity and extension.

Conclusion

In most Serbs, the horizontal and vertical identification has led to forceful mass aggression. Incapability of sublimation as a progressive direction of the psychic development, with a simultaneous tendency toward regression, has evoked in them a behavioral pattern abundant with early defense mechanisms. The split and projection, as well as projective identification, are the consequences of frustration due to incapability of a more mature resolution of commonly opposed impulses. This aggression is directed toward the source of their frustrations, i.e. other peoples, particularly the Croats who have developed a higher capacity of sublimation.

Autoaggression to suicidality is another trait of the group of people described. Reduction of the aggressive tension is preferred to their own integrity.

References

1 English HB, English AC. A comprehensive dictionary of psychological and psychoanalytical terms. Toronto: Longmans, Greens and Co., 1958.

2 Čović B. Izvori velikosrpske agresije. Zagreb: August Cesarec & Školska knjiga, 1991.

3 Adler A. Praxis und theorie der individual psychologie. Muenchen: Bergmann, 1920.

4 Laplanche J, Pontalis JB. Vocabulaire de la psychoanalyse. Paris: PUF, 1967.

5 Freud S. Beyond the pleasure principle. SE XVIII. London: Hogarth Press, 1973.

6 Fairbairn WRD. Psychoanalytic studies of the personality. London: Routledge and Kegan Paul, 1978.

7 Freud S. Drei abhandlungen zur sexual theorie. Frankfurt am Main: S. Fischer, 1968.

8 Klein M. Die psychoanalyse des kindes. Wien: Int. Psa. Verlag, 1932.

9 Gruden Z. Psihoterapijska pedagogija. Zagreb: Školske novine, 1989.

10 Krech D, Crutchfield RS. Elements of psychology. New York: Alfred A. Knopf, 1958.

11 Klain E. Yugoslavia as a group. Croat Med J 1992; 33 (War Suppl 1): 3-13.

12 Gruden V, Djaković J. Velika grupa - analitički pristup. U: Grupni proces u psihoterapiji. Zagreb: Sekcija za psihoterapiju Zbora liječnika Hrvatske, 1984:139-47.

13 Kreeger L. The large group. London: Constable & Co., Ltd., 1975.

14 Wolberg LR. The Technique of psychotherapy. Orlando, New York, London, Philadelphia, San Diego, San Francisco, Sydney, Tokyo, Toronto: Grune and Straton, 1988.

15 Nunberg H. Algemeine neurosenlehre. Bern, Stuttgart, Wien: Hans Huber, 1971.

16 Winnicott WD. The maturational process and the facilitating environment. London: The Hogarth Press and Institute of Psycho-Analysis, 1972.

17 Freud S. Die psychoanalitische technik. Studienausgabe. Frankfurt am Main: S. Fischer, 1972.

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Psychiatric Perspective of the War against Croatia

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Abstract. The war being waged against Croatia offers an opportunity for the scientific study of malevolent political ideas and models of behavior, as well as mass political madness, so that these states could be better understood, and in the future more easily anticipated and controlled. This paper provides a framework for integrating issues in the psychological, social and political sciences. The role of psychological mechanisms implicit in political social systems is emphasized. Primitive and pathologic psychological defences and mechanisms at both individual and collective levels are of great importance in the genesis of armed conflict and collective violence.

Key words: *politics; psychopathology; social conformity; war*

Introduction

The psychopathologic basis of war has for a long time been recognized in the syndrome of ethnocentrism (1-4), which manifests itself in "experiencing one's own group/ethnos as the center of everything", while others are measured and evaluated with increased hostility. Underlying the tragic war in former Yugoslavia is also a malignant ethnocentrism accompanied by paranoic collective consciousness and paranoic political culture (5).

The development of the syndrome of ethnocentrism can be associated with a competition for insufficient resources - "Realistic Group Conflict Theory" (3), but also with the process of cultural differentiation resulting in ethnocentric definitions of one's life/existential position and prejudices about other people and their values ("Culture Conflict Theory"), as well as in an uneven cultural development of individual groups/ethnoses interfering with global balance ("Culture Disbalance Theory"). According to the "Frustration-Aggression Displacement Theory", frustration within a group/ethnos results in a release of repressed aggressiveness and hostility within the same group, which are displaced on others (3). Thus, by the mechanism of projection, one's own unacceptable (aggressive) impulses are ascribed to others, so that one's own aggression is "recognized in others as a danger/menace coming from them". By a simultaneous "dehumanization" of other groups-ethnoses (e.g., the thesis of "the Croats as a genocidal people"), and by lifting, in one's own ethnos, the cultural prohibition of manifesting aggression towards the others, everything is ready for a war.

The Theory of Cultural Conflict: A War of Paranoic vs. Narcissistic Political Culture

From the psychological and psychiatric points of view, the war against Croatia may be desribed as a war of a paranoic political culture against a narcissistic political culture which has tended to take part in the attempts of creating a cooperative/peaceful European culture. It is obvious that any war is essentially a fight for economic and political interests, nevertheless, without the formation of a collective paranoic consciousness, this barbaric war could not have begun, whereas the problems that have accumulated for years, could have been resolved in a civilized manner.

The Psychopathology of Political Cultures

The term political culture refers to a kind of structuring and shaping of social and political relations within a community (e.g., a nation/state), but it is also a way of experiencing, comprehending, and interpreting those relations. It is the product of the political mind of a community, and encompasses political ideas, meanings and values embodied in institutions, social and political relations, systems of beliefs, morals, and customs of a community, which govern the experiences and behaviour of its members. By virtue of political culture, a person becomes a political individual (*zoon politicon*), part of a political group, party, or political nation.

The attitude of individual political cultures towards the expression of violence and aggression in conflict situations has a special importance. Indeed, human history is full of wars and violence, so that collective memory is a reservoir of bloody destructiveness and aggression. We may say that "violence is lurking in man, and mankind is simply wallowing in violence" (6), which requires enormous efforts in order to be repressed and controlled. Political cultures vary as to the means and methods of controlling, releasing, directing, or sublimating the aggressiveness of their members. In this context, we may distinguish between violent/militant and peaceful political cultures.

Paranoic political culture. In the last fifty years, more than a hundred million people were killed as the result of paranoic political cultures (7). It is the reflection of a demented political mind, and is formed around extreme and demented politogenetic ideas (National Socialism, Bolshevism, national Communism, etc.), on the basis of a paranoid existential/life position (see Fig. 1). Paranoic political ideas may be expressed in delusions of grandeur/unrecognized grandeur, messianic role, special merits, unrecognized rights, conspiracy, erotic qualities, etc. They represent the realization of the losers' script (for example, the heroic losers' script of "victors in war and losers in peace"), or the script of the celebrators of Pyrrhic victory, the script of "genocidal suicide". In this culture, games of power usually take the form of war games, which involve presenting oneself either as a "victim" defending itself, or as a "rescuer" defending someone else and labelling others as "persecutors", while being the actual persecutor - see Karpman's Drama Triangle (8). The attitude of a paranoic culture towards others is determined by a complex interplay of the parts of a split paranoic collective self: the grandiose self (+/-), the inferior self (-/+), and the nihilistic self (-/-). Megalomania, expansiveness, hegemony, and pathological possessiveness are the reflections of the grandiose self, and represent, in fact, a pathological defense against a deeper sense of inferiority. Destructiveness is related to the nihilistic self ("black hole"), with the destruction of others resulting eventually in self-destruction. In the end, each of the militant cultures was destroyed in an internal war, which is well illustrated by the destinies of Darius, Alexander the Great, Caesar, Ghengis Khan, Napoleon, Hitler, etc. (9).

Narcissistic political culture. Narcissism as a metaphor of political culture denotes all forms of vanity, self-admiration and self-magnification by a political group or community, going as far as ethnical or racial prejudices that hinder cooperation with others (10). One might say that people have always been selfish, groups have always been ethnocentric, and politics have always involved one's own interest. The processing of information is dominated by the so-called contextual metastrategy, whereas narcissistic culture is dominated by its own context, which determines the meaning of processes and phenomena. "We know that there is our/my, your, and his/her/their truth, but it is only our/my truth that counts for us/me." "Let us live the way we want to, who cares about the others." "We are better than the others, we are sufficient to ourselves." The attitude of a narcissistic culture towards the others is determined by the interplay of two parts of the collective self: the grandiose (+/-), and the inferior (-/+) self. By the inclusion of magnificent object images, the grandiose self defends the collective narcissistic self against the inferior self and the experience of anxiety, guilt, inferiority, etc.

+/+ position	**+/- position**
We are OK, you are OK	*We are OK, you are not OK*
Cooperative pacifist political culture	Narcissistic political culture Paranoid political culture
-/- position	**-/+ position**
We are not OK, you are not OK	*We are not OK, you are OK*
Nichilistic political culture	Depressive (castrated, conformist) political culture

Figure 1. OK Koral of political culture

Political culture of peaceful coexistence. Without a cooperative (peaceful) political culture, the future of mankind, and hence of the peoples of former Yugoslavia, is very uncertain. Instead of competition, this culture offers cooperation as the ideal way of resolving interpersonal-collective-interethnical-interstate problems. It is a culture of nonviolent action and peacemaking, the key concepts of which include contact, meeting, understanding, solidarity, cooperation, negotiation, and agreement on the solution of problems existing between people/communities/nations. It is based on the script belief that "everyone can be a winner/loser". "That which we want for ourselves should be granted to others as well." It means a cooperative satisfaction of the need for power, thus shaping a healthy, integral, i.e., unsplit collective self with a (+/+) existential position. In information processing there is a predominantly holistic,

Figure 2. Psychodynamics of the war against Croatia.

integrative, pluralistic, and interactional metastrategy of thinking, which allows a creative and cooperative resolving of problems, taking into consideration oneself, the others, and the particular situation.

Collective Psychodynamics of the Tragedy in Former Yugoslavia

Yugoslavia was a tragic combination of very close, and, at the same time, from the cultural and civilizational points of view, very different nations. It was created as a result of interests and wishes of foreign factors rather than of its own constituents. From the very beginning it was established on lies, deceptions, pilferage and violence, in spite of incorporating the ideals of a community of brother

Table 1. Attributions of the Serbian nation resulting from paranoid political culture

Self-attributions	Attributions given by others
Heroic/militant nation	Wild/barbaric nation
Primitive nation (D. Ćosić)	Descendants of Turkish bastards
Victors in war, losers in peace (D. Ćosić)	The greatest vultures of allied victories (J. Clemenceau)
A nation that does not know how to work, but knows how to fight (S. Milošević)	Guardians of traumas and celebrators of defeats
The chosen people of the creators and guardians of Yugoslavia	Jailers of other Yugoslav peoples
A nation of death and necrophils (J. Rašković)	A disturbing factor in Croatia (A. Starčević)
A crazy nation (J. Rašković)	Unhappy/tragic is the nation that has Serbs as its neighbors/brothers

Table 2. Attributes of the Croatian nation

Negative attributions given by paranoid political culture	Positive self attributions
Genocidal nation	A nation like any other, with its ups and downs
Castrated nation	Freedom-loving nation Peaceful nation
Nonexisting nation	Civilized nation with thousand year-old culture and tradition

nations living in equality ("double-bind situation"). The primitive vision of a family of nations, shaped on the model of a "Big Brother guiding his small brothers", could not withstand the challenges brought by the age of democratic "communities of equal brothers". The extent of the tragic consequences of the Big Brother's "madness" and the small brothers' naivety is yet to be seen. Using the words of a poet, "We have broken the frame, and the picture was made of a dream", so now we have floods of blood, and no one knows where they will stop.

Conflict of different politogenetic ideas and socio-cultural traditions. Figure 2 presents the political psychodynamics which has brewed a dirty and treacherous war against Croatia, fought with the aim of materializing the idea of Great Serbia. It is actually a transhistoric process, when, in the stage of exhaustion and breakdown of the Communist model of Yugoslavia, two mutually exclusive nation-building ideas meet: the idea of a "powerful (meaning Great) Serbia with absolute domination in a Modern (centralistic and unitarian) Yugoslav federation", and the idea of a "democratic and independent Croatian state in a confederative community of the Yugoslav peoples' independent states, based on the principles of the European Community". These ideas are the reflections of different political traditions underlying the two different political cultures, including pathologic collective experiences and the definitions of oneself and the others (Tables 1 and 2).

Serbian cultural tradition belongs to the Byzantine (Orthodox) civilization. Serbian Orthodox religion is rather a part of national identity than a religious symbol integrating into Christian civilization. The Serbian Orthodox Church is autonomous, and has been, throughout history, an important factor of national cohesion, even in the process of integration of non-Serbian peoples into the Serbian nation. Militant tradition is a significant part of Serbian collective identity and self, and it can be identified in Serbian national mythology, epic tradition, literature, historiography, politics, etc., but also in the inclination to military career, and an almost erotic attitude towards weapons. Not only in monarchic but also in Titoist Yugoslavia, Serbs dominated the army, police, diplomacy, judiciary, etc., where they were represented in a much higher percentage than it would have corresponded to their proportion in total Yugoslav population. The Kingdom of Yugoslavia was ruled by Serbs in a direct way, while in Tito's Yugoslavia, they ruled in an indirect way, through a majority in the League of Communists, the army, police, and other organs of government. In post-Titoistic Yugoslavia, Serbs demanded a strong, centralized Yugoslav state under their absolute dominance, in the form of a "modern federation", depriving others of the same rights that they have been asking for themselves, even resorting to violence. Communist ideology based on the psychological mechanisms of splitting, paranoid projection, dual thinking, double standard, and a pathological need for control, has struck the deepest roots among Serbs (11).

Croatian cultural tradition, on the other hand, belongs to Western civilization, and European tradition of the Roman Catholic Church. Through religious and cultural idealization, Croats have more intensely and more often identified with Western democracies, so that Communist ideas could never take deep roots in the Croatian people. The tradition of Croats is based rather on faith, work, obedience, dialogue, and justice (11). They have been weighed down by the myth of a curse on a people without a state of its own, but which has managed, despite its fate, to preserve its identity, primarily by virtue of its culture and religion. While Serbs of humble origin enrolled, in both Yugoslavias, mainly in military and police schools, Croats coming from poor families preferred the clerical profession. In the population of political prisoners the proportion of Croats is by far the largest (over 90% taken together with the Muslims), which is quite suggestive of the nature of former Yugoslavia. Anybody who would emphasize his or her Croatian identity was labelled as an Ustasha. Croats were blamed for treason and the disintegration of monarchistic Yugoslavia, and were finally proclaimed a "genocidal nation". In Communist Yugoslavia, as the result of systematic decroatization and political castration, a depressive political culture took hold among Croats. The victory of the HDZ (Croatian Democratic Union) at the first free elections marked the beginning of the process of croatization and democratization in the manner of narcissistic political culture.

Political psychopathology and the war against Croatia. Conflict in itself is a catalyst of personal and social changes; its adequate solution enables development and leads to progress and benefit. However, unsolved individual (intrapsychic) conflicts may result in mental disorder and disease, whereas unsolved political conflicts may result in war, mass murder, crime and destruction. Hence the interesting comparison between peace and health, and war and disease (3,12). We may state freely that war is very often started by sick political minds that have created a sick collective political consciousness and culture.

Paranoic political mind: the origin of the malignant aggression. After the famous 8th meeting of the Serbian League of Communists, the paranoic political mind of "victor in war and loser in peace", of those who "don't know how to work, but know well how to fight", started an expansion of a "too readily promised speed", which has never been seen in these regions before. It was carried out through the populist movement of "imperilled Serbs", "the anti-bureaucratic revolution of spreading the truth, fraternity and unity" and "the log-revolution of saving the imperilled Serbs from the Ustashas", all under the patronage of the Yugoslav Peoples' Army and Federal Police. By a paranoic political perception and delusional processing of real problems and "bitter" facts, as well as by offering a number of deceits and myths about themselves and the others to the domestic and international public, a collective paranoic political consciouness has been shaped, with the conscious or unconscious inclusion of many intellectuals, scientists, persons of letters, politicians, respectable public figures, artists, as well as institutions of the highest order, such as universities, academies of sciences, the mass media, the Church, diplomacy, etc.

Collective exaltation following the elections in Croatia, the process of cultural and political recroatization, and the process of collective mourning for and valediction of the Croatian victims of the Communist regime, which had had to be supressed on pain of severe penalties, as well as the rehabiliation of political victims and prisoners many of whom have become representatives of the new authorities, have markedly increased the frustrations and anxiety of the paranoic political mind. The fear of something new and of the arrival of democracy, the likeliness of losing unjustly obtained privileges, and, in some cases, the fear of responsibility for abuse of power have all lead to a great frustration. In paranoic structures frustration and anxiety result in aggressive impulses (displacement of frustration by aggression), which are then, by the mechanism of projection, ascribed to and recognized in the others, only to turn responsibility from oneself to the others, and/or assure an easier tolerance of painful experiences and events to come. Should the repression of aggres-

sive impulses fail, in addition to the mechanism of projection, some other psychological mechanisms are activated (denial, mystification, mythologization, rationalization, intellectualization), which serve to justify one's behaviour or disguise the true motives/goals of such a behaviour. Denial is a psychological mechanism by which one denies the existence of some experience, motive or action towards other people (e.g., the claim that "Serbia is waging no war in Croatia or against Croatia", denial of crime, etc). An example of mythologization as a psychological mechanism of political defense is the denial pronounced on Belgrade television in relation to a crime committed by a group of Chetniks, suggesting that "no such thing is possible, because committing crime is not in the collective ethos of the Serbian people". Paranoic structures use, with remarkable skilfulness and effectiveness, the mechanisms of intellectualization and rationalization, with the aim of logical self-justifiction. It is partly the reason why paranoic ideas and explanations seem to be plausible, convincing, quite logical and well systematized, so that those who are not conversant with the situation, cannot easily recognize the paranoic distortion of reality. Rational explanations and intellectualization are successful means of concealing the genuine motives of behaviour both from oneself and the others. Therefore, the process in which persons who were previously normal from the psychiatric point of view develop persecutory or grandiose political delusions, "Shared Paranoid Disorder" (13), expands very rapidly, involving great masses in times of economc and political crises and collective tension, with the critical ability of consciousness reduced and realistic observation of reality blurred. In the state of eclipse of the collective political mind, the masses are open to all possible suggestions and sick, war-mongering ideas, which consequently result in crime and terror, killing of civilians, children and helpless people, "the strategy of burnt-up country", destruction of cultural monuments of inestimable worth, obliteration of civilizational achievements, and violation of international norms of behaviour.

Paranoic politics can do without friends but cannot be deprived of enemies in order to achieve or maintain the existing integration and structure. If there are no enemies they are created by disclosing their aggressiveness which is nothing but one's own projected aggression, with the imputation of one's own motives and goals to the enemy. By political labelling and defining other ethnoses as "demonic" and "genocidal" they are defined as a constant menace to one's own ethnos. This leads to a gathering of the "imperilled" with the aim of defending themselves against common danger. Since this is a "continuing danger", "brothers in the other republic" should be helped, so that everyone could live in the same "big state that will protect them". In order to "protect" themselves against the "genocidal nation", regardless of the fact that this "genocidal nation" has been absolutely unarmed and ready for a peaceful agreement, the paranoic political mind sets in motion a tremendous war machinery against the "victim" in which it previously recognized its "Persecutor" and "Scapegoat" which is to be blamed for all the troubles of the Serbian people.

War has a manifold psychological meaning for a paranoic political culture, including: 1) relief of internal tensions and social discontent by finding external objects, i.e., the others, to be blamed for one's own problems and displacment of aggression on them - abreaction. (The attack on Croatia was preceded by great unrest and demonstrations against the regime in Belgrade.) 2) "Self-defense" or the defense of one's own interests, because the others are paranoically perceived as the source of aggression and danger, which should be prevented and neutralized; 3) satisfaction of the pathological need for power and appropriation; 4) compensation for one's self-image (a "heroic people of victors in war and losers in peace, with good fighting abilities, embellishes the image of itself by means of new wartime "heroic deeds"); 5) imposition of norms of behaviour on other people who are believed to exist only to satisfy the needs of the paranoic political mind.

Narcissistic contribution of the victim to its own getting into trouble. Contemporary victimology claims that "violence is, by all means, a game for two persons" (6), or, in the case of war, for two sides. "Even in those cases when the victim does nothing but show up in the wrong time and at the wrong place, its contribution is essentjal to getting into trouble or participating in its own destruction". This fact partly accounts for the psychological tendency of many observers of the war against Croatia to equlize the responsibility of both sides, and not distinguish the aggessor from the victim. No doubt that such an attitude is always based on some hidden interests, either economic or political, however, this is not the subject of this text. The above mentioned victimological thesis raises the question of whether Croatia is the victim not only of a paranoic aggression of "victors in war and losers in peace" who "don't like to work but are ready to fight", but also of its own narcissistic benevolence and naivety.

The first free postwar elections have resulted in collective exaltation, cultural and political recroatization, idealization of the so-called free world, identification with great democracies all over the world, narcissistic optimism, etc. Narcissistic psychological mechanisms have restructured the perception of real danger overestimating the civilizational achievements of modern democracies in Europe and the world, and underestimating the barbarism and primitiveness of reggressive political cultures in resolving conflict situations. Identification is a complex psychological mechanism of taking over and adopting attitudes, behaviours, systems of thoughts, feelings and values of others, including individuals/groups/cultures, and it plays an exceptionally important role in the development of indivdual/collective identity and self. It may also be a psychological defense mechanism

against anxiety, pain or menace, either real or imagined. Narcissistic identification with "the great democracies of the world" reduced the fear of the unarmed Croatian people of the potential aggressor which later became real. The narcissistic phantasies about "the most democratic government/state in the world" probably reflected a strong desire for democracy and freedom of which Croatia had been deprived in previous regimes. However, for the achievement of true democracy and freedom it is not enough that the party offering democracy in its programme should win at the elections, but also a maximum use of all Croatian resources is needed, as well as the time and aid of the democratic world. By the mechanisms of narcissistic intellectualization and rationalization, too many "logical" reasons were found why Croatia must not be attacked, which contributed to a narcissistic distortion of reality. Narcissistic optimistic regression lead to an "unrealistic belief" in the promises of the paranoic protagonists claiming that they would not attack Croatia. Nevertheless, due to the mechanism of splitting immanent in paranoic political structure, it never suits the action to the word, proclaiming peace and provoking war, proclaiming defense while actually attacking.

One needs to distinguish healthy narcissism with a protective function, and pathological narcissism which is destructive. If we divide human tendencies between the dychotomies of life-death, peace-war, love-hate, creation-destruction, confidence-suspicion, etc., then healthy narcissism favours life, love, peace, creation, and confidence, whereas pathological narcissism involves killing, war, hate, destruction, and suspicion. After the elections, Croatian political culture has tended to achieve the goals of healthy narcissism, including the development of democracy and a peaceful/nonviolent political culture. However, due to its narcissistic optimism, and, in a way, naivety too, it was a bit late with preparations for defense, but has shown, nevertheless, that it deserves a place in the world of freedom and democracy. It is extremely important for Croatian politics not to take the course of pathological narcissism underlying paranoic political cultures such as Nazism, Bolshevism or Communism.

The Theory of Roles: the Psychopolitical Triangle of the Yugoslav Tragedy

Karpman's Drama Triangle and Politics

Using Karpman's Drama Triangle including the roles of the Persecutor, Rescuer and Victim (8), we may present and explain many political and historic games. These three roles may be a realistic reflection of a particular situation, and in that case they are legitimate (realistic roles). However, very often these roles are only a mask which is used to disguise immoral and illegitimate goals, so in such situations the players present themselves as the "Victim" or "Rescuer", and the opponent as the "Persecutor" (illegitimate, manipulative, nominal roles). In this case, the "Persecutor" is someone who has been unjustly accused of imposing limitations on the others, or of exerting violence with sadistic brutality. The "Victim" is the one who gives a false presentation of himself or feels unrealistically endangered for various religious, ratial, or national reasons. The "Rescuer" is the one who, under a mask of helpfulness, tries to achive some of his secret interests, makes other people dependent on him, and is, in fact, frequently menacing someone. In life, just like on stage, drama is based on "switches" which are indicated by arrows along the drama triangle (14). Each protagonist starts with one of the three roles, while the opposite side (the antagonist) takes one of the remaining roles, or it is imposed on him. Whenever a crisis arises, two or more protagonists exchange roles moving around the same triangle. Eventually, the players end up with the roles which are congruent with their existential positions, and their individual/familial/cultural/national script, depending on the level of play. More or less important roles are played by the Connection and the Patsy (Fool), which also may be real or nominal, and they may be taken by any of the three main protagonists. The Connection is an actor providing the necessary conditions or details for a switch, usually at a given price, and he is usually aware of his role. These are, for example, dealers selling influence, weapons, etc. Weapons may enable the real Victim to be saved, i.e., to get rid of the imposed nominal role of "Persecutor", but may also turn him into a real Persecutor, thus changing his defensive role into an offensive one. The Patsy is the one who is cheated in order to prevent a switch, or speeding it up. Sometimes the Patsy is a passive protagonist serving only as a lever providing the switch (14).

Psychopolitical Drama Triangle in Former Yugoslavia

The strategists of paranoic political culture introduced the thesis that "the Serbian people made the greatest sacrifice for the creation of Yugoslavia" and that "they liberated their Small Brothers" (other Yugoslav peoples) who "should be grateful" for that. However, "the ungrateful brothers" started "inventing the guilt of the Serbian people, only because it helped the others, who paid him back in a terrible way" (15). Not only have the Small Brothers committed genocide among the Serbian people (primarily the Croats, but also the Muslims), they also imposed on the Serbian people the 1974 Constitution (primarily the Slovenes and Croats), which brought "TERROR" ("UŽAS", meaning "terror", was meant as an abbreviation for Serbia proper, without is two autnomous provinces). The "Great Victors in War" have thus become "Losers in Peace". The "Conqueror in the War" who made the "greatest sacrifice" has once again become the "Victim" of his own "Small Brothers", the Croats, Slovenes, Muslims, and Macedonians. However, since the "Tito-Kardelj conspiracy" was still not enough, the

"Vatican-Comintern" plot and the "Islamic-fundamentalist" plot were discovered in addition. It goes without saying that the "Victim" has a historic "right to defend himself". What else could be expected from a "heroic nation" of "victors in war and losers in peace" than to start another war against "genocidal" and "nonhistoric" nations. Thus, the nominal "Rescuer of Yugoslavia" who made for it "the greatest sacrifice", became in peace nominally the "Victim" of those for whom he "sacrificed himself", but actually, the real Persecutor of his nominal "Persecutors". "Either a modern (centralistic) federation in which the Serbs would not be 'Vicitms', or else - war." "Either it will be our way, or you will disappear." "All Serbs must live in the same country." "Where there is only one Serbian's grave, there is Serbia." "Each Serbian has to be avenged."

In "rescuing" Yugoslavia, a very important role is played by the Yugoslav Federal Army, "preventing bloodshed among the nations" by levelling Croatian cities to the ground. The role of the Patsy is played by those non-Sebian officers in the army who have a Yugoslav orientation, as well as by non-Serbian members of the Yugoslav diplomatic corps, and the Federal Executive Council, all of which participated in the "rescue" of Yugoslavia which was actually its destruction.

The Story about "Endangered" Serbs in Croatia

A special place in the Yugoslav tragedy belongs to the "endangered position of Serbs in Croatia". It is a very clear example of the so-called phenomenon of "ressentiment", when the past (victims in the second world war) is taken as an excuse for one's present and future behaviour. Here we are not talking about an objective evaluation of the past from a certain distance, because the historic context of the event in question (in our case, the sufferings of the Serbian people) is disregarded. The sufferings of either the Croatian or the other Yugoslav peoples are not taken into consideration at all, although some of them had proportionally even more casualties. It is actually a manipulation serving to mask dishonest political goals, and induce the Serbian masses to fight and give their lives for these goals. By frightening their own people with the "return of the past" and "repeated suffering", the ruling clique in Serbia convinced the majority of Serbs that they were endangered by the "ustashoid government" and the "genocidal Croatian state", since Croats, as a "genocidal nation can't create anything but a genocidal state". They used the case of a fabricated "assault" on the insignificant Serbian extremist Milan Mlinar to disturb their own people who carry massacres in their collective memory with a special emotional charge (the fabrication of the symbol of "Victim" in order to remind of menace). Since fear is a normal reaction to danger and menace, such a manipulative provocation of fear originating from the past of the people was used to prove the endangered position of that same people. In the state of collective tension and fear, when the critical sense of consciousness is fading, the realistic perception of reality is dimmed, and an eclipse of reason ensues, the masses are open to all possible suggestions and demented ideas, which will later impel the "imperilled" but frightened masses to start behaving in a hostile way towards brother nations, regardless of the consequences. By defining other ethnoses and ethnicities as "demonic" and "genocidal", they are determined as a constant threat to one's own ethnos. Thus, those who are "endangered" come together to defend themselves against common danger. Since it is an illusion of danger, the "victim in self-defense" becomes the aggressor/real persecutor, and starts an armed rebellion. Throughout history, appearences have always played a more significant role than the reality (16), and there have been many insurrections in the past which were started by virtue of a partly or entirley imaginary sense of danger.

The real danger brought about by the democratic elections was the one that menaced unjustified privileges and could induce loss of power. As a matter of fact, under the previous regime, in Croatia, the representation of Serbs in the government was disproportionately high as related to their percentage in the total population of Croatia. The endangered privileges and loss of power of one layer of Serbs have been nominalized as the "endangered ethnos", in order to incite the masses for the achievement of disguised, ultimately military goals. Similarly, their own uneasy consciounness and fear of penalty and revenge for what they had done to former political losers was planted in the masses as the imperilled existence of the Serbian people in Croatia. Indeed, many participants in the Croatian Spring in 1971, who had been drastically persecuted and had spent many years in prison, were among the winners of the 1990 democratic elections, which explains the fear of those who lost their power. Nevertheless, the democratically elected authorities publicly proclaimed that "a winner is not worthy of his victory if he is unable to forgive", and that there wouldn't be any revenge campaign.

It is an unavoidable fact that the first Serbian victims were killed at the hands of Serbian murderers (the demonstrations in Belgrade, the first victims of the log-revolution in Knin). On the other hand, considering the national structure of the police in Croatia and of the Yugoslav Army, as well as the act of taking away the arms from the Croatian territorial defense units, the new, democratically elected government was not in the position to use force against the Serbian people.

"Endangered victim" has become persecutor. However, the "endangered victim" did not accept the results of the democratic and free elections, he took up arms, and started to persecute the "Persecutor" whom he defined as "genocidal ustashoid government". After that, presenting themselves as "Victims", the "endangered Serbs" do not want to continue their work in Croatian Parliament ("due to" the Mlinar case), do not wish even to try to cooperate in finding a peace-

ful and democratic solution. Relying on its "Rescuer" (Serbia) and "Connection" (the Yugoslav Army), the "Victim" (Serbian population in Croatia) violates all laws and the Constitution, declares a state of war in the summer of 1990, blocks roads, robs innocent people, sabotages the tourist season, only to provoke the "Persecutor/Aggressor" to attack him. The Yugoslav Army, which should nominally protect constitutional order, warns the legitimate Croatian authorities ("Persecutor") against taking any measures against the members of the "endangered Serbian people". After that, the Yugoslav Army starts acting in several roles, as "Connection" supplying arms for the "endangered Serbian paople", as the "Rescuer" saving the "endangered Serbian people", protecting criminals and plunderers who violate the Constitution and the law, and as the "Persecutor" of the legitimate Croatian government, suspending its legitimate authority. The "endangered Serbian people" ("Victim") should serve the "Rescuer" and "Guardian of Yugoslavia" as an excuse for overthrowing the "Persecutor" (the legitimate Croatian authorities) and annul the results of the democratic elections which were lost by the Communist party that created and dominated the Army. The "Persecutor" (winner of the elections) could at that time "rely" on the police with its predominantly Serbian and Communist composition, and the disarmed territorial defense units, so it was the right time to destroy him. The truely endangered victim has faith in its own Rescuer (the democratic world) and in a peaceful solution, and wants to avoid conflict at all costs, however he does not succeed. The rebellion of the "endgangered Serbs" escalates and spreads to other parts of Croatia, under the auspices of the Yugoslav Army. This prompts the "Persecutor" (the truely endangered winner of the elections) also to try to find some Connections (arms dealers), and create his real Rescuer (Croatian National Guard, Police Forces of the Ministry of Internal Affairs), because he can accept neither the Modern Federation nor Great Serbia, and the Yugoslav Army and Serbia do not accept confederation. It is either war, or the acceptance of the demands of the "endangered Serbian people" and the "Guardians of Yugoslavia".

The "endangered" and "unarmed" Serbian people starts attacking Croatian cities and villages, killing and massacring members of the legitimate authorities in order to provoke and prove its "endangered situation". The "Rescuer" of Yugoslavia, by this time the "so-called" Yugoslav Peoples' Army, becomes the "Rescuer" of the endangered Serbian people from the fascist Ustashas by killing civilians, children, helpless people, destroying schools, churches, and levelling cities to the ground. Increasing numbers of non-Serbian cadres leave the Yugoslav Peoples' Army which thus becomes the Serbian People's Army.

Instead of a Conclusion

It is difficult to grasp psychodinamics and psychopathology of political cultures in which many different large, medium and small groups exist. This article has done no more than sketched the framework which integrates the main issues concerned with the relations between individual and collective psychopathology, political cultures and war. Behavioral sciences may considerably contribute to decreasing the threat and incidence of war. Education for peaceful political culture as well as for perceiving not only the nation but humankind as the in-group could make a critical contribution here (17).

References

1 Sumner WG. Folkways. Boston: Ginn & Co, 1907, 12-4.

2 Jones NCH. Security through co-operation. Med War 1990;6:191-4.

3 Bullough K. Review of some studies of group behavior relevant global security. Med War 1990;6:182-90.

4 Levine RA & Campbell DT. Ethnocentrism: Theories of conflict, ethnic attitudes, and group behaviour. London: John Wiley & Sons, 1972.

5 Jakovljević M. Psychiatry and politics. Psychiatria Danubina 1991;3:5-15.

6 Toch H. Nasilnici (orig. Violent Men: An inquiry into the psychology of violence). Beograd: Prosveta, 1978.

7 Laing RD. Podijeljeno ja - politika doživljaja (orig. The divided self - the polities of experience). Beograd: Nolit, 1977.

8 Karpman S. Fairy tales and script drama analysis. Transactional Analysis Bulletin 1968;7:39-43.

9 Gabriel RA. Nema više heroja - Ludilo i psihijatrija u ratu (orig. No more heroes - madness and psychiatry in war). Zagreb: Alfa, 1991.

10 Lasch C. The Culture of narcissism. New York: WW Norton & Company, Inc., 1979.

11 Klain E. Yugoslavia as a group. Croat Med J 1992; 33(War Suppl 1) :3-13.

12 Beer FA. Peace against war. New York: Freeman & Co., 1981.

13 Menkes DB. Psychological defence mechanisms and the nuclear arms race: an interactive model medicine and war 1989;5:80-95.

14 Berne E. What do you say after you say hello? London: Corgi Books, Transworld Publishers Ltd., 1987.

15 Rašković J. Luda zemlja (Crazy country). Beograd: Akvarijus, 1991.

16 Le Bon G. Psihologija gomile (orig. Psychologie des fouls). Zagreb: Globus, 1989.

17 Hinde R. Towards integrating the behavioural sciences to meet the threat of violence and war. Med War 1989;5:5-15.

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Towards Understanding the War in Croatia during 1990-1991: Sociopsychologic Perspectives

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Abstract. A critical analysis of Serbia's ongoing predatory war against Croatia from the perspectives of contemporary social psychology is presented. Three principal issues are brought into focus: (a) Serbia's and her allies' moral, political and historical responsibility for this war; (b) the poorly understood motivational sources of large Serbian ethno-centric community and its violent behavior towards other ethnical, political and social groups in close historical and cultural surroundings; (c) preliminary evidence on the size and categories of civilian casualties of this war on the Croatian side, including relative rates of victims caused by genocide. In conclusion, the article calls attention to urgent scheduling of multidisciplinary investigations on the "special case of Yugoslavia", focusing on the current war as well as on many ethnical atrocities evolving on the Balkans, including sociobiologic, cultural, anthropological and sociopsychologic studies and related humanistic disciplines.

Key words: *Croatia; genocide; peace psychology*

Introduction

Among the great many evils man inflicts upon himself, one society upon another, there are two kinds of violence that by far exceed our common sense and limits of moral reasoning. These are *genocide* and *mass killings*.

This paper is an attempt to bring under the looking glass an even more infamous example of mass murder, torture and mistreatment of large groups of people in our times. We will examine Serbia's ongoing aggression on Croatia.There are several very complex issues involved here, each calling for urgent response and understanding from the perspectives of many disciplines, including contemporary peace psychology. There are three pressing questions drawn into the focus of this paper:

First, what is this? How do we define this "new Balkan war"? Second, why is this war happening? Why has Serbia prepared hundreds thousands of men, including "specialized" killers (Chetniks), to go to Croatia to murder, devastate homes and land, and in the process, drive away, into exodus, over half a million innocent civilians, mostly children, women and the elderly? And last, is this war aimed at genocide, ethnocide, or what? If so, how to prove this in order to restrain Serbia from further violence and slaughtering thousands of people more?

Certainly, each of these questions demands volumes of documents, empiric evidence and exhaustive elaborations. None of these fits into a single paper. However, we shall try to respond briefly to each of the above posed questions, including preliminary (analytic) evidence pertinent to the last issue raised, for many moral reasons.

The Anatomy of Serbia's War-mongering: Serbia's Many Paths to War

A New Balkan War - "Incognito"

To begin with, Serbia's ongoing aggression on Croatia has many tentative labels. Yet, it has not

a single - name! Its perpetrators have aimed at winning it in a disguised manner, without any clues about its historical, social and moral identity. This *is* a war against Croatia. Symptomatically, so far it has been called an "ethnical conflict" (by most Western observers and bystanders), an "occupation" (by Croats), a "liberation war" (as Serbia claims), a "Great-Serbian aggression", a "new Balkan war", and "neo-Barbarian invasion on Western civilization", to name but a few improvised labels.

"Playing" Politics in the Dark

Another striking fact of this war is that Serbia and its allies played a disguised and well organized plot in role taking for a long time before their game was discovered. An important element in systematic creating a whole range of role ambiguities of very different kinds and origin has been discovered in Belgrade's persistent refusal to take over their sole responsibility for this war. Behind the great destructions and pillaging all over Croatia, one can unmask Belgrade's lasting Machiavellian directing in the current game of Big-World-Politics, aiming at "restoring justice" on the Balkans, and/or to "save lives" of the "unarmed" 12-percent Serbian ethnical minority in Croatia, and/or to "save Yugoslavia" as the "only home" for all historical ethnical South Slavs, etc.

All these war strategies, as one may guess, represent a deck of many false cards with which the current Belgrade Administration, and more importantly, the lasting coalition of Serbia's intellectual, political and historical religious leaderships, had started playing this war-game a few years ago (cf. Memorandum SANU, 1986), and probably wish to continue it, perhaps at different locations of these same territories (e.g., Bosnia and Herzegovina, Macedonia), or somewhere else.

The Melting Pot of All-Serbian Militant Ideologies

Many wonder where Serbia has gained those devil darings and fanatisms for this war. Where do Serbia's ideological strengths emerge from, to lead, let us say, a "civilian" war, which has no parallel in the history of modern Europe for the last four hundred years?

While this is not the time to go into historical details, it should be clear that this particular war is just one stage in the long process of creating a "romantic" coalition of all-inclusive, Great-Balkanian/Great-Serbian ideologies, coined rather carefully and systematically by four generations of Serbia's ethno-centric, then gradually growing to an ethno-fascist intelligentzia, political and other leaderships, since the middle of the 19th century (1-4).

In short, Serbia's current quest for violence and war in the Balkans has a long history and strong militant ideological network. After this violence, its lasting ideologies are likely to beget other violence, for as long as its political and military misdoings are not put under strict control, either from their own society or by force, i.e. from the outside - both alternatives actually missing for quite a long time. The all-Serbian coalition of ideological and military fanatics (hence the symbolic and common name, "warriors"), who are waging this war against Croatia, are best described by a simple acronym, EFCHER-BOY, a combination of *ethno-fascist-chetnik-religious-bolshevist-yugoslav* ideologies. The first three constituents of this "great" coalition have been gradually evolving for the last 75 years, under the blessing of the allies who created the Treitee de Versailles (in 1919). Later on, from the birth of Tito's "new Yugoslavia" (in 1945), they were further strengthened by association with the last two constituents in a relatively safe political environment. It was by no means just accidentally that, as for the Big-World-Politics, Tito's Yugoslavia was from its birth considered a "special case" among virtually all European societies and political systems, and tender-loving care was shown for it (5,6).

Abuse of High-tech Mass Media in Selling the "Croatian Demon"

Researchers and experts in modern media and mass communication would agree that Belgrade's conditioning of enormous masses of people for this war *via* powerful mass media, both within the country and abroad (e.g., London editions of the *Politika* daily paper, in English; Belgrade-BBC "hot line" on war news), has reached the finest level, using a wide range of psychologic and sociologic knowledge for a single task: how to *demonize* four million people and their leaders elected in legal, democratic elections (!), with a devilish aim to transform them into an archetypal image of a "genocidal nation", as if they are a threat to every single innocent human being on this earth, even including, as Belgrade-BBC's evening news "hot line" tells their audience: "...cutting off Serbian children's fingers and making a rosary of them..." (BBC News, September 1991).

On the other hand, Belgrade and its allies' media war against Croatia represents even stronger evidence on the corruption of modern polities in abusing and trading with the most refined, highest human values and emotions, such as patriotism, feeling of ethnical identity, sense for moral and justice, to name only a few. According to current contemporary critical theory on modern West and its states and societies, such a kind of moral reasoning, ironically enough, tends to occur rarely, if ever, in the minds of today's political and military superpowers (7-11).

Cheating with "Just World Hypothesis"

What is the core element, i.e. the "moving force", in Belgrade's *pro*-war propaganda against Croatia? For the purpose of this paper, we will point out only one important socio-psychologic observation on this matter.

Belgrade's mass media have succeeded, over the past five years or so (since the publication of the Memorandum SANU, 1986), in systematic ma-

nipulation with one rather unique psychological law known in the literature under the label "*blaming others for threatening events*". This is a forceful psychological law, a paradigm in every-day moral reasoning, with possibly large-scale societal, political and ethnical implications if used (or abused) by every-day politics and with manipulations on great masses of people (12-14).

This specific coping strategy sets in action a vast range of misattributions (erroneous, counterfactual causal reasonings) to moral matters, indeed, such as "scapegoating", "victim blaming", "displacement of guilt feeling", etc.

Specifically, we have evidence on Belgrade's very sophisticated psychologic manipulation with the famous "just world hypothesis" paradigm, and its far reaching implications, if used in the context of every-day politics (15). The essence of this law on moral reasoning is that ordinary people, as long as they are (or feel) members of a social group, of any kind, do have (and must have) faith or trust in the structure of moral (just) existence. This gives them the urge for alarming any and all possible social resources, if feeling so, to stand up and fight against all kinds of social acts of transactions which they may feel as inflicting "injustice", i.e. threatening their own beliefs in the existence of a "just world".

Belgrade's "art" in pulling millions of people of extremely heterogeneous personal and social standing, culture, etc, into this dirty war, boils down to corrupt manipulation with two simple statements, put into the immoral rhetoric and language of every-day politics (see, e.g., S. Milošević, V. Šešelj, etc.):

Statement A: "Many 'bad things' are going on in Yugoslavia (as a political metaphor), *including historical injustice done to Serbian ethnical minorities living outside the Republic of Serbia.* (Particularly those "forced to live" in present-day Croatia!)"

Statement B: "The historical all-Serbian ethnical community spread accross these territories (as mythic 'cultural'), *has nothing to do with any of those 'bad things'. The 'truth' is that all the non-Serbian ethnical groups, particularly the Croats* (as a metaphor of 'historical enemy'), *prepare genocide upon all Serbs - here-and-now!"*

How this kind of misattributed (counterfactual) reasoning process "really" works in Belgrade's every-day political rhetoric, should be documented in the political speeches of Serbia's leading authorities. The following quotation from Batrić Jovanović's speech in front of the Serbian Parliament (June 2, 1991) illustrates it quite well: "*... The Croats hate us, the Slovenes don't like us, the Albanians hate us, we are hated by the Moslems and Macedonias. Yet, there are enough of us, Serbs, thanks God, and nobody can do anything against us.*" (In original text: "Mrze nas Hrvati, ne vole nas Slovenci, mrze nas Šiptari, ne vole Muslimani, Makedonci. Nas Srba, hvala bogu, dosta je i nitko nam ništa ne može" (16).

Or, if we go more "down", to the basement of Belgrade's agit-prop primitivism in targeting "Croatia" as "the prime Evil", we would be overwhelmed by similar news headlines in Belgrade's *Politika* (early August 1991), at this time, i.e. when the "real", military attack started all over these territories: "*During the day they* (Croats) *work, at night they kill...*" (In original: "Preko dana rade, preko noći idu ubijati...")

Host Audiences/Targets of Belgrade's Pro-war Propaganda

One may discern at least five targeted populations, all taxed by Serbia's manipulation with the above outlined strong psychologic immoral reasoning ("just world hypothesis"):

(i) All-Serbian ethnical communities in political Yugoslavia. This makes over 8 million people with claimed Serbian ethnical identity plus 1.2 million persons claiming themselves "Yugoslavs", according to Yugoslavia's Census from 1981 (17).

(ii) Serbian ethnical minorities within Yugoslavia (Croatia). Some 531 thousand ethnical Serbs (11.5 percent) are/were citizens of the Republic of Croatia plus about 380 thousand of those claiming themselves "Yugoslavs", according to the 1981 Census. Symptomatically enough, Belgrade's war propaganda has in the first place targeted only highly selected parts of this community, i.e. those in the least developed rural areas of the country (e.g., Knin). With virtually no exception, these are all Serbian ethnical communities whose members are relatively "new colonists", largely unsophisticated (uneducated) people mostly oriented toward traditional values, including strong dependency on authoritarian leadership (18) and above all, strong identification with own (all-Serbian) ethnical groups, yet weak identification with majority groups, no matter who they may be! This makes them (a) ethnically strongly self-identified as "Serbs"; (b) culturally embedded; (c) separated; and (d) largely dissociated from virtually all other cultural, social and political resources, except for their own "Serbian" culture (19).

For Belgrade's political war-making propaganda, all these rather "primitive" Serbian minority groups are counted as an "ideal" human mass in making them hostile toward virtually all surrounding non-Serbian majority groups in a very short time, if needed, and all up to the degree of killing and slaughtering their own non-ethnical neighbors, if told by a strong authority! And this is the point. Virtually all massacres, pillagings, and other bestial wrongdoings all across Croatia's rural areas are committed by local Serbian "neocolonist" groups, together with "imported" Chetnik hordes, all blessed and protected by the almighty Yugoslav Federal Army (YFA), on the command of its generals and officers. (Simptomatically enough, Zagreb Serbian ethnic community was never approached by Belgrade's anti-Croatian agit-propaganda. The reason is in the fact that the Zagreb Serbian community in large makes one of the best educated social strata in

both Yugoslavia and Croatia, thus being inappropriate for and probably irresponsive to such manipulations.)

(iii) Serbian ethnical and/or "Yugoslavian" military officers - active and retired. This is a very special kind of Belgrade's target audiences taxed with their primitivism combined with bolshevic-rooted cruelty and relentles adversarial confrontation, carefully fostered through military training since Tito's partisan days.

(iv) Serbian emigrant groups abroad (Western countries). The social composition of this target audience, as one would expect, is a very heterogeneous one, ranging from unsophisticated blue-collar workers through academicians from the world's most famous universities, such as Harvard in the USA or Sorbonne in France. What is common to them all, is the lasting sentiment of being an "eternal newcomer" to the host society and culture, as an "excuse" for breeding ethno-centric sentiments and sub-cultures (20).

(v) Survivors of Nazi Holocaust and other mistreatments. This is, by all means, another important audience targeted by Belgrade's mass media since World War II, for at least three reasons: first, these communities consist of personalities with strong moral principles and sensitivity to any kind of social injustice; second, they represent powerful social groups in virtually all Western countries, both among the intelligentzia and in business; and third, as an observer has put it, they would "never forgive" the wrongdoings to their people caused by Pavelić's death camps in Croatia during World War II (21). Belgrade's ground strategy in biasing these communities, as one would expect, counts with them as influential bystanders to this war. Namely, it has long been assumed that their moral image and attitudes toward the entire Croatian ethnicum as a lasting "genocidal nation" is well-formed and steady, thanks to their personal memories of the Nazi Germany and related events in the then Croatia. All this trade with human personal values, disasters and attitudes on own political and economic behalf, were skilfully handled by Tito's politocracy, as evidence shows (2,22).

In summary, Belgrade's media and audience mix in recruiting both enormous masses of "actors" and "bystanders" (hidden supporters) to this war, surely demonstrate high-skill professionalism in war-making against Croatia. The results are more than dramatic, both on the combat fields, in deep immorality of the "ways" the killings and large-scale destructions are accomplished (e.g., Vukovar, Dubrovnik), as well as at negotiation tables set for "peace making", under the utmost controversial blessing of the European Community.

The Sociobiology of Hate and Killing

Among the great many things uncovered by this war, is the all-inclusive hate of its "actors" toward every single person or symbol or whatever else associating them with "Croatia", the demonized, ultimate "enemy". This is true for Serbia's war-makers at (former) Yugoslavia's Presidency, and many of those sitting in the Serbian Parliament, for media and audience mixers at Belgrade's studios and news agencies, all down to professional killers who butcher innocent villagers all across the Croatian territories they are attempting to "liberate" from the invisible "demons".

Consequentially, it belongs to the moral and professional responsibility researchers of all fields of humanities, to virtually answer a single pressing question, raised by millions of people victimized in this war: Who are the killers?

For this matter, let us recall one of the famous quotations from Aristotle's *Politics* (c. 328 B.C.): "*Man by nature is a social animal; an individual who is unsocial naturally and not accidentally is either beneath our notice or more than human. Society is something in nature that precedes the individual. Anyone who either cannot lead common life or is so self-sufficient as not to need to, and therefore does not partake of society, is either a beast or a god*" (23). So, Aristotle's challenge is for us in making one single choice in deciphering the kind of "actors" making this war against Croatia: They are either gods or beasts!

What is the basis for all the cruelties that Serbian soldiers and terrorists are commiting on the people of Croatia, and to many innocent men drafted by the YFA and shot for refusing commands to kill (e.g., Hungarian reservists from Voivodina, Albanians from Kosovo). The answer to this important question is unclear. As far as the contribution of certain genetic predisposing factors is concerned, recent research would suggest that certain biologic and genetic contributors are likely to exist, at least accounting for the case of criminogene personalities sliding into delinquency and life-long criminality (24,25). So, this line of reasoning may give some clue to understand some of the criminal acts commited in this war, i.e. commited by certain individuals or groups of "born" criminals who would be inclined to commit killing, robbery, mistreatment, abuse and other criminal acts anyway, i.e. in peaceful times, too. Just how many of such "actors" have taken part in this war, one may only make blind predictions.

What is more important, though, is to approach the whole question from a broader perspective, that is, considering the sociobiologic basis of Serbian "warriors" in this very war (26,27). First and most important, one should seriously consider the fact that the moving force in Serbia's leading "warriors" (i.e. Chetniks, leading military officers) is *hate*, more precisely, *rage*. And, this is an undeniable psychologic fact where "rage", by definition, *represents a pattern of all-destructive, predatory, behavior in animals more easily elicited with decorticated than with normal animals* (28).

Thus, here we have at least one clue that would help to explain the cruelty of this war. Serbian Chetnik groups' cruelty in war situations is more than well-known throughout the history of

this century. *Chetniks (Četnici)* represent Serbian guerilla (*hajduci*), first organized in the late 19th century in self-initiated resistance movements and wars against the Turks. After the Peace Convention with the Turks (1878), Chetniks became especially active in the Balkans, counteracting any political-social process aiming at the formation of a modern state on the territories of (present) Macedonia, Bulgaria and Greece. They kept extending their membership to other ethnicities (e.g., in Bulgaria). During World War II (1914-1918), Chetniks were part of the Serbian Army, and were actively involved in the heavy battles near Solun. Between the two world wars, Chetniks were self-organizing at higher levels of Serbia's royal hierarchy, even constituting one of most reactionary lobbies in the Serbian Parliament (*vojvoda* Kosta Pečanić and others). During World War II (1941-1945), headed by their chief leader, *vojvoda Draža Mihajlović*, Chetniks spread their organization virtually all over the territories of (former) Yugoslavia, including Slovenia, Dalmatia, Montenegro, Bosnia and Herzegovina, etc. As early as 1941, Chetniks were aiming at the creation of *Great Serbia* by shrinking Croatia to only two minor territories (Zagreb with its surroundings and Zagorje), and accepting Slovenia's striving for independence. All other ethnical groups and/or "minorities" on the territories of Croatia would be banned to physical extermination, according to Chetniks' rule. Throughout World War II, Chetniks were allies to both occupiers of the Balkans and the Mediterranean (Hitler's Germany and Mussolini's Italy). "*Their own crimes commited on Serbs, the Chetniks have attributed to Croatian people as a whole, and declared their total war against Croats to extermination. In gearing up ethnic and religious animosity, Chetnik battalions in Serbia, Bosnia and Herzegovina, Montenegro, Sandžak and Croatia (Dalmatia and Lika), have commited numerous crimes, mass murders and extermination of Croatian and Moslem populations of many settlements, including crimes against their own people in Serbia proper, in their fights against (Tito's) partisans*" (italics by A.B.) (29).

Serbia's instrumental manipulation with ethnos-linked hate and rage of their own people has two means: one is the above described monstrous machinery of psychologic manipulation *via* high-tech mass media. The other equally forceful means one should find in the very psychology of the mob, that is, in the forces and destructive powers of a crowd whose behavior is out of any social control whatsoever (30).

As an undeniable characteristic of the Serbian ethnic culture and behavior is crowding, indeed, one should not wonder that their social inclination for "fighting" represents a peculiar social norm. Accordingly, their interest in "real" war making is a matter of *learning by committing aggression* (31). This one of the motivational sources for so many Serbs for this war apparently emerges from a special kind of *social mimicry*, i.e. one of the fundamental schemata for collective behavior in which any personal responsibility for any kind of misdoing, including harming others, is being abolished. This means that no one accepts responsibility for anything! Their conduct may end up in mean, bestial collective actions, such as completely uncontrolled devastation and predatory behavior, including genocide in situations of large group conflicts, such as war.

Actions committed by mobs, such as witnessed in this war, belong to the category of aggressive and predatory behavior in decorticated animals. While "decortication", in the present case, surely has a symbolic meaning, yet, if one recalls thus far the most bestial crimes seen in this war committed by Chetnik and/or other hordes of Serbian "warriors" under the influence of alcohol, their aggressive behavior becomes quite clear, at least, on the grounds of sociobiologic explanation. It has nothing to do with "reason", as one of sociocultural endowments of our species which breeds on personal control and individual intellectual powers rather than on sociobiologic "collectivism" of any kind (32).

To summarize, introducing sociobiologic perspectives in understanding the utmost brutality of Serbia's "warriors" during this conflict seems necessary. The reason lies in the necessity to decipher the very characteristic history and peculiar "subculture" of the Serbs' aggressive behavior when it supersedes any strict social (authoritarian) control, such as is the case in this war, indeed. The well documented series of Chetnik genocides throughout this century prove the necessity for such sociobiologic perspectives. Another, certainly less known historical document supportive to such views, goes back to the middle of the 19th century, when Serbian "colonists" (i.e. a militant group without strong authoritarian control of their "own"), living in the surroundings of Zenta, a small Hungarian city (now Senta in Voivodina), in the war-time period of the Kossuth's Hungarian Liberation Movement, on February 2, 1849, during one single night had massacred some 2,500 innocent Hungarian civilians, residents of this small town. Their victims were, in effect, co-residents of the same town (33). This represents the very first Serbian genocide over another ethnical group in the history of modern national states, to the best knowledge of author.

The Scope and Targets of Hate and Killing: Two Important Concepts Defined

One of the most frequently used and abused terms, particularly in this war, is genocide. However, few lay and involved professionals (e.g., mass media people) could define its exact meaning. Let us clear up this infamous "catch-word", broadly abused in Belgrade's immoral war against Croatia for the last 45 years.

Genocide

Raphael Lemkin, a jurist, has originally proposed this term (in 1933), composed of the Greek

Table 1. The wounded and the dead on the Croatian side in the 1990-1991 war until November 11, 1991

	Croatian Army	Civilians	Total
Wounded	3,972	2,486	6,458
Dead	579	529	1,108
Total	4,551	3,015	7,566
Wounded %	61.5	38.5	100.0
Dead %	52.3	47.7	100.0
Total %	60.2	39.8	100.0

From: Medical Corps Headquarters of the Republic of Croatia, Tables 1 and 2: The Overview of Casualties in the War against Croatia, August 17 - November 11, 1991.
Note: Casualties recorded in Croatia in the second half of November 1991 (over 3 thousand persons) are not included.

genos (race, tribe) and the Latin *cide* (killing), from his crusading through the major cruelties and war crimes done during this century. As the result of Lemkin's efforts, the first version of Genocide Convention, passed on December 11, 1946 by the United Nations' General Assembly, says: "Genocide is a denial of the right of existence of entire human groups... Many instances of such crimes have occurred, when racial, religious, political and other groups have been destroyed, entirely or in part" (34).

Mass Killing

From a psychological point of view, *mass killings* have somewhat different built-in social dynamics and moral reasoning than genocide, stresses an American peace psychologist (31).This is when "killing members of a group have no intention and plan to eliminate the whole groups of people as social, ethnic, religious or political entities, i.e. when killing large number of people occurs, yet without a precise definition of group membership" (31).

Who Is Committing Genocide on Whom? - A Look at Croatia's Casualties

To aid in early detection of many potential misattributions and biased ethnical reasoning on the "causes" of this war, including jury decision makings of different kinds and levels (35), there is a series of statistical and forensic evidence on Croatian casualties in this war, covering the period from late July/early August until mid-November of 1991, as displayed in Tables 1-3.

Data shown in Table 1 present the distribution of two categories of casualties: on one hand, the frequency distribution of the killed and wounded among the Croatian forces (Croatian National Guard and Croatian Police), and on the other, the civilian side of the population.

Table 2 provides cumulative statistics on the exodus of Croatia's civilian resident populations from their geopolitical territories, in the period between May through mid-November 1991.

The next series of data shows the distribution of two categories of civilian deaths during the first three months of war escalation (late July until late October), a total of 535 cases, all drawn from forensic data files of the Croatian Medical Corps Headquarters (36,37): one category consists of the victims (324 persons) of planned massacres (i.e. genocidal acts), according to forensic and police evidence. The other is the category of victims (211 persons) who died from causes other than terroristic massacres, e.g., victims of military mortar attacks, air raids, snipers, etc (Table 3).

And finally, Table 4 shows forensic findings of a selected number of victims of genocide committed by Serbian "warriors".

The following major inferences should fit the scope and purpose of this paper: First, it becomes clear that this war has forced into exodus an enormous part of civilian population (over 500 thousand people), all residents of Croatia's historic and current geopolitical territories (38-40). Large masses of Serbian minority communities had also been displaced from their homes to the territories of Serbia proper (i.e. some 120 thousand people) long before the large-scale war started (i.e. January-March 1991).

Second, civilian casualties, if compared to the scores of the dead and wounded among the Croatian armed forces (Guard and Police) (Table 1),

Table 2. Refugees and displaced persons in the Republic of Croatia, August-November 1991

	Aug 1	Sep 1	Oct 1	Oct 30	Rates
Endangered place					
Osijek	3,057	11,024	16,658	19,783	10.2%
Vukovar	817	10,085	14,808	18,983	9.8%
B. Manastir	0	4,682	8,725	9,815	5.1%
Vinkovci	644	4,138	7,646	14,433	7.4%
Petrinja	217	1,480	6,624	8,656	4.5%
Glina	525	2,771	4,418	6,308	3.2%
Other	4,738	19,545	61,498	116,225	59.8%
Total	9,638	53,725	120,377	194,203	100.0%
Place of displacement					
Zagreb	1,416	1,039	32,710	53,990	27.8%
Rijeka	554	8,736	15,377	19,504	10.0%
Osijek	3,195	9,924	17,044	22,010	11.3%
Varaždin	204	4,341	7,863	8,648	4.5%
Split	404	2,332	9,944	22,408	11.5%
Sisak	182	1,257	5,169	14,709	7.6%
Zadar	421	3,514	13,737	20,680	10.6%
Other	3,262	10,479	18,533	32,254	16.6%
Total	9,638	53,725	120,377	194,203	100.0%
Total in Croatia: 194,203 (43.8%)					
Total abroad: 248,870 (56.2%)					
Serbia: 120,000 (48.2%)					
Slovenia: 20,789 (8.4%)					
Bosnia and Herzegovina: 58,000 (23.3%)					
Hungary: 45,000 (18.1%)					
Austria: 4,000 (1.6%)					
Czecho-Slovakia: 1,081 (0.4%)					

From: Ministry of Labor and Social Welfare, Office of Refugees of the Republic of Croatia, Pro Memoria (November 15, 1991).

Table 3. Distribution of Croatian civilian casualties according to victim categories and months (July 22 - October 25, 1991)

Week	Victims of genocide	Victims of mass killings	Total
Before Aug 1	4	0	4
Aug 01-15	97	1	98
Aug 16-31	22	22	44
Sep 01-15	71	27	98
Sep 16-30	10	49	59
Oct 01-15	65	94	159
Oct 16-25	55	18	73
Total	324	211	535
(%)	60.6	39.4	100.0

From: Judaš, October 28, 1991.

Examples (excerpts from data archives):

For genocide acts: September 1, 1991. In the village of Popovac (Baranja), Serbian terrorists killed 3 citizens and wounded 2 more, while in the nearby village of Kozarac one civilian was killed, and one man and one woman (husband and wife) were hanged (score: 3+2=5 victims).

For mass killing: September 1-2, 1991. During the heavy mortar attack on Daruvar, three civilians were killed (T.I., Z.B. and V.P.), and six more wounded (M.P., V.P., V.Z., Z.H., S.P. and V.S.) (score: 3 victims).

Table 4. Selected medical (forensic) data on slaughters of civilians in Croatia, August 1 - October 25, 1991

Site of violence - Slavonia:

On September 3, 1991, Serbian terrorists attacked the villages of Cetekovac, Cojlug and Balinci near Podravska Slatina in Slavonia. The attack lasted eight hours. The terrorists entered the village and killed 2 policemen and 21 civilians left in the village. Most of the inhabitants fled their homes before the attack, and only those who could not or would not leave remained.

Decedent No. 2:

J.B., male, aged 65, autopsy code Kir:1633/91:S-451/91.

Pathoanatomical diagnosis:
- stabbing wounds of the neck and chest
- skin excoriation of the right side of the face and the neck and the left elbow
- excoriation and hematoma of the chest
- fracture of the sternum
- generalized atherosclerosis, medium grade
- putrefaction of the body

Cause of death:
- stabbing wound of the right side of the neck and chest with subsequent hemorrhage in the right hemithorax

Decedent No. 3:

M.R., female, aged 63, autopsy code Kir: 1633/91:S-445/91.

Pathoanatomical diagnoses:
- gunshot wound of the chest, abdomen and the left arm
- hemorrhage into the peritoneal cavity

Cause of death:
- gunshot wounds of the chest, abdomen and the left arm

From: ref. 41.

exceed all statistical predictions (i.e. over 50 percent by now, as compared to 5-6 percent of civilian losses during World War II, on these same territories, as set to a comparable time basis). Moreover, about 30 thousand Croatian civilians are "missing" from all the data records thus far available to the Croatian authorities.

And finally, evidence suggest that, in the many cases of violence inflicted upon civilians, genocidal acts are interwoven with military actions aimed at mass killings.

Instead of a Conclusion

Serbia's recent military attack on the Republic of Croatia represents one of its lasting, well prepared aggressions aiming at occupation of large parts of its geopolitical territory. However, as sociopsychological analysis indicates, Serbia's current war mongering appears to originate from a complex interplay of three deep-rooted motivational sources conducive to mass destruction and large-scale violence, including genocide. These are: (a) difficult life conditions conductive to maladapted political response of Serbia's current political leadership to cope with overwhelming economic, social and political crisis typical for the entire (former) Yugoslav society in transition; (b) specific cultural and personal preconditions in political, religious and local community leaders with enhanced militant ethno-centerism and self-imposed separatism from the larger cultural and political environments in the modern Balkans; and lastly, (c) the lasting presence of a traditionally authoritarian and totalitarian societal-political organization left largely unchecked in its large-scale political activism at both local and international levels. Both the motivational forces and the strength of group violence politically escalated in this war, make Serbia's behavior in the Balkans threatening in its striving for total hegemony and further aggression toward its neighboring states and social communities (e.g., ethnical minority groups), both within and beyond its current political borders.

A more systematic multidisciplinary empirical research seems to be urgently needed to provide appropriate political means and sociocultural resources in helping Croatia as well as other societies, to oppose further evolvement of the Serbia's self-imposed predatory behavior on these territories.

References

1 Artuković M. Ideologija srpsko-hrvatskih sporova (Srbobran 1884-1902). Zagreb: Naprijed, 1991.

2 Čović B. Izvori velikosrpske agresije: rasprave, dokumenti, kartografski prikazi. Zagreb: August Cesarec - Školska knjiga, 1991.

3 Korsika B. Srbija i Albanci: Pregled politike Srbije prema Albancima od 1913. do 1945. godine, sv. 2. Ljubljana: Časopis za kritiko znanosti, 1989.

4 Moljević S. Homogena Srbija. U: Vojno-istorijski institut. Zbornik dokumenata i podataka o narodnooslobodilačkom ratu Jugoslavije. Beograd: Vojno-istorijski institut, 1981;1-10.

5 Bibo I, editor. Valogatott tanulmanyok. Vols. 1-3. Budapest: Magveto, 1986.

6 Hayward JE, Berki BN, editors. State and society in contemporary Europe. Oxford: Martin Robertson, 1979.

7 Staub E. Persian Gulf conflict was reflection of stormy undercurrents in US psyche. Psychol Internat 1991; 2:1-8.

8 Barath A. Two biblical puzzles: creativity and health. Radovi Med Fak Zagreb 1991;32:97-101.

9 Bloom A. Sumrak američkog uma. Beograd: Prosveta, 1990.

10 Bibler VC. Mislenije kak tvorcenstvo. Moscow: Politizdat, 1975.

11 Mumford L. The myth of machine techniques and human development. London: Secker and Warburg, 1967.

12 Higgins RL, Snyder CR. Reality negotiation and excuse making: the health connection. In: Snyder CR, Forsyth DR, editors. Handbook for social and clinical psychology: the health perspective. New York: Pergamon, 1990;79-95.

13 Lipe MG. Counterfactual reasoning as a framework for attribution theories. Psychol Bull 1991;109:456-72.

14 Tennen H, Affleck G. Blaming others for threatening events. Psychol Bull 1990;108:209-32.

15 Lerner MJ, Miller DT. Just world research and the attribution process: Looking back and ahead. Psychol Bull 1978;85:1030-51.

16 Milardović A. Duh velikosrpske političke retorike. Publicistika br. 2: Slavonija i Baranja. Zagreb: Vjesnik, kolovoz 1991.

17 SGJ '83. Stanovništvo. U: Statistički godišnjak Jugoslavije 1983. Beograd: Beogradski izdavačko-grafički zavod, 1983:114.

18 Snarey JR. Cross-cultural universality of social-moral development: a critical review. Psychol Bull 1985;97:202-32.

19 Phinney JP. Ethnic identity in adolescents and adults: review of research. Psychol Bull 1990;108:499-514.

20 Csepeli G. Csoporttudat-nemzettudat. Budapest: Magveto, 1987.

21 Irek M. HTV-Press conference: news report (reported by G. Jureško). Zagreb: Vjesnik, August 5, 1991:8.

22 Vlašić B, Vojinović A. Križni put. Zagreb: Start, 1991.

23 Aronson E. The social animal. New York: Freeman, 1984.

24 Fisher-Dilalla L, Gottesman G. Biological and genetic contributions to violence - Widom's untold tale. Psychol Bull 1991;109:125-9.

25 Widom CS. The cycle of violence. Science 1989;244:160-6.

26 Bereczki T. A szociobiologia tarsadalomkepe. Janus 1987;3:1-101.

27 Passingham RE. The human primate. Oxford: Freeman, 1982.

28 Young PT. Emotions in man and animal. New York: Krieger, 1973.

29 Jugoslavenski leksikografski zavod. Opća enciklopedija, No. 2 - C_Fob. Zagreb: Jugoslavenski leksikografski zavod, 1977.

30 Gibbs JP. The sociology of deviance and social control. In: Rosenberg M, Turner RH, editors. Social psychology: sociological perspectives. New York: Basic Books, 1981;483-524.

31 Staub E. The roots of evil. The origins of genocide and other group violence. Cambridge: Cambridge University Press, 1989.

32 Koestler A. The act of creation. New York: MacMillan, 1964.

33 Glatz F, editor. Magyarok a Karpat-medenceben (2. kiadas). Budapest: Historia konyvek, 1989.

34 Kuper L. Genocide: its political use in the twentieth century. New Haven: New Haven University Press, 1981.

35 Penrod S, Hastie R. Models of jury decision making: a critical review. Psychol Bull 1979;86:462-92.

36 Judaš M. Civilian victims caused by Yugoslav Army attacks. (Incomplete chronological list). Zagreb: Medical Corps Headquarters of the Republic of Croatia, October 28, 1991.

37 Judaš M. Slaughters of innocent Croatian civilians. Zagreb: Medical Corps Headquarters of the Republic of Croatia, October 28, 1991.

38 Andrassy E et al, editors. Magyarorszag - Verecketol napjainkig: Tortenelem. (Elso kotet). Budapest: Franklin, 1918.

39 Horvat J. Politička povijest Hrvatske. Zagreb: August Cesarec, 1990.

40 Roksandić D. Srbi u Hrvatskoj od 15. stoljeća do naših dana. Zagreb: Vjesnik, 1990.

41 Marcikić M, Kraus Z, Dmitrović B, Mošunjac M, Marušić A. Civilian massacre near Podravska Slatina. Croat Med J 1992; 33(War Suppl 1):49-54.

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Children Casualties in the War against Croatia

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Abstract. Children casualties in the war against Croatia are chronologically listed, with the initials, age and sex of the victims. By January 4, 1992, the casualty toll among children amounted to 46 killed and 302 wounded. This figure, however, does not indicate the total number of children casualties in the war against Croatia. The war against Croatia in which civilians are being killed and forced to flee their homes, the war in which hospitals, schools, kindergartens, homes for the elderly, churches and cultural monuments are intentional targets, is daily taking its heavy toll among children.

Key words: *child; chronology; Croatia; victims; war*

The first victim of the war against Croatia was a girl killed on July 5, 1991; that very day five children were wounded.

July 5, 1991 - A girl (J.K., aged 16) from Gornja Budičina near Petrinja was shot dead in front of her house. Her sister and her sister's fiancee, member of the Minsitry of Internal Affairs troups who was the target of the attack, were wounded on that occasion.

July 22, 1991 - A girl (J.K., aged 16) was killed during a mortar attack on the village of Novi Jankovci.

A boy (F.H., of unknown age) from the village of Novi Čačkovci near Vukovar was wounded on the same day.

July 26, 1991 - A boy (D.L., aged 15) was wounded by gunshot fire in Slavonski Brod.

July 28, 1991 - A boy (S.V., aged 13) was wounded in a gunshot fire in Pakrac.

August 2, 1991 - During a mortar attack on Osijek, a boy (R.R., aged 9) was wounded.

August 16, 1991 - A boy (D.G., aged 15) suffered explosive injuries in the village of Novo Selo, near Vinkovci.

August 24, 1991 - During a mortar attack on the village of Ernestinovo, near Osijek, two boys (M.B., aged 10 and T.B., aged 12) were wounded.

August 26, 1991 - During a mortar attack on Daruvar a girl (M.LJ., aged 11) was killed. Her father was killed on that occasion too, and her sister (D.LJ., aged 17) was wounded. That very day a boy, (D.P., aged 13) was wounded in the village of Velika Kopaonica.

In a mortar attack on Borovo Naselje, brother and sister (D.B., aged 11 and J.B., aged 16) were wounded, whereas their mother was killed in an attempt to protect them with her body.

August 27, 1991 - During a mortar attack on Borovo Naselje, sisters (G.K., aged 12 and I.K., aged 16) were wounded. In Virovitica a boy (K.V., aged 5) was wounded by an explosion.

August 28, 1991 - A boy (R.J., aged 8) was wounded in Vukovar.

August 29, 1991 - A girl (S.E., aged 15 months) was wounded, while her mother was shot dead by sniping rifle fire in Osijek. During a mortar attack on the village of Viduševac a disabled boy without both arms (D.T., aged 12) was

wounded. His mother and aunt were killed on that occasion.

August 31, 1991 - In a coordinated assault by mortars, cannons and artillery fire from warships on the Danube river on Vukovar, ten children were wounded: Six boys (T.R., aged 4, S.R., aged 10, V.M., aged 7, J.B., aged 13, N.Č., aged 8 and D.Š., aged 10), and four girls (V.M., aged 6, N.G., aged 16, S.L., aged 13 and M.B., aged 5).

September 2, 1991 - A boy (I.J., aged 8) was wounded in the village of Kruševo in the vicinity of Zadar.

September 3, 1991 - A girl (I.V., aged 13) was killed when the fifth floor of an apartment house was hit with a tank grenade from federal army barracks in Osijek.

That very day a boy (D.D., aged 3) was wounded in Osijek, and another (Z.L., aged 15) in the village of Berak.

During an artillery attack on Vukovar, a boy G.Š. (aged 3) was wounded.

September 4, 1991 - A Croatian soldier accidentally wounded a girl (aged 6) by a rifle shot in Podravska Slatina.

September 5, 1991 - During an artillery attack on Osijek, three boys (T.K., aged 10, M.M., aged 6 and K.R., aged 10) were wounded, while a boy (D.O., aged 11) was wounded the following day.

September 8, 1991 - A girl (I.M., aged 13) was wounded in Osijek.

September 9, 1991 - A boy (I.O., of unknown age) was wounded in the village of Budak near Šibenik.

September 11, 1991 - A boy (Z.M., aged 13) was wounded in Osijek, and another (I.M., aged 12) in Virovitica. A boy (D.S., aged 15) wounded himself playing with his brother's gun in Zadar.

September 13, 1991 - A boy (D.Č., aged 7) was killed by a tank grenade in front of the *Borovo* factory in Vukovar, while a group of civilians were filling protective sacks with sand. Eight civilians were killed and 6 were wounded on that occasion.

September 14, 1991 - A girl (N.Č., aged 2) and a boy (A.V., aged 16) were wounded in Vukovar in an air raid and artillery attack.

September 15, 1991 - A girl (M.P., of unknown age) was killed in an artillery attack on Drniš. Another girl (A.M., aged 17) was wounded in an artillery attack on Nova Gradiška. A boy (I.K., aged 8) was wounded the following day.

During an artillery attack on Vinkovci, two girls (I.M., aged 7 and I.N., aged 6) were wounded.

September 16, 1991 - A boy (B.M., aged 2) was wounded in Osijek, and another (D.Š., aged 10) in Vukovar.

September 17, 1991 - In an artillery attack on Nova Gradiška, a boy (K.B., aged 15) was wounded, and another boy (D.V., aged 12) was wounded during an artillery attack on Vinkovci. A boy (M.I., 8 months old) was wounded in Virovitica on the same day.

September 18, 1991 - A boy (N.B., aged 7) from Vrgorac, near Makarska, suffered severe burns when fire broke out in a shelter during an attack on the Split area. A boy (P.T., aged 12) from Čakovec wounded himself setting a bomb fuse on fire.

September 19, 1991 - During an artillery attack on Osijek, a girl (K.Š., aged 11) was wounded. A boy (T.K., aged 10) was wounded during an air raid on the village of Donji Andrijevci. Another boy (R.R., aged 14) was wounded during an artillery attack on Šibenik.

September 20. 1991 - During an air raid on the village of Krasno, a boy (M.S., aged 12) was killed by cluster war plane bombs, while his sister (A.S., aged 6) was wounded.

During mortar shelling of Pakrac, a boy (A.B., aged 13) was wounded. A girl (D.M., aged 15) was hurt.

September 21, 1991 - During an artillery attack on Vinkovci, a boy (M.J., aged 15) was killed, while two sisters (B.B., aged 14 and LJ.B., aged 10) and their brother (I.B., aged 8) were wounded.

A girl (K.K., aged 9) suffered injuries playing with bullets near an open flame.

During a mortar attack on the village of Zaton near Šibenik, a boy (F.S., aged 6) was wounded. In an air raid on Nova Gradiška two boys (S.J., aged 17 and K.G., aged 17), were wounded.

September 22, 1991 - In a bombing raid and rocketting of *Zagreb* hotel in Karlobag, which accommodated refugees from the Lika province, a boy (I.S., aged 10) was killed, while a girl (M.D., aged 14) and a boy (I.P., aged 17) were wounded.

During an air raid on Pakrac a boy (S.D., aged 12) was wounded. While playing with fire arms belonging to one of the household members, a girl (L.M., aged 10) was killed. A boy (V.S., 18 months old) was wounded by grenades fired from the *Borongaj* federal army barracks in Zagreb, whereas his mother was killed.

September 23, 1991 - During an artillery attack from one of the federal army barracks in Šibenik, a boy (V.P., aged 14) was killed, and a girl (A.B., 8 months old) was wounded.

September 24, 1991 - A boy (D.H., aged 14) was wounded by a grenade fired from a warship in the Split waters. During an artillery attack on Vukovar, a girl (D.J., aged 6) was wounded, while a boy (M.B., aged 9) was wounded in Vinkovci and another (M.D., aged 9) in Nuštar near Vinkovci.

September 25, 1991 - A girl (LJ.B., aged 14) was wounded by a sniping rifle bullet on a bus terminal in Split, while a boy (V.M., aged 15) was wounded in the area of Split.

September 26, 1991 - During an artillery attack on Šibenik, a boy (G.M., aged 7) was killed. In a mortar attack on *Grabovac* motel and a campsite near Slunj, which accommodated the refugees from the neighbouring Croatian villages, a boy

(I.Š., 4 months old) and his two female cousins, (D.Š., aged 16 and J.Š., aged 17) were killed.

A boy (R.J., aged 13) was wounded by gunshot fire in Slavonski Brod.

September 27, 1991 - During heavy artillery fire on the village of Gat near Valpovo, five children were wounded: one girl (T.A., aged 12) and four boys (S.K., aged 12, A.V., aged 10, and brothers I.S., aged 14 and I.S., aged 12). A boy (M.M., aged 14) was wounded by sniping rifle fire in Osijek.

September 28, 1991 - Playing with an unexploded bomb found near the federal army facilities in Našice, a boy (M.R., aged 6) was fatally wounded, whereas a girl (S.S., aged 10) was hurt.

A girl (M.J., aged 13) sustained injuries while playing with firearms in the village of Brčina.

September 29, 1991 - A boy (S.B., aged 16) was hurt playing with firearms in Zadar.

September 30, 1991 - A boy (T.S., aged 17) was killed in an explosion of an unactivated artillery grenade which had been fired the previous day in an artillery attack on Bjelovar from the nearby federal army barracks. His brother (J.Š., aged 12) and two other boys (M.K., aged 4 and D.Ž., aged 14) were wounded on that occasion.

During an artillery attack on Vukovar, brother and sister (J.K., aged 11 and R.K., aged 10) were wounded.

A boy (J.LJ., aged 15) was wounded in Brnjice near Šibenik.

October 2, 1991 - During a mortar and artillery attack on the Osijek residential area *Jug II*, a girl (G.V., aged 16) was killed, while another (S.K., aged 15) was wounded.

During an attack on Vinkovci a boy (Z.C., aged 17) was wounded, while another (D.L., aged 14) was wounded in Vukovar.

October 3, 1991 - During heavy artillery fire on Vukovar brother and sister (G.Š., aged 5 and T.S., aged 7) were hurt, while a girl (D.M., aged 16) was wounded in Osijek.

During incessant artillery fire on Komarevo near Sisak, a boy (Z.C., aged 16) was wounded. A boy (T.V., aged 14) was hurt in an explosion of a pressure-activated anti-personnel mine near Senj.

October 4, 1991 - During a mortar attack on the village of Petrijevci near Osijek, a boy (D.B., aged 15) was hurt. In an artillery attack on Vinkovci three boys (K.M., aged 8, R.Ć., aged 17 and R.Š., aged 15) were wounded.

A boy (G.K., aged 9) was wounded in an air raid on the village of Jarmina near Vinkovci.

During a mortar attack on the village of Barilović near Duga Resa, a boy (I.T., aged 12) was wounded. A girl (K.H., aged 11) was accidentally wounded having activated an explosive charge in Trogir.

A boy (T.P., aged 7) was injured by gun-fire in the village of Sonković near Šibenik.

During an artillery attack and air raid on Zadar a boy (D.G., aged 12) was wounded.

October 5, 1991 - A boy (D.A., aged 18) was wounded during an artillery attack and bombing raid on Vinkovci, while boys (J.G., aged 13) and (J.G., aged 13) were wounded in Vukovar.

During a mortar attack on Osijek, a boy (H.J., aged 14) was wounded, and a girl (D.V., aged 11) was wounded in Ernestinovo.

A girl (S.Š., aged 6) was wounded in Velika Gorica.

October 6, 1991 - In an air raid on Velika Buna, a boy (Ž.D., aged 14) was hurt, and a girl (M.K., aged 4) was wounded in the area of Velika Gorica.

A boy (T.J., aged 15) was wounded by a bullet in the village of Ivanovo selo near Grubišno Polje.

In an artillery attack and air raid on Zadar, a girl (N.R., aged 14) was wounded, while five boys (P.T., aged 15, H.Š., aged 11, M.K., aged 16, D.Š., aged 7 and B.F., aged 8) suffered injuries.

October 7, 1991 - During a heavy artillery attack on Vinkovci, a boy (M.T., aged 15) was killed. A girl (J.Č., aged 15) was killed in a bombing raid on the village of Strizivojna.

A girl (I.B., aged 6) sustained explosive wounds in Ključić Brdo, and a boy (M.Š., aged 3) was wounded in Velika Gorica.

During an artillery attack on Vukovar, a boy (V.M., aged 2) was wounded. A boy (P.T., aged 9) was wounded by an explosion of a bomb in an air raid on the village of Ivankovo near Vinkovci.

October 8, 1991 - Brother and sister (G.R., aged 16 and M.R., aged 12) were wounded in an artillery attack on Vinkovci. A boy (M.Š., aged 11) was wounded in Osijek.

During an artillery attack on Karlovac, a boy (M.Š., aged 2) was hurt.

October 9, 1991 - In Zadar, a boy (S.L., aged 15) wounded himself by accident when a mine fuse exploded in his hand.

October 10, 1991 - Girls (A.O., aged 16 and S.V., aged 14) were wounded in Vukovar, and a boy (D.S., aged 14) was wounded in Dubrovnik.

October 11, 1991 - During a heavy artillery attack on Vukovar, a girl (Ž.J., aged 16) and a boy (T.M., aged 8) were killed.

Boys (M.D., aged 13 and I.D., aged 11) were wounded in Velika Gorica, and a boy (A.B., aged 16) was wounded in Zadar.

October 12, 1991 - During incessant artillery attacks on Vukovar, a boy (T.G., aged 11) was wounded. A boy (D.T., aged 17) suffered gunshot injuries in the village of Ždralovi near Bjelovar.

October 13, 1991 - A boy (K.H., aged 15) killed himself by accident due to careless handling of firearms in Križevci.

A boy (D.R., aged 14) was injured by gun-fire in the Split area.

October 14, 1991 - During heavy mortar shelling of Osijek, a boy (I.K., aged 15) was wounded.

October 15, 1991 - A girl (K.B., aged 7) was wounded in an artillery attack on Sisak. A boy (Ž.P., of unknown age) suffered gunshot injuries in the vicinity of Bjelovar.

A boy (D.R., aged 14) was wounded by a bullet in Nova Gradiška.

October 16, 1991 - During a heavy artillery attack on Osijek a girl (V.B., aged 16) and a boy (K.K., aged 16) were killed, while a boy (S.Š., aged 12) was wounded.

A boy (D.B., aged 16) was wounded in an artillery attack on Valpovo.

October 17, 1991 - A girl (K.B., aged 16) was wounded in Vinkovci, and a boy (B.M., aged 4) was wounded in Split.

October 18, 1991 - During an artillery attack and air raid on Vukovar, a boy (I.K., 6 months old) was killed and another (J.B., of unknown age) was wounded.

A girl (Ž.R., aged 15) was wounded in Osijek. A boy (Z.T., aged 15) was wounded in an explosion of a grenade in Lipovljani near Novska.

During an artillery attack on Karlovac a girl (S.Š., aged 6) and a boy (M.S., aged 14) were hurt.

October 21, 1991 - A boy (I.M., aged 16) was killed by gunshot fire in Garešnica. A boy (I.K., aged 12) was wounded in Vukovar, and another (A.V., aged 12) was wounded in Jaska.

A boy (M.V., aged 6) wounded himself by accident in an explosion of a hand grenade in the vicinity of Krapina.

Two boys (S.Š., aged 12 and B.V., aged 12) were wounded when a mine exploded in an ammunition storehouse of the former *Smiljevac* federal army barracks in Zadar.

October 23, 1991 - A girl (M.L., aged 2) and two boys (I.G., aged 13 and J.M., aged 13) were wounded in the area of Velika Gorica.

October 24, 1991 - During an artillery attack and air raid on Sisak, a girl (Ž.V., aged 15) was killed, while a girl (N.S., aged 5) was wounded in Greda near Sisak by an explosion of a cluster bomb.

A boy (D.J., aged 12) sustained gunshot injuries in Ludbreg, and another (M.M., aged 15) was wounded in Split.

October 25, 1991 - During an attack on the village of Jarmina, a boy (S.B., of unknown age) was wounded, and a girl (E.M., aged 16) was wounded in Vinkovci.

A girl (D.L., aged 15) was wounded in Split.

October 26, 1991 - A boy (M.C., aged 14) wounded himself by accident due to careless gun handling in the vicinity of Podravska Slatina.

October 27, 1991 - During artillery fire on Vinkovci a girl (R.Z., aged 6) and a boy (N.P., aged 12) were killed.

A boy (M.K., aged 13) was wounded in Vukovar.

October 28, 1991 - During an artillery attack and air raid on Osijek, four girls (K.B., aged 9, D.G., aged 10, K.K., aged 17 and K.H., aged 10) were wounded.

October 29, 1991 - During an artillery attack and air raid on Vukovar, when a bomb hit a shelter, two boys (M.K., aged 13 and D.P., aged 12) were killed, while seven children were wounded. Two girls (A.P., aged 9 and M.R., aged 2) and a boy (J.T., aged 8) were wounded in Split.

October 30, 1991 - A boy (S.D., aged 9) suffered explosive wounds in Primošten.

October 31, 1991 - During an artillery attack on Valpovo, a girl (A.O., aged 12) was wounded.

A boy (S.S., aged 5) was wounded in an artillery attack on Gruž in Dubrovnik.

November 1, 1991 - Four children were killed in Mokošica near Dubrovnik; brother and sister (H.G., aged 11 and K.G., aged 13), as well as brother and sister (M.Š., aged 4 and M.Š., aged 9). All of them were killed, together with the mother of the younger children, in a car accident while trying to flee Mokošica in panic under heavy grenade fire.

During an artillery attack on Vinkovci, brother and sister (I.B., aged 1 and M.B., aged 2) were wounded.

November 2, 1991 - During an artillery attack on Vukovar, brother and sister (M.Š., aged 8 and M.Š., aged 4) were wounded, while in artillery fire on Osijek, two boys (V.B., aged 14 and F.H., aged 12) were hurt.

November 3, 1991 - During an artillery attack on Daruvar, a boy (M.LJ., aged 6) was wounded. A girl (L.P., aged 11) was wounded in Vinkovci.

November 4, 1991 - In an artillery attack on Dubrovnik, a boy (D.B., aged 11) and a girl (M.B., aged 14) were killed, whereas a boy (S.B., aged 9) was wounded. A boy (I.K., aged 16) was wounded during an artillery attack on Osijek.

November 5, 1991 - A girl (A.T., aged 12) was wounded in Vukovar, and a boy (N.K., aged 3) was wounded in Osijek. In an artillery attack on the village of Belaj, near Duga Resa, a boy (I.T., aged 5) was wounded.

November 6, 1991 - A boy (K.M., aged 16) was killed by the explosion of a mine in the vicinity federal army barracks in Rijeka, two more boys were hurt.

A boy (N.M., aged 13) was wounded in Vukovar.

November 7, 1991 - In a bombing raid on Bizovec, a boy (D.C., aged 11) was killed. During an artillery fire on Zagreb, from *Maršal Tito* federal army barracks, a girl (I.B., aged 6) was wounded in her flat.

During an air raid on Ivankovo, a boy (A.M., aged 14) was wounded, a girl (S.P., aged 15) was

wounded in Osijek, and a boy (D.J., aged 15) was wounded in Našice.

November 9, 1991 - A girl (J.Z., aged 12) was wounded in an artillery attack on Daruvar.

A girl (D.B., aged 5) was wounded in Split, and a boy (Ž.P., aged 12) was wounded in Karlovac.

During an artillery attack on Dubrovnik, three girls (I.A., aged 12, M.M., aged 13 and A.P., aged 3) and a boy (I.B., aged 10) were wounded.

November 12, 1991 - In an artillery attack and air raid on Daruvar, a boy (D.N., aged 16) was killed.

A boy (I.C., aged 14) was killed by a mine explosion near the *Logorište* federal army barracks in Karlovac. Another boy (M.K., aged 12) was wounded by an explosive "fountain-pen" he had found.

A girl (B.G., aged 10) and a boy (A.Z., aged 4) were wounded in Split.

In an attack on Vinkovci and its surrounding area, a boy (D.M., aged 11) was wounded in Retkovci, and another (N.S., aged 12) was wounded in an air raid on the village Sela near Sisak.

November 13, 1991 - A boy (D.M., aged 16) was wounded in the village of Lukovac near Podravska Slatina.

November 14, 1991 - During a rocket and bomb air raid on Županja, two boys (V.M. aged 6 and M.M., aged 15) were wounded, and another boy (M.P., aged 13) was wounded in the village of Bokanjac in the Zadar area.

November 15, 1991 - A boy (M.M., aged 10) was killed in the village of Oriovac in an air raid on the area between Slavonski Brod and Nova Gradiška. During an artillery attack from the *Lora* harbor on the residential parts and the ancient nucleus of Split, a girl (M.M., aged 9) was wounded. A boy (K.B., aged 17) was wounded in Osijek.

November 16, 1991 - During an artillery attack on Osijek, a boy (D.K., aged 13) was wounded, and another boy (A.S., aged 3) was wounded in Zadar.

November 20, 1991 - In mortar shelling of the village of Škabrnja, in the Zadar inland, a boy (A.Ž., aged 1) was hurt.

A boy (P.A., 8 months old) was wounded in Osijek, and a boy (S.B., of unknown age) was wounded in Ćepin. During an attack on Ivankovo, a girl (M.P., aged 13) was hurt.

November 24, 1991 - During an artillery attack on Karlovac, a girl (M.M., aged 6) was wounded.

November 27, 1991 - A boy (D.L., aged 8) was wounded consequentially to careless handling of a *Kalachnikov* automatic rifle in Đakovo.

November 28, 1991 - During an artillery attack on Nova Gradiška, a girl (I.S., aged 14) was wounded.

November 29, 1991 - During an artillery attack on the larger area of Novska, a boy (D.S., aged 12) was wounded.

December 3, 1991 - A boy (M.L., aged 11) killed himself accidentally while playing with a weapon.

December 5 & 6, 1991 - During an artillery attack on Dubrovnik, a girl (N.O., aged 1) and three boys (I.B. of unknown age, B.Ž., aged 17 and Ž.P., aged 12) were wounded.

December 10, 1991 - In an artillery attack on the larger area of Slavonska Požega, a girl (N.Ž., aged 13) was wounded in the village of Vučjak, while a boy (M.S., aged 9) was wounded in the village of Biškupci.

December 13, 1991 - A boy (D.J., aged 8) was wounded by an accidental shot of a Croatian soldier in Veliki Zdenci.

December 14, 1991 - During a mortar attack on the village of Bilaj near Gospić a girl (A.Š., aged 12) was killed.

December 16, 1991 - In an artillery attack and air raid on the area and town of Daruvar a boy (M.P., aged 4) was wounded. Due to careless handling of automatic fire arms by adults, two boys, (K.J., aged 8 and T.Ž., aged 10), were wounded in Županja.

December 18, 1991 - In an artillery attack on Sisak, a girl (M.H., aged 2) was wounded. Two boys (I.M., aged 16 and M.M., aged 10) were wounded during automatic weapon fire opened from the *Lora* harbor on the area of Split and Kaštela.

December 21, 1991 - During an artillery attack and air raid on the area of Zadar, a girl (J.M., aged 14) was wounded in the village of Bruška. A boy (D.K., aged 14) was accidentally wounded in Zagreb.

Due to his activating of a found explosive device - a firing cap, a boy (M.D., aged 12) was wounded in Ogulin.

December 25, 1991 - During an artillery attack on Islam Latinski, near Zadar, a boy (A.K., aged 1) was wounded.

In gunshot fire in the village of Donja Motičina near Našice, a boy (I.H., aged 14) was wounded.

In Jastrebarsko, a boy (Z.L., aged 13) was wounded while playing with bullets near an open fire.

December 26, 1991 - Playing with an explosive device and activating it, a boy (K.V., aged 11) wounded himself in Ogulin.

December 28, 1991 - Due to explosion of a found explosive device, a "pen", a boy (Z.K., aged 7) was wounded in Velika Gorica.

December 31, 1991 - During an artillery attack and air raid on Zadar, three boys (A.K., aged 5, H.V., aged 8 and Ž.V., aged 7) were wounded.

January 1, 1992 - A boy (M.P., aged 6) was wounded in Ogulin.

Table 1. Killed and wounded children from August 18, 1990, to January 4, 1992. The data is cummulative.*

	Killed	Wounded
July, 5 1991	1	5
August 25, 1991	2	14
September 4, 1991	3	40
September 19, 1991	6	63
October 1, 1991	17	99
October 29, 1991	32	197
December 12 1991	44	266
January 4, 1991	46	302

*According to the figures released by the Medical Corps Headquarters of the Republic of Croatia and reports of health instituitons.

Table 2. The age of killed and wounded children in the war against Croatia by January 4, 1992*

	Killed		Wounded	
Age (yrs)	No.	%	No.	%
0-6	5	11	60	20
7-10	7	15	69	23
11-14	16	35	97	32
15-17-	17	37	58	19
unknown	1	2	18	6
Total	46	100	302	100

*According to the figures released by the Medical Corps Headquarters of the Republic of Croatia and reports of health institutions.

January 2, 1992 - A boy (M.M., aged 10) was accidentally wounded in Zagreb.

January 4, 1992 - In the village of Sibinj, near Slavonski Brod, a boy (T.M., aged 2) was wounded.

More children were wounded in Vukovar, but the precise dates are not available: Two boys (M.B. and M.C. of unknown age) and three girls (A.K., aged 14, S.V., aged 4, and Ž.V., aged 14). Three more children were wounded in Vinkovci: A boy (K.B., aged 8) and two girls (P.P., aged 9 and I.P., aged 10). For 38 children the data concerning the date and the place where they were wounded are unknown. The data on children casualties in the war are partly taken from the Medical Corps Headquarters, and partly provided directly from medical facilities of the war-stricken areas.

Basic data on every child (name, place of accident and type of injuries) are registered. The circumstances under which they were killed or hurt are known for only a number of children. However, we cannot estimate the total number of children casualties in this war, due to the inaccessibility of the data for the time being, but we believe it to be much higher.

The major characteristic of this war is a high share of civilian victims among the killed and the wounded. The number of children who were killed and wounded is commensurate with the increase in number of the civilian victims in the war against Croatia. Among the killed civilians, the number of children amounts to 3%, whereas among the wounded the number of children amounts to 6%.

A 16-year-old girl who was killed on July 5, 1991 was the first among the children casualties in the war against Croatia; five children got wounded by that date (Table 1). By the beginning of October the number of children who were killed amounted to 17, and 99 were wounded; this number was doubled by the end of October. The highest number of children casualties was registered during the second half of September and in October; the casualty toll was equally high in November. By January 4, 1992, 46 children were registered as killed, whereas the number of wounded amounted to 302. However, this figure does not seem to correspond to the factual situation. It seems that the war took a much higher toll among the children, although confirmed facts are not at our disposal.

Children of various age groups, ranging from infants to adolescents, are not spared in this devastating war (Table 2). The youngest victim of the war against Croatia is a boy of four months, whereas the oldest victim is a 17-year-old girl.

In the group of children and adolescent casualties, those up to 14 years of age make up 60% of the victims killed and 75% of the wounded victims.

Although enjoying better protection, children of the pre-school age, ranging from 0 to 6 years, also appear on the casualty list. The fact that this age group make up 11% among those who were killed and 20% among the wounded children, clearly demonstrates the dimension of civilian casualties in this war.

Table 3. Sex of killed and wounded children in the war in Croatia by Jauary 4, 1992*

	Killed children			Wounded children		
Age (yrs)	M	F	Total	M	F	Total
0-6	4	1	5	35	25	60
7-10	5	2	7	48	21	69
11-14	11	5	16	72	25	97
15-17	8	9	17	42	16	58
unknown	0	1	1	18	0	18
Total	28	18	46	215	87	302
%	61	39	100	71	29	100

*According to the figures released by the Medical Corps Headquarters of the Republic of Croatia and reports from health institutions.

School-age children from 7 to 14 years of age, who make up 55% of all the children casualties in the war, top the casualty list. However, the age group from 11 to 14 years old seems to be mostly imperilled. It is the children of the age group of 11 to 14 who make up one third of all the children casualties in this devastating war.

Regarding the sex of the children casualties in the war against Croatia, it is obvious that the boys

Table 4. Number of killed and wounded children according to the regions in which deaths and injuries occured by January 4,1992*

Region	Killed		Wounded	
	No.	%	No.	%
Banija	2	4.3	7	2.3
Dubrovnik and South Dalmatia	6	13.1	11	3.6
Hrvatsko Primorje	3	6.5	3	1.0
Hrvatsko Zagorje and Medimurje	0	0	3	1.0
East Slavonija	17	37.0	134	44.4
Kordun	4	8.7	13	4.3
Lika	2	4.3	0	0
Podravina and Moslavina	4	8.7	7	2.3
Split area	0	0	18	6.0
Šibenik area	3	6.5	8	2.7
Zadar area	1	2.2	24	7.9
Zagreb	0	0	20	6.6
West Slavonija	4	8.7	26	8.6
unknown	0	0	28	9.3
Total	46	100	302	100

*According to the figures released by the Medical Corps Headquarters of the Republic of Croatia and reports of health institutions

Table 5. Causes and types of injuries inflicted on children in the war in Croatia by January 4, 1992*

Region	Killed		Wounded	
	No.	%	No.	%
Fire arms:				
Explosive wounds	26	68.4	142	59.5
Gunshot wounds	8	21.1	51	21.3
Falls, blows, conquassations, fractures	4	10.5	40	16.7
Burns	0	0	6	2.5
Total	38	100	239	100

*According to the figures released by the Medical Corps Headquarters of the Republic of Croatia and reports of health institutions

belong to a higher risk group in comparison to girls (Table 3). This is due to their more active way of living and playing in comparison to girls. Boys make up 61% of all the children who were killed and 71% of all the children who were wounded during the war in Croatia. Their curiosity and exploration drive, combined with the lack of experience and inability to comprehend the extent of danger, is greatly responsible for their becoming victims in this war. In all age groups except the earliest age, boys are more prone to injuries than girls, with those ranging from 11 to 14 years of age being the highest risk group, who are three times more prone to injuries than girls of the same age group (Table 3).

Although most children were hurt in the war-ravaged areas, children are daily becoming victims deep in the rear, in almost all parts of Croatia (Table 4). The deadly toll among the civilian population is related to massive destruction of civilian targets in the rear by heavy, long-range artillery fire, as well as by bombing and airborne missile assaults.

Most children who got killed, wounded or fired at, come from the urban areas of East Slavonia, like Vukovar, Vinkovci and Osijek. The number of children casualties in this region amounts to almost 40% of all the children killed and almost a half of the wounded children. The number of casualties among children in the area of West Slavonia amounts to 9%. However, children are getting killed or wounded in all the war-stricken areas, although some are becoming victims far from their home, in the places they have fled to.

Children got killed or wounded in all the parts of Croatia, including the Adriatic coast, the North Adriatic, Middle and South Dalmatia, as well as in the inland, in the Banija and Kordun areas.

According to our sources, around 90% of the children killed and 80% of those wounded were directly exposed to the devastating effect of lethal weapons (Table 5). In most cases (almost 90%) children got killed or wounded during artillery attacks and bombing raids on the places of their residence or the places they fled to, since the war against Croatia is characterized by severe devastation of civilian targets in the rear, which results in a large number of civilian casualties. The injuries are inflicted by missiles of various artillery weapons, explosions of mortar, tank or artillery grenades, or they come as a consequence of bombing raids and airborne missile assaults. Consequently, explosive injuries are characterized by massive tissue destruction and severe multiple wounds, which are often fatal or result in serious disablement. Gunshot wounds in children are relatively rare (except those caused by grenade shrapnels) because children are not often exposed to small-arms fire.

Accidental and self-inflicted injuries caused by the activation of explosive means, mostly in the vicinity of federal army facilities, are also the cause of death and injuries among children in the war against Croatia (about 10% of the injuries inflicted by firearms and weapons). These severe explosive injuries, which are often fatal or result in heavy disablement, are caused by explosive means of all kinds, such as anti-tank mines, anti-personnel mines, explosive charges, hand grenades, unexploded missiles and other. Such injuries will present a long-lasting threat for years and decades to come, since unexploded explosive means are abundant in the war against Croatia.

Self-inflicted injuries or injuries caused by careless handling of firearms of their family members or relatives is another category of war-time injuries in children. To a significantly lesser extent, children were killed or wounded as a consequence of various other injuries, such as those

caused by falls, blows, conquassations or burns in wartime conditions.

Notwithstanding the numerous conventions and declarations on children protection and rights, as well as the international legislative acts on the protection of children in armed conflicts (1-3), children still continue to be the most vulnerable among the victims of the war. They are constantly being exposed to various forms of injuries which lead to severe short-term and long-lasting consequences for their physical and spiritual well-being (4-7).

Among all the victims of the war, children who got killed or wounded, definitely belong to the most tragic category (8). There have already been dozens of children killed and several hundreds wounded in this brutal aggression against Croatia. Unfortunately, as the ruthless war against Croatia is still going on, we rightly fear that the number of these innocent victims should by no means be considered final.

References

1 ICRC and children in situation of armed conflicts. Geneve, International Commettee of the Red Cross, 1987.

2 Plattner D. Protection of children in international humanitarian law. Int Rev Red Cross 1984; May-June:1-13.

3 Singer S. The protection of children during armed conflict situations. Int Rev Red Cross 1986; May-June:1-38.

4 Boss LP, Brink EW, Donabro TJ. Infant mortality and childhood nutritional status among Afghan refugees in Pakistan. Int J Epidemiol 1987;16:556-60.

5 Harvard Study Team. The effect of the Gulf crisis on the children of Iraq. N Eng J Med 1991;325:977-80.

6 Mardešić D. Osobitosti zaštite djece u ratu. Liječ Vjesn 1991;113:269-71.

7 Fattorini I, Grgurić J. Dijete u posebnim uvjetima. Zagreb: Medicinski fakultet Sveučilišta u Zagrebu, 1991.

8 Cigit I, Milić Ž, Fattorini I, Pedišić I, Vrdoljak J. Ratne ozljede kod djece. Liječ Vjesn 1991;113:220-4.

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Remember They are Humans

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Abstract. The Center for Handicapped Children and Adolescents with Somatomental Diseases in Vrlika was a residence for 290 children from all over Croatia. On August 26, 1991, the Center was attacked by Yugoslav Federal Army (YFA) and Serbian paramilitary forces and remained surrounded for five days without water, electricity and with limited care for children. The only way to survive was to escape by inappropriate transportation. Five cases, two dead and three sick children, the victims of this unthinkable attack, are reported here.

Key words: *child; Croatia; handicapped; mental retardation; victims; war*

Description of the Event

The Center for Handicapped Children and Adolescents with Somatomental Diseases in Vrlika, 56 km north-west from Split, was a domicile for children with mild, moderate and severe mental retardation, often associated with blindness, deafness and immobility. Before the war against Croatia, the Center's staff was comprised of 8 defectologists, 2 psychotherapists, 1 pedagogue, 1 social worker, 77 nurses, 1 laboratory technician and 2 consulting physicians.

Problems commenced with the road blockade by Serbian terrorists during August, 1990. Many employees were unable to commute to work, and some even joined the terrorists. The Center was often without electricity due to terrorists' diversions; this dark and cold environment was grossly improper for the weak and sick children. During the Yugoslav Federal Army (YFA) aggression on the nearby village of Kijevo in April 1991, the Center was without running water for 20 days. Despite regular control of the water taken from wells and brought by cistern lorries, many children developed gastric symptoms. Culmination of the inhuman behavior of the YFA and its allies occurred on August 26, 1991. They launched a heavy artillery and air attack on Kijevo and Vrlika, using internationally forbidden cluster bombs. The Center definitely lost the water and electricity. Bombs fell close to the Center. Drunken enemy soldiers wandered around, scaring the children and the personnel. The same afternoon, under an awesome mixture of explosions and screams, 160 mobile children were transported by bus to the city of Split, to the *Juraj Bonači* Center for Special Education. One hundred and thirty immobile and heavily retarded children remained in Vrlika with six nurses. These helpless victims stayed there for three more days, under constant threat and humiliation by Serbian terrorists. After breaking into the warehouse by blowing the doors with rifle shots, the terrorists grabbed all bandage material and medicines. The children were left in the stench of their own urine and stool because the remaining nurses simply were unable to feed every child and change the beds. The food the children were used to was replaced by dry biscuits. Horrified, people from the neighboring villages organized a shelter for the Center's inhabitants, trying to stop further mistreatment. After difficult negotiations, Croatian officials managed to secure a safe transport by bus. These starving, thirsty and dirty children were then taken to Split. Two died on the way and three were immediately admitted to hospital. The others

found themselves in unfamiliar surroundings, and reacted with depressive behavior or increased aggression towards themselves or others.

Case Reports

The Dead

K.S., a 14 year-old blind girl with high-grade somatomental retardation died four days after her arrival to Split. Pathological examination showed numerous hematomas of different sizes on the upper and lower extremities, inflicted by a blunt object. Although the origin of injuries was unspecific, their number and size contributed directly to the death. The time of development of hematomas corresponded to the time of surrounding of the Vrlika Center. The death was classified as violent, caused by cachexy and general exhaustion.

M.K., a 9 year-old boy with spastic tetraparesis and somatomental retardation developed after Rey's syndrome, died on a bus seat during the transportation to Split. Pathological examination revealed reduced fat tissue and three decubiti in the sacral region. Autopsy findings were not remarkable, except for the poorly configurated skull base that was shorter in anteroposterior direction. The death was classified as violent, caused by dehydration and cachexy.

The Wounded

C.P., a 28 year-old male with Down syndrome was referred to the Department of Internal Diseases, Split Clinical Hospital for acute cystopyelitis and multiple decubiti. On admission, the patient was dehydrated, with cardiac rate of 100 bpm and blood pressure of 13.3/9.3 kPa. The skin was dry, with multiple decubiti in the sacral region. Initial laboratory screening revealed a $12x10^9$/L leukocytes, $547x10^9$/L erythrocytes, erythrocyte sedimentation rate of 87 mm/h and albumin fraction of 33.5%. *Pseudomonas aeruginosa* and *Enterobacter aglommerans* were isolated from urine cultures. Urinary catheter was placed because of paraphimosis, and the patient was given cloxacillin (2 g/day per os). This therapy was replaced by ceftazidime (6 g/day iv.) after 8 days. Decubiti were treated regularly, with Sol. clorhexidine and sulphadiazine Ag 1%. The patient was then transferred into a decubitus bed. Dehydration was treated with 10% glucosaline iv. The patient stabilized after 8 days.

M.D., a 28 year-old male with somatomental retardation was admitted to the Department of Intensive Care, Split Clinical Hospital because of suspected gastrointestinal hemorrhage. His skin was pale, cardiac rate was 140 bpm, blood pressure 14.6/8.7 kPa. During hospitalization, melena or hematemesis could not be observed. Initial laboratory screening revealed erythrocyte sedimentation rate of 20 mm/h, $2.6x10^{12}$/L erythrocytes, 14 g/L hemoglobin, 0.33 L/L hematocrit, $6.2x10^9$/L leukocytes and $629x10^9$/L platelets. On the day of admission, the patient was given 700 ml of fresh blood. Ranitidine (300 mg/day) and Al-hydroxide and Mg-carbonate (6 g/day) were used for the treatment of the ulcer. Four days after treatment, the patient showed signs of improvement (erythrocytes $3.37x10^{12}$/L; hemoglobin 75 g/L and leukocytes $5.32x10^9$/L. A 6-month treatment with 100 mg/day ferrous sulphate was prescribed.

K.G., a 17 year-old girl with West syndrome was admitted to the Department of Respiratory Diseases, Split Clinical Hospital, for high temperature and severe cough. On admittance, she was tachypnoic (25 breaths/min), pale and dehydrated. Auscultation revealed inspiratory crepitations over the whole left lung. Cardiac rate was accelerated (100 bpm) and the blood pressure was 13.3/7.9 kPa. The initial laboratory findings were: erythrocyte sedimentation rate 40 mm/h, leukocytes $9.5x10^9$/L, albumin 39%, α1-globulins 6.6%, α2-globulins 19.8%, alkaline phosphatase 385 IU/L, LDH 594 IU/L. Blood gas analysis revealed hypoxemia (pO_2 8.13 kPa), saturation O_2 of 92.4%, hypocapnia (pCO_2 3.19 kPa) and respiratory alkalosis (pH 7.51). Segmental bronchopneumonia of the left lung, mostly affecting lower lung parts, was diagnosed on X-ray examination. Fracture of the right clavicle was also diagnosed and immobilized. After 5 days of cefotaxime (2g/day), the patient became afebrile, laboratory findings returned to normal levels and control X-rays showed a regression of infiltrative changes.

Conclusion

The children with somatomental diseases, often forgotten by many, paid once more the price of an unmerciful and heartless world. The savage disregard of Serbian terrorists and the YFA for the lives of handicapped children shows once again the brutality and destruction brought onto Croatia.

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Children War Casualties in the District of Rijeka and Senj

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Abstract. This paper describes the children war causalties in the district of Rijeka and Senj. The forensic expertise showed that S.M., aged 12, was killed on September 9, 1991, during an air-attack on the village of Krasno near Senj. Two other civilians (K.M., aged 16, and M.R., aged 16) died after an explosion of military explosive devices around Yugoslav Federal Army facilities near Rijeka.

Key words: *child; forensic medicine; expert testimony; victims; war*

The Injuring of Under Age Civilians During the Air Attack on Krasno

During the air attack on September 9, 1991, launched by the Yugoslav Federal Army (YFA) on the village of Krasno, near Senj, S.M. (a boy aged 12) died from the explosion of a cluster bomb while three other civilians were seriously wounded. It is necessary to emphasize that in the village of Krasno there were no military facilities and that children were wounded while playing in front of their school. The remaining patients were treated at the Surgical Ward of the Rijeka General Hospital. A litle girl, S.A., was very seriously wounded in the head, trunk and extremities. Two adult civilians injured in this attack had numerous explosive wounds (one of them underwent splenectomy because of internal bleeding).

From the Investigation Records

Four civilians were found to be seriously wounded: S.M., a boy aged 12, S.A., a girl aged 6, and two adults, B.M., aged 36, and S.J., aged 30. After being given the first aid by the mobile surgical team located on the battlefield, the wounded were transported to the Rijeka General Hospital. The boy did not show any signs of life.

From the Autopsy Records

DECEDENT: S.M., aged 12

External examination revealed explosive wounds of the head, trunk and extremities. A stellate defect of the scalp was found in the left parietal region, measuring 2x2.5 cm. Cranial bone defect and contusion of the brain were found at the base of the wound. In the anterior aspect of the left shoulder a bruise and a skin defect, measuring 1 cm in diameter, were found (Fig. 1). Near the posterior axillary fold, a wide and deep defect was found stretching into the axillary fossa. On the left elbow a 1 cm defect was found from which a piece of metal was removed. The left upper arm was covered with numerous smaller and two larger defects with 4 cm deep canals. On the flexor side of the right lower leg a laceration, measuring 7x1 cm, was found. Internal examination revealed multiple fractures of the skull, blood suffusion of the brain envelopes and a defect of brain tissue. Three bone fragments were recovered from the brain, representing secondary projectiles.

Pathoanatomical Diagnoses:

Explosive wounds of the head, trunk and extremities

Vulnera explosiva capitis, corporis et extremitatum

Brain contusion and fractures of the cranial vault

Figure 1. Decedent S.M., aged 12. Explosive wound of the right axilla (top) and the skull (bottom).

Contusio cerebri et fracturae calvariae
Edema of the brain
Oedema cerebri grave

Children as Victims of YFA Explosive Devices Planted in the Vicinity of YFA Barracks in Rijeka

Katarina Barracks Case

On November 6, 1991, 16-year-old M.K. died from the explosion of an antiinfantry mine near the Katarina barracks in Rijeka. The boy and his two friends were exploring the area surrounding the army barracks which the YFA had previously mined. His friends, both aged 17, were seriously wounded. S.A. had abdominal injuries while S.Z. had serious head injuries with brain contusion.

From the Investigation Records:

Three seriously injured boys were transported by a YFA vehicle to Rijeka General Hospital where M.K. was pronounced dead and the other two boys urgently transferred to the surgical block.

Figure 2. Decedent K.M., aged 16. Multiple explosive wounds of the chest and upper extremities (top) and right thigh (bottom).

From the Autopsy Records:

DECEDENT: K.M. aged 16

The external examination of the decedent revealed explosive wounds of the head, trunk and extremities (Fig. 2), while the autopsy revealed traumatic lesions of the lungs and urinary bladder. Round, shallow skin defects with contused margins were found on the face and external ear, measuring up to 0.3 cm in diameter. In the region of the left sternoclavicular joint, a skin defect measuring 1.5 in diameter, was found. On the chest, at the level of the 4th rib, a deep defect measuring 1.5:1.5 cm in diameter, was found. On the anterior abdominal wall, a number of defects were found, the largest being located a centimeter above the pubic symphysis measuring 1.5:0.7 cm, still bleeding. Numerous shallow defects were found on the both upper extremities, left and right upper leg and scrotum. Internal examination revealed complete conquassation of the superior lobe of the left lung with 900 ml of blood in the left hemithorax and the rupture of the urinary bladder with subsequent subperitoneal hemorrhage.

Pathoanatomical Diagnoses:

Explosive wounds of the head, trunk and extremities
Vulnera explosiva capitis, trunci et extremitatum

Rupture of the left lung
Ruptura pulmonis sinistri

Hemorrhage inte the left hemithorax
Haematothorax sinister

Rupture of the urinary bladder
Ruptura vesicae urinariae

Subperitoneal hematoma
Haematoma subperitoneale

Internal bleeding
Effusio sanguinis interna

Zahum Barracks Case

On November 29, 1991, 16-year-old M.R. died from the explosion of a hand grenade while A.Č. (aged 17) and R.N. (aged 16) received minor injuries in the vicinity of a YFA warehouse in Zahun near Rijeka. The bomb, found by the decedent near the previously abandoned YFA warehouse, exploded as a result of inexperienced handling of the bomb, i.e. accidental activation of the bomb.

From the Investigation Records:

The dead body of M.R. was found lying on the back seat of a car where his friends had put the body in an attempt to save the boy.

Since the boy was already dead his friends decided not to move the body any further.

From the Autopsy Records:

DECEDENT: M.R., aged 16

External examination revealed numerous explosive wounds of the trunk and extremities while internal examination revealed a ruptured left lung, blood-filled thorax and ruptured left kidney. On the back a dozen small, round skin defects were found near the vertebral column, sacrum and more than fifty in the gluteal region. Along the spinal column, between the 6th to 7th and 10th to 11th left ribs, two large skin defects with bruised edges were found. The autopsy confirmed that the basal portion of the left lung had been ruptured with 1,000 ml of blood in the left hemithorax, as well as the lower pole of the left kidney.

Pathoanatomical Diagnoses:

Explosive wounds of the trunk and extremities
Vulnera explosiva corporis et extremitatum

Rupture of the left lung
Ruptura pulmonis sinistri

Hemorrhage into the left hemithorax
Haematothorax sinister

Rupture of the left kidney
Ruptura renis sinistri

General anemia
Anaemia universalis gravis

Conclusion

In all three cases, death was the result of wounds inflicted upon the victims by military explosive devices. Consequences of the explosions were numerous wounds of the whole body, some of which were particularly serious and life threatening. In the first case (decedent S.M.) the cause of death was contusion and edema of the brain while in the remaining two cases (decedents M.K. and M.R.) death was the result of profuse bleeding and traumatic shock. All three victims died a violent death which occurred soon after being wounded. With respect to the cause and the manner of death, not even the most urgent medical help could have saved their lives.

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Suffering of Croatian School Children during War

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Abstract. Children and adolescents are among the most vulnerable victims of war. The aim of this report is to estimate the influence of war on the health status of the school children and adolescents in Croatia. The loss of home and the separation from the family are considered high risk factors. More than 100,000 displaced school children and adolescents were registered in Croatia at the end of 1991. Less than a half of them are enrolled in schools. A high percentage of children are displaced without their parents; even those in the youngest group (35% of the first grade-pupils). Changes in the morbidity pattern of school children could not yet be proved, but observations of school doctors indicate a more frequent occurrence of neurotic signs and psychologic disturbances, both in younger children and adolescents, especially if they are displaced without parents.

Key words: *adolescent; child; Croatia; displaced persons; school health services; war*

Seventeen years of my life have disappeared. I have neither books nor pictures from my past. I only want to know where my parents are. What is going to become of us? (K.T., schoolgirl displaced from Vukovar)

Introduction

Children and adolescents are among the most vulnerable victims of war. During enemy's attacks on the civilian population they share with adults the perils of death and injuries. In the war against Croatia, 42 children were killed and 259 wounded until the middle of December 1991. Besides the most tragic incidents, there are many ongoing events threatening the health and normal growth of children: frequent and longlasting stays in shelters, shortage of food and water supply, impossibility of school attendance, etc.

Measures undertaken to protect children from the horrors of war - evacuation to safer regions in the country or even abroad, are followed by a series of risk factors for their health and somatic and psychologic development: abrupt abandonment or loss of home, the life in a new and unfamiliar environment, sometimes in inappropriate hygienic conditions and, worst of all, separation from the family, especially the mother. Emerging disorder and disturbance as well as emotional suffering the children pass through might exert longlasting consequences upon their health.

The aim of this report is to: (a) estimate to what extent the health of school children and adolescents in Croatia could be imperilled by the war, taking into consideration the loss of home and separation from parents as risk factors; and (b) assess whether certain changes in the morbidity pattern of school children and adolescents have already appeared.

Table 1. Number of displaced persons and refugees from Croatia until December 10, 1991

Age(yrs)	Displaced persons (registered)	%	Refugees (estimation)	Total
0-6	56,301	21.3	61,000	127,800
7-18	98,555	37.4	107,000	224,400
18 and more	108,905	41.3	118,000	247,800
Total	263,761 +50,000*	100.0	286,000	600,000

*Unregistered displaced persons.

Terms according to the International Humanitarian Law (1): Displaced persons - persons who flee armed conflicts or other disturbances but remain inside the country; refugees - persons who seek refuge from armed conflicts or other disturbances and who are outside their country.

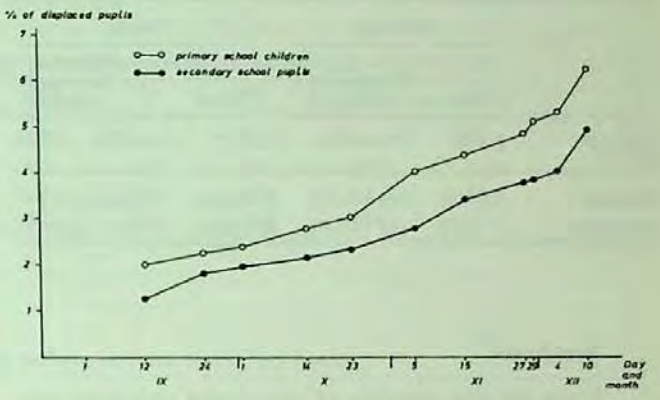

Figure 1. Percentage of displaced pupils in the total number of school attendants in Croatia (during the autumn of 1991).

Table 2. Number of displaced children and adolescents enrolled in school from September 12 to December 10, 1991

Type of school	Sept. 12	Oct. 14	Nov. 15	Dec. 10
Primary	10,137	14,019	22,142	31,715
Secondary	2,586	4,460	7,039	10,179

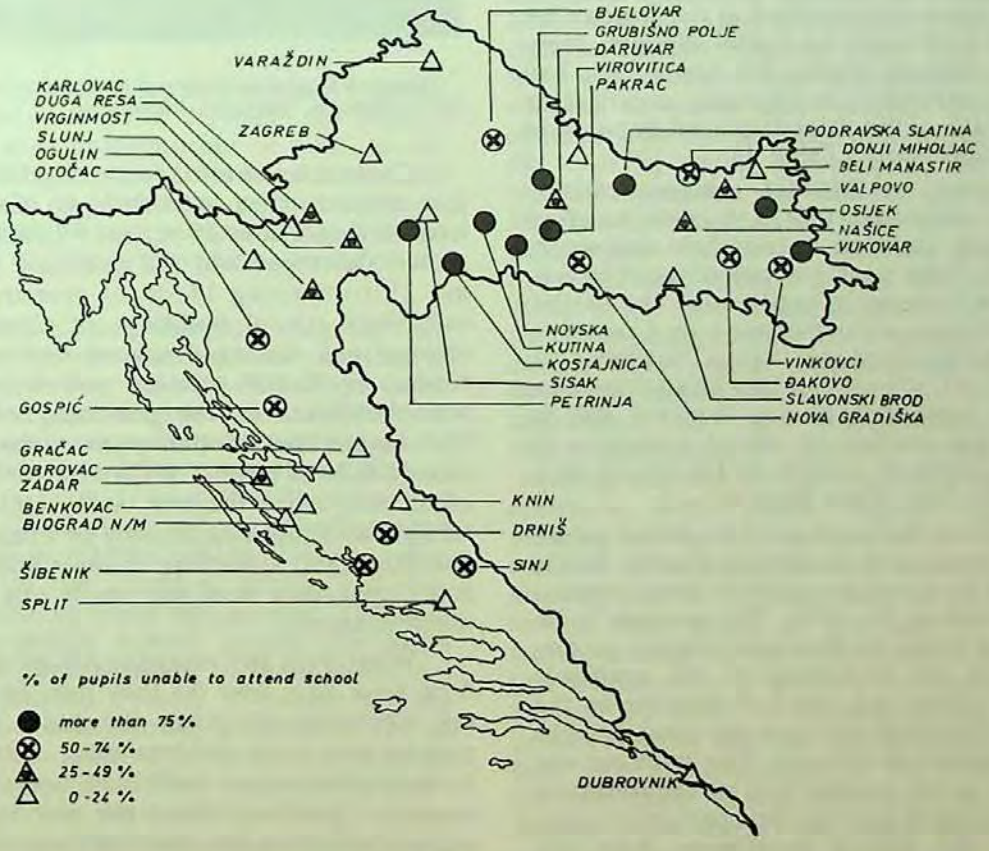

Figure 2. Towns in Croatia with destroyed and damaged school buildings, related to the percentage of children attending these schools.

Table 3. Number of destroyed and damaged schools in Croatia and number of children attending these schools

	Schools		Pupils	
	Total	Destroyed or damaged	Total	Attending damaged schools
Type of school	No.	No. (%)	No.	No. (%)
Primary	2,703	195 (14.5)	506,634	73,564 (14.5)
Secondary	247	42 (17.0)	207,106	43,137 (20.8)

Methods

Data on the number of displaced children and adolescents as well as the number of damaged and destroyed school buildings were collected by the Ministry of Education and Ministry of Social Welfare of Republic Croatia. Data on the way of life in the place of resettlement were collected by a special questionnaire. Changes in the morbidity pattern of school children were observed by school doctors in certain areas of Croatia.

Results

It is estimated that about 600,000 people in Croatia have left their homes from the beginning of the war until December 10, 1991. According to the data registered and analyzed at the Bureau for Refugees at the Ministry for Social Welfare, there were 56,300 children under the age of six and 98,555 school children (7 to 18 years), constituting 21.3% and 37.4% of the total displaced population in Croatia, respectively (Table 1).

With respect to 286,000 refugees outside Croatia, it is estimated that a further hundred thousand school children found their temporary shelter abroad. If the probable percentage (35% to 37%) of the school-age group among the 50,000 unanalyzed persons also displaced in Croatia is added, it can be assumed that, up to December 10, 220,000 to 230,000 school children and adolescents were forced to leave their homes. It makes 30% to 32% of the total number of school attendants in Croatia. Approximately 110,000 to 120,000 of them are displaced in their home country.

Table 2 shows the number of displaced pupils enrolled in primary and secondary schools in the regions spared from war devastation from September 12 to December 10, 1991. The number is increasing, being three to four-fold higher in December than at the beginning of the academic year. Figure 1 shows the trend of increase in the percentage of displaced pupils in the total number of school attendants in Croatia. The increase was more intensive in the second part of the observed period - in November and the first part of December. However, the school enrollment does not reach even the half of the total number of displaced school-age children. Data on schooling of refugees outside the country were not available.

Figure 3. Classroom damaged by a bomb (Vidušević, July 27, 1991). Photo: R. Belošević, *Večernji list*.

Quite a number of school buildings were subject of destruction. According to the data of Ministry of Education, 25 school buildings were completely destroyed and 212 damaged (Table 3, Figure 2), comprising 14.5% of primary and 17% of secondary school buildings in Croatia. The destroyed and damaged school buildings were attended by 73,500 primary and 43,200 secondary school-children in the previous academic years. This means that 15% of primary and 21% of secondary school pupils in Croatia lost the place of education. After the war, many children will not be able to either temporarily or even permanently continue their schooling in their domicile. Therefore, separation from the family will probably last much longer.

What does the everyday life of displaced children look like, how do they live, and where they are accomodated? After the onset of war, some parents sent their children from endangered areas to their relatives or friends in "safer" parts of the country. Later on, when the war spread, evacuation of children, mothers, sick and elderly people was organized. However, many families looked for shelter by themselves. Two models of displaced school children accommodation were observed:

Table 4. Percentage of primary school children displaced without parents in some towns in Croatia

Town	No. of displaced, enroled in schools	Without parents	Percentage of children without parents according to the primary school grade:							
	No.	No. (%)	I	II	III	IV	V	VI	VII	VIII
Rijeka	977	387 (39.5)	5.7	28.6	48.0	29.0	44.4	52.8	60.7	41.5
Koprivnica	138	18 (13.0)	10.0	11.1	20.0	0.0	4.6	18.7	20.0	23.5
Čakovec	153	50 (32.7)	26.7	20.0	11.8	18.7	33.3	30.0	54.2	23.5
Zagreb*	3,948	1,750 (44.3)	35.0	43.4	44.0	48.2	46.6	45.0	45.0	53.2

*Data are based on a 40% sample.

Table 5. Percentage of secondary school children displaced without parents in some towns in Croatia

Town	No. of displaced, enroled in schools	Without parents	Percentage of children without parrents according to the school grade:			
	No.	No. (%)	I	II	III	IV
Rijeka	570	323 (56.7)	53.0	56.3	47.4	74.4
Koprivnica	61	14 (23.0)	20.0	22.0	21.2	50.0
Čakovec	206	151 (73.3)	65.1	46.9	37.8	75.0
Zagreb*	1,609	1,347 (83.7)	82.0	80.0	82.5	89.0

*Data are based on a 35% sample.

1. With parents; mostly with mother, with both parents or father: (a) in private accommodation, with relatives or friends; (b) in displaced persons' camps - hotels, summer colonies, boarding schools, etc.

2. Without parents: (a) in private accommodation with relatives and friends; (b) with a close relative, e.g., grandmother or aunt, in displaced persons' camps; (c) alone, without any relatives; mostly in displaced persons' camps, but sometimes in private accomodation with an unknown host willing to give home to displaced children.

Tables 4 and 5 show the percentage of children displaced without parents and enrolled in primary and secondary schools in several Croatian towns. In Rijeka, Koprivnica and Čakovec, all displaced pupils were analyzed, while data on Zagreb were obtained from a sample of 40% of the displaced in primary and 35% in secondary schools. The percentage of pupils displaced without parents is relatively high, except in Koprivnica, even in the youngest group. The percentage increases in older age groups. The data show that secondary school pupils are often separated from parents, many of them alone and without any relatives, mostly in camps for the displaced. Local educational authorities try to include displaced children into regular curriculum as soon as possible. They are provided free school meals, books and other school supply. Authorized school physicians take care of their health.

Changes in the morbidity of school children and adolescents influenced by war events have not been reported yet. School physicians noticed a slightly more frequent occurrence of respiratory infections related to periods of alarms, after frequent and long stays in shelters. However, younger children showed neurotic signs: nail biting, ticks, fears and enuresis. This is especially expressed in children separated from parents. Even more so, children who had not been able to reach their parent even by phone for months, showed distinct signs of depression and sadness, and suffered from insomnia and nightmares. Some also went through hallucination crises. If they are displaced with their mothers, younger pupils adapted faster and easier to the new school environment. The majority of physicians reported a change in behavior among older pupils, especially adolescents. They were frightened, sought help for insomnia and nightmares, and had concentration difficulties. Many complained of digestive problems: nausea, vomiting and loss of appetite. Girls had menstrual disorders. Some pupils became aggressive, explaining this by feeling labelled in the new environment. (For example, only those living in dormitories receive hygienic supplies and free school meals.) Such pupils do not want to accept help, feeling inferior to their classmates. Often added to this are the lack of modern conveniences, narrowness of the place of accommodation and limited privacy, factors that do not improve their condition. This was confirmed by the survey of the living conditions of the displaced persons in Novi Zagreb (New Zagreb suburbs). The displaced accepted by host families live in very small rooms, with the average of 4.8 persons per one-bedroom apartment and 6.6 persons per two-bedroom apartment.

Discussion

The number of persons who have to abandon their homes is constantly increasing. The displaced persons often move from one town to another. Many of them fled to safer areas or larger cities (Zadar, Osijek, Dubrovnik) during attacks or occupation of their villages. Some of these areas were attacked as well and they had to seek safer areas again. This made it hard to keep accurate records. Apart from this, many displaced persons who found shelter with relatives and friends do not want to register as refugees and remain unknown. Among unregistered displaced persons, at least one third are school children and adolescents, because they are the first to be evacuated.

There is a great difference between the number of displaced children of school age (over 100,000) and the number of displaced children enrolled in schools (around 37,000). Many parents do not enroll their children in schools immediately upon arrival to the shelter area, thinking that they will not reside long in that area. Some children, exhausted by the terrors they experienced, do not want to continue school immediately. A large number of families found shelter in the areas that have also come under attack so that classes cannot be held there (Zadar, Sisak, Karlovac, Osijek, Vinkovci, etc). This is the reason why numerous efforts to organize education by means of radio have been undertaken (3). A larger inflow of displaced children to schools in November and December might have been the result of mass desertion of certain areas due to catastrophic destruction. On the other hand, from the middle of September to the beginning of November, air-raids interrupted the classes even in "safe" areas (Zagreb, Split, Pula) thus there was no great urge to admit displaced children to schools.

The observation of school physicians that younger pupils show less emotional disturbances if they had been displaced with their mothers, agrees with the results of the UNESCO study on children in war (4). Younger children take war incidents (air-raids, bombing, stays in shelters, fleeing) emotionally relatively well if they are close to a person they have confidence in and who in their minds incarnates security. Their lively imagination, curiosity and sense of adventure can quickly adjust to great dangers without being fully conscious of the situation. However the greatest trauma with heavy consequences for further mental development is the break of emotional ties and separation from the family - especially the mother. That is why already the Fourth Geneva Convention, and two additional protocols (4-6) require that children, especially younger ones, be evacuated along with their mothers. Even though our data show that a large number of younger school children are with their mothers in the place of resettlement, there is still a great percentage of those who do not have that privilege.

Loss of home and separation from the family are a heavy trauma, even for older children. The situation is particularly difficult when contacts with parents and news about them are impossible to reach. As compared to younger children, adolescents are aware of the dangers and horrors of the war. High school students are often displaced without parents or even alone, without any close relative. Adolescents, even in peace times, often go to school outside their family residence. Separation from parents is a normal stage of maturation, but the war violates the course of the normal mental development. While searching for their own identity, adolescents are badly hurt by disasters they experience directly or indirectly. The loss of home, anxiety for their parents, relatives and friends, uncertainty and fear of the future, and deep dissapointments in the world they believed in, bring many of them to the state of hopelessness, so that they manifest behavioral disorders or signs of ilnesses. How much our children are imbued with the wish for peace, is best illustrated by the words of an eleven-year old boy, D.D., displaced from Vukovar, who wrote in his notebook: *Peace is to me the Sun in the sky, peace is love, happiness and fortune. Let peace be in entire Croatia. I want my dad to stay alive, I want us all to live together and happily. In peace children are happy, in war they are sad.*

Acknowledgement

We would like to thank the Ministry of Education and the Ministry of Social Welfare of the Republic of Croatia for making the data on school children available.

References

1 Krill F. ICRC action in aid of refugees. Int Rev Red Cross 1988;265:328-50.

2 Škole, odjeljenja - obrazovne grupe, učenici i nastavnici. Dokumentacija (Republika Hrvatska) 1991;826:28-9.

3 Njavro L. Dr. Juraj Njavro, my husband. In: Marušić M, editor. Medical testimony of the Vukovar tragedy. Zagreb: Croatian Medical Journal 1992;54-6.

4 Platner D. Protection of children in international humanitarian law. Geneva: International Committee of the Red Cross, 1984.

5 Singer S. Protection of children during armed conflict situations. Geneva: International Committee of the Red Cross, 1986.

6 Basic rules of the Geneva Conventions and their additional protocols. Geneva: International Comitte of the Red Cross, 1987.

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Deliberate Attack on an Ambulance near Karlovac

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Abstract. On October 21, 1991, an ambulance with a doctor, a medical technician and a driver was attacked by Serbian paramilitary formations in the village of Turanj near Karlovac. The ambulance was properly marked with Red Cross signs, on the car and on a flag. The doctor was killed and the technician and driver were seriously wounded.

Key words: *Croatia; forensic expertise; Geneva Conventions; medical personnel; red cross; war crime*

Description of the Event

On October 21, 1991, an ambulance with a doctor, medical technician and a driver was attacked by Serbian extremists in the village of Turanj, near Karlovac. The doctor, Dr. B.B., was killed; the medical technician, M.B. (student of the 5th year of the Zagreb University Medical School) and the driver, Mr. B.T., were wounded by projectiles from the mortar or hand rocket launchers. According to their statements, here is a reconstruction of the accident.

On the day of the accident, Dr. B. was vaccinating the members of the Croatian National Guard in Karlovac. At some point, they were called over a radio receiver to come and collect one dead and one wounded guardsmen in the village of Turanj. Dr. B., Mr. B. and Mr. T. drove toward the indicated place in their ambulance, which was clearly marked with international Red Cross signs. On entering the village of Turanj, they stopped to learn about the exact position of the wounded and dead guardsmen from the members of the Croatian National Guard. They then drove full speed towards the combat line, over the hill. Before the top of the hill, rifle-fire was opened on the ambulance, hitting the driver in the leg. He tried to turn the ambulance on a bridge over a ditch, but the wheels fell into the ditch. The first grenade hit the engine of the ambulance. The second was directed to the right, shattering the windscreen and injuring Dr. B. in the chest. Grenade fragments also hit Mr. T. in the left ear and Mr. B. in the head. Dr. B. fell on the floor in front of his seat. Mr. T. leant over the front seat, checking if Dr. B. were alive, while Mr. B. tried to open the back door of the ambulance and jump out. After coming out, he was hit by rifle-fire in the abdomen and upper thighs, but managed to jump into the ditch. The ambulance then caught fire. Mr. T. was shocked that his friend, the doctor, was dead. Burning pieces of the car's interior were falling on him, setting his hair on fire. He managed to open the door with his foot. He was hit in the left arm while trying to get out, he fell and broke his arm. He crawled for five meters and stayed in the mud at the bottom of the ditch for half an hour until the National Guard soldiers came to rescue them. While lying in the ditch, he could hear the terrorists discussing whether or not they should go and check if the medical team were still alive, and butcher them if they were not.

The wounded were brought to the Zagreb Clinical Hospital and the body of the doctor was transported to the Zagreb University School of Medicine, where the autopsy was performed. The

car was left in Turanj and it was impossible to make any photographic records of the scene since this village is still under the terrorists' control.

The Wounded

M.B., medical technician, aged 30

Clinical Diagnoses:

State after explosive wound of the head with subsequent brain contusion

Explosive wound of the right lumbar region with subsequent penetration into the abdomen and lesion of the large intestine

Explosive wound of the right gluteal region and right thigh

State after craniotomy and laparotomy

B.T., driver, aged 40

Clinical Diagnoses:

Gunshot wound of the right auricle

Bilateral tympanic rupture

Gunshot wounds of the right thigh, left forearm and both arms

Fracture of the proximal part of the left humerus

Gunshot wounds of the chest and abdomen

Foreign bodies in both arms

Hematoma and intracerebral foreign bodies in the frontal region

The dead

DECEDENT: B.B., aged 35

Autopsy Code: sp 52.915.-1291/91

Pathoanatomical Diagnoses:

Carbonization of the head, trunk and extremities
Carbonisatio capitis, trunci corporis et extremitatum

Explosive wound of the head with brain lesion
Vulnus explosivum capitis cum laesione cerebri

Multiple fractures of the base and the vault of the skull
Fracturae multiplex baseos et calvariae cranii

Explosive wounds of the chest with lesions of the sternum, heart, left lung and left part of the diaphragm
Vulnera explosiva thoracis cum laesione sterni, cordis, pulmonis sinistri et diaphragmae sinistrae

Hemorrhage in both thoracic cavities
Haematothorax bilateralis

Cause of Death:

Explosive wounds of the thorax with heart rupture
Vulnera explosiva thoracis cum rupturam cordis

Opinion: According to the received information, the decedent, Dr. D.B., was killed when performing his medical duties in an ambulance in the village of Turanj, near Karlovac, on October 21, 1991. The external examination and the autopsy revealed that the death was caused by explosive wounds of the chest, with subsequent rupture of the heart. The autopsy revealed carbonization of the skin of the head, trunk and extremities, and the explosive wound of the head with subsequent lesion of the brain and multiple fractures of the vault and the base of the skull. The autopsy also revealed explosive wounds of the thorax, with 3 defects of the sternum and subsequent lesions of the heart, left lung and left part of the diaphragm and bilateral hemorrhage into the thoracic cavity. The defect No. 1 of the sternum is found in the 3rd right intercostal space, 4 cm to the right from the midline. The wound canal was directed backward, downward and medially, penetrating the right atrium, where a piece of metal (shrapnel) is found. The defect No. 2 of the sternum is continuing into a wound canal directed backward and downward, injuring the wall of the left heart, inner part of the lower lobe of the left lung and the left half of the diaphragm. The defect No. 3 of the sternum is found in the midline and is continuing in the wound canal directed backward and upward, injuring the left auricle and the corona cordis. Carboxyhemoglobin or cyanides could not be detected in the decedent's blood, indicating that the decedent was dead before the ambulance caught fire. The decedent was sober at the time of death.

Conclusion

Rules for the Behavior in Combat of the International Red Cross Committee demand that staff and objects with the Red Cross sign be respected (1). However, this rule is continually breached by the Yugoslav Federal Army and Serbian terrorists. The tragic death of our colleague shows once more that deliberate attacks on medical personnel, institutions and vehicles is one of the aggressor's main tactical weapons in producing fear and panic among the Croatian Armed forces and civilians.

References

1 International Committee of the Red Cross. Rules for the Behavior in Combat. Geneva: ICRC,1985.

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Civilian Victims in Bjelovar: Attack on Medical Personnel and a Church

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Abstract. Two cases of war crimes against civilian victims are presented. In the attack on Bjelovar launched from the Yugoslav Federal Army barracks on September 29, 1991, the church of St. Theresa of Avila, a cultural monument of the UNESCO first category was damaged and three elderly women, attending the Sunday mass, were killed. On November 13, 1991, a doctor and a medical team from the Bjelovar Medical center were killed by Serbian terrorists and Yugoslav Federal Army soldiers in an ambush near Bjelovar.

Key words: *Croatia; forensic expertise; medical personnel; Red Cross; war crime*

Introduction

The region of Bjelovar was an area of intensive attacks by the Yugoslav Federal Army (YFA) forces (1). This paper presents forensic data on four civilian victims; one doctor from the Bjelovar Medical Center and three women killed in a church. On September 29, 1991, the YFA opened heavy artillery fire on Bjelovar from its barracks in the town. Refusing to surrender and leave Bjelovar peacefully, the YFA commanding officer launched the attack, destroying the houses around the barracks and in other parts of the town. The town hospital and a retirement home were damaged, as well as the church of St. Theresa of Avila, where three women took shelter just before the Sunday mass. They were killed in the doorway of the parish offices (Fig. 1), and the church itself, a monument of the 1st UNESCO category, was damaged (Fig. 2). The second case concerns an attack on medical personnel. On November 13, 1991, Dr. A.V., a gastroenterologist from the Bjelovar Medical Center, his driver and members of a Croatian National Guard (CNG) medical unit went towards the front-line to execute the routine medical activities. A.V. and the driver were in a medical transportation vehicle, properly marked by Red Cross signs, and six members of the CNG medical unit followed them in another car. In the village of Velika Bastaja, they were ambushed by Serbian paramilitary troops and YFA soldiers, and killed by machine-gun fire (Fig. 3). The investigation on the spot revealed that the most probable weapon used was an anti-aircraft machine-gun, positioned on an armored military vehicle.

Attack on a Church

DECEDENT: K.K., female, aged 79

Autopsy Code: Kir.I.360/91-1

External Examination: The cadaver is of a short, adipose female. The postmortem rigidity is pronounced. The skin is pale. Below the left breast, an explosive wound is found, measuring 3 cm in diameter. The wound penetrates into the thoracic cavity and blood can be squeezed out by pressure. On the outer side of the right forearm, a laceration is found, measuring 3 cm in diameter. On the right foreleg and lower part of the thigh, a laceration measuring 31:18 cm, with fractures of the

Figure 1. North view of the church of St. Theresa of Avila from the XVIII century. Three women were killed in the doorway of the parish offices just before the mass on September 29, 1991, when the YFA launched heavy artillery attack on Bjelovar. Photo: M. Medar, Bjelovar.

foreleg bones and conquassation of the muscles, blood vessels and nerves, is found.

Pathoanatomical Diagnosis/Cause of Death:

Explosive wounds of the chest and right extremities
Vulnera explosiva thoracis et extremitatis dextri

Opinion: According to the collected data, the decedent K.K. was killed with grenade fragments in the local church during a heavy artillery attack on Bjelovar. The external examination revealed an explosive wound of the right side of the chest, with consequent bleeding into the thoracic cavity, and an explosive wound of the foreleg and thigh. The injuries caused extensive bleeding. Death was violent.

DECEDENT: R.P., female, aged 61

Autopsy Code: Kir.I.360/91-2

External Examination: The cadaver is of a short, adipose female. The postmortem rigidity is pronounced. The skin is pale-grey. In the left armpit, an explosive wound measuring 15:10 cm is found, with conquassated musculature and blood vessels of the axilla. In the left inguinal region, above the external genitalia, an explosive wound is found, measuring 24:19 cm, with ruptures of large blood vessels of the left thigh and pelvis and multiple bone fractures of the left pelvic bones. On the right foreleg, an explosive wound is found, measuring 7:5 cm. A metal fragment was recovered from the wound.

Figure 2. South view of the Bjelovar's church of St. Theresa of Avila from the XVIII century. The roof was damaged during the heavy artillery attack launched by the YFA on the town. The sign of protection for monuments of the 1st UNESCO category is visible on the church tower. Photo: M. Medar, Bjelovar.

Pathoanatomical Diagnoses/Cause of Death:

Explosive wounds of the left axilla, pelvis and thigh and right foreleg
Vulnera explosiva axillae sinistrae, pelveos et femoris sinistri et cruris dextri

Opinion: According to the collected data, the decedent R.P. was killed in a local church during a heavy artillery attack on Bjelovar. The external examination revealed explosive wounds of the left axilla and pelvis with ruptures of the large blood vessels and musculature. The consequent bleeding led to the lethal outcome. Death was violent.

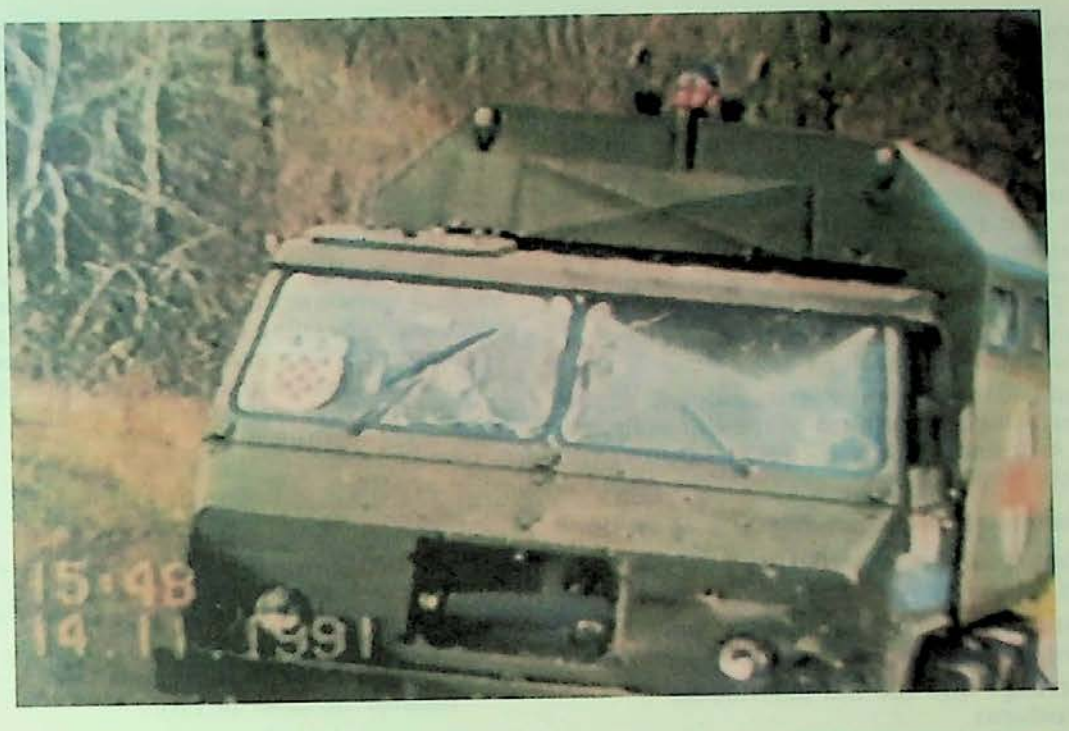
DECEDENT: A.D., female, aged 67

Autopsy Code: Kir.I.360/91-3

External Examination: The cadaver is of a medium-high, adipose female. The skin is pale-grey. Below the right costal arc, an explosive wound measuring 18:12 cm is found. Several loops of the small intestine are protruding from the wound opening. In the depth of the wound, ruptures of the liver, greater omentum and small intestine are found. Approx. 1000 ml of blood is recovered from the abdominal cavity. Three explosive wounds are found on the left foreleg, each measuring approximately 3 cm.

Pathoanatomical Diagnoses/Cause of Death:

Explosive wound of the abdomen, ruptures of the liver, greater omentum and small intestine



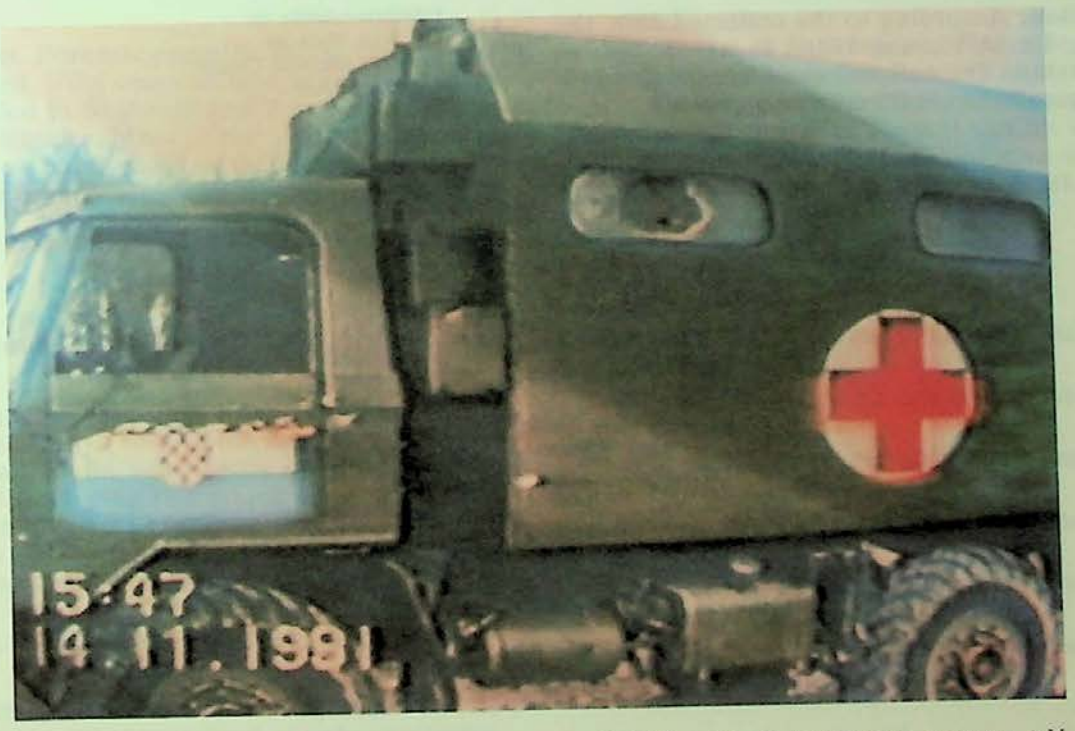


Figure 3. Medical transportation vehicle ambushed in Veliki Bastaji in Bjelovar region. A doctor, A.V., his driver and 6 members of the Croatian National Guard medical unit were killed by gun-fire.

Vulnus explosivum abdominis, rupturae hepatis, omenti majoris et intestini tenuis

Opinion: According to the collected data, the decedent, A.D., was killed in the local church during a heavy artillery attack on Bjelovar. The external examination revealed a large explosive wound of the abdomen, with ruptures of the liver, greater omentum and small intestine. The injuries caused extensive bleeding, which was a direct cause of death. Death was violent.

Attack on Medical Personnel

DECEDENT: A.V., male, aged 43

Occupation: doctor in the Bjelovar Medical Center

Autopsy code: Kir.I.460/91-5

External Examination: The cadaver is of a well built, 182 cm-high male. The postmortem rigidity is pronounced. The skin is pale. Small excoriations are found on the skin of the face. The neck is medium-sized, the chest symmetric. On the left side of the chest, a large exit gunshot wound with contused margin, measuring 4.5:2.5 cm, is found. On the right side of the chest, near the right shoulder, an entrance gunshot wound with contused margins, measuring 1.5 cm in diameter, is found. The thumb is missing on the left hand. An explosive wound, measuring 1 cm in diameter is found on the right foreleg.

Internal Examination: Partial autopsy of the chest is performed. A rupture of the left lung and the heart is found, with subsequent hemorrhage into the left hemithorax.

Pathoanatomical Diagnoses/Cause of Death:

Gunshot wound of the chest
Vulnus sclopetarium thoracis

Rupture of the heart and the left lung
Ruptura cordis et pulmonis sinistri

Hemorrhage into the left hemithorax
Hematothorax

Opinion: According to the collected data, the decedent, Dr. A.V., was killed in an ambush in Veliki Bastaji. The external examination and partial autopsy of the chest revealed a gunshot wound of the chest, with consequent rupture of the heart and left lung and hemorrhage into the left thoracic cavity. The death was violent. The intensity of the injuries was such that even urgent medical help wound not have saved the decedent's life.

Conclusion

The killing of a doctor with 7 members of medical personnel and three women in a church represent appalling evidence of the aggressor's brutality and disregard, not only for human life, but for the institutions that are sacred to every modern society: medicine and medical personnel and sacral institutions.

References

1 Žic R, Đikić I. War against Croatia: a view through human casualties in the region of Bjelovar, Grubišno Polje, Daruvar and Pakrac. Croat Med J 1992;33 (War Suppl 2):78-84.

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Civilian Massacre in Škabrnje and Nadin

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Abstract. Forensic expertise of the civilian massacre in the villages of Škabrnje and Nadin near Zadar are presented. Fifty-one civilians were killed by Serbian terrorists and Yugoslav Federal Army soldiers; 44 were killed in Škabrnje and 7 in Nadin. The age of the victims ranged from 23 to 92; almost half of them were females. Most of the victims were executed by close-range gunshots. Several victims were tortured before execution. One female was first shot and then run over by a tank. One old man died from bronchopneumonia after the fracture of the right femur and two older persons froze to death.

Key words: *Croatia; forensic expertise; massacre; war crime*

Description of the Event

Serbian terrorists and soldiers of the Yugoslav Federal Army (YFA) attacked the villages of Škabrnje and Nadin near Zadar on November 18 and 19, 1991. During the attack they looted the villages and killed 51 civilians. On November 21 and 22, 1991, Croatian officials visited the villages and gave the following report. Following the information released by the YFA Headquarters from Benkovac garrison, the official committee recorded the following facts:

Cadaver No. 1, (name unknown): male, middle aged, dressed in military uniform of unknown origin, personal signs: mustaches, no documentation.

Cadaver No. 2, (name unknown): female, 60 yrs of age, civilian clothes.

Cadaver No. 3, (name unknown): male, 65 yrs of age, civilian clothes.

Cadaver No. 4, (name unknown): male, 65 yrs of age, civilian clothes.

Cadaver No. 5, (name unknown): male, 75 yrs of age, civilian clothes.

Cadaver No. 6, (name unknown): male, 70 yrs of age, civilian clothes.

Cadaver No. 7, (name unknown): male, 60 yrs of age, civilian clothes.

Cadaver No. 8, (name unknown): male, 70 yrs of age, civilian clothes.

Cadaver No. 9, (name unknown): male, 35 yrs of age, civilian clothes.

Cadaver No. 10, (name unknown): male, 40 yrs of age, civilian clothes.

Cadaver No. 11, (name unknown): male, 50 yrs of age, civilian clothes.

Cadaver No. 12, (name unknown): female, in civilian clothes, run over by a tank.

Forensic Findings:

All cadavers were transported to the Pathology Ward of the Zadar General Hospital. The survivors of the massacre and the relatives of the victims identified the dead (Fig. 1). The European Community monitors were also present during the identification procedure (Fig. 2). The forensic expertise of 48 cases was performed at the Pathology Ward of Zadar Medical Center.

Table 1 summarizes the type of wounds, mode of killing and causes of death of the victims. The age of the victims ranged from 23 to 92 years; 10

Table 1. Summary of forensic findings in the civilians massacred in Škabrnje and Nadin

	Age (yrs)	Sex	No. and type of injuries	Close-range gunshots	Other injuries	Cause of death
P.J.	57	M	7 gunshots	head (1)		Traumatic and hemorrhagic shock
J.J.	83	F	explosion			Conquassation of the brain
Š.Š.	36	M	explosion			Conquassation of the brain
B.M.	38	F	4 gunshots	head (3)		Conquassation of the brain
Č.Ž.	23	M	8 gunshots	head (1)		Traumatic and hemorrhagic shock
H.V.	38	M	4 gunshots	head (1)		Conquassation of the brain
V.S.	35	M	4 gunshots	head (1)		Conquassation of the brain
R.K.	59	F	1 gunshot		Squashed brain and trunk	Conquassation of the brain
R.N.	61	M	13 gunshots	head (2)		Conquassation of the brain
R.M.	32	M	8 gunshots	head (3)		Conquassation of the brain
Š.N.	36	M	8 gunshots, explosion			Traumatic and hemorrhagic shock
Ž.R.	62	M	6 gunshots	head (2)	Excoriations of the face Multiple fractures of the nose	Conquassation of the brain
P.N.	69	M	2 gunshots	head (1)	Excoriations of the face Left periorbital hematoma	Conquassation of the brain
V.S.	55	F	2 gunshots	head(1)	Excoriations of the face	Conquassation of the brain
R.I.	64	M	3 gunshots	neck (2)		Conquassation of the spinal cord
J.P.	55	M	4 gunshots	head (1) neck (2)	Excoriations of the face and left forearm	Conquassation of the spinal cord
P.I.j.	59	M	6 gunshots	head (1) neck (1)	Conquassation of the spinal cord	
P.G.	36	M	9 gunshots	head (2)	Excoriations of the face	Conquassation of the brain
J.N.	36	M	8 gunshots			Traumatic and hemorrhagic shock
Š.K.	64	M	2 gunshots	head (2)	Excoriations of the head	Conquassation of the spinal cord
Ž.T.	63	M	10 gunshots	head (3)		Conquassation of the spinal cord
Ž.P.	63	F	explosion			Traumatic and hemorrhagic shock
Ž.M.	77	F	6 gunshots		Excoriations of the face	Traumatic and hemorrhagic shock
B.J.	67	M	6 gunshots	head (2) neck (1)		Conquassation of the brain
J.G.	82	M	6 gunshots	head (3)		Conquassation of the brain
Š.G.	80	F	3 gunshots			Hemorrhagic shock
M.S.	35	M	9 gunshots			Traumatic and hemorrhagic shock
Š.R.	60	M	3 gunshots	head (2)		Conquassation of the brain
Š.V.	58	M	4 gunshots	head (2) neck (1)		Conquassation of the brain
M.J.	63	M	4 gunshots	head (1)	Excoriations of the face	Hemorrhagic shock
B.M.	48	M	2 gunshots	head (1)		Conquassation of the brain
P.M.	26	M	1 gunshot	head (1)	Excoriations of the face	Conquassation of the brain
Š.I.	30	M	1 gunshot	head (1)	Right orbital hematoma Contusions of the right eye	Conquassation of the brain
R.A.	36	M	1 gunshot	head (1)	Violent amputation of the left ear Contusions of the face, left eye, left kidney, and genitalia Manual strangulation Excoriations of the face Blood suffusions of the loin and flank	Conquassation of the brain
P.P.	49	M	3 gunshots	head (1) neck (1)		Conquassation of the brain
I.M.	84	M			Fracture of the right thigh	Bronchopneumonia
B.D.	40	F	6 gunshots	head (1)		Conquassation of the brain
Š.M.	58	F	9 gunshots	neck (1)		Conquassation of the spinal cord
Š.J.	80	M	11 gunshots	head (1)		Conquassation of the brain

Table 1. Summary of forensic findings in the civilians massacred in Škabrnja and Nadin (continued).

	Age (yrs)	Sex	No. and type of injuries	Close-range gunshots	Other injuries	Cause of death
Ž.M.	59	M	2 gunshots	head (1)		Conquassation of the brain
B.S.	63	F	8 gunshots	head (1) neck (1)		Rupture of the thoracic aorta
Č.M.	70	F	7 gunshots	head (1)		Rupture of the thoracic aorta
A.N.	26	M	11 gunshots	head (3)		Conquassation of the brain
D.M.	71	F	2 gunshots	head (1)		Conquassation of the spinal cord
R.J.	86	F	3 gunshots	head (1) neck (1)		Conquassation of the brain
R.D.	67	F				Congelation
B.I.	92	M			Excoriations of the face Left forearm hematoma	Congelation

were in 31-40 age group and 13 in the 61-70 age group. Five persons older than 80 years were killed. Explosive wounds were found in 3 and gunshot wounds in 41 victims. One was run over by a tank, one was killed by mechanical force and 2 froze to death. In 36 victims, close-range gunshot wounds were found on the head and neck. Thirty-two also had 2-11 gunshot wounds of the other body parts. Two close-range gunshot wounds were found in 10, and 3 close-range gunshot wounds in 6 victims. The localization of the close-range gunshot wounds was mostly the occipital region, then forehead, cheek, ear, chin, nose, temporal or parietal region. In one victim, injuries inflicted by mechanical force were found - strangulation, cutting off the auricle, contusions of the face and genitalia and excoriation of the face. One older woman was run over by a tank. One man, aged 84, died from bronchopneumonia and two, a female aged 67 and a male aged 92, froze to death.

DECEDENT: R.K., female, aged 59.

Autopsy Code: 187/91.

Comment: The victim was shot and than run over by a tank in Škabrnje on November 18, 1991. The autopsy was performed on November 23, 1991.

External and Internal Examination: The head, neck, chest, substantial part of the abdomen and the arms are completely squashed (Fig. 3). The head is a shapeless bloody mass with pieces of the scalp left. Numerous lacerations of the skin and multiple open fractures of the face and skull bones are found. The brain is completely squashed and mixed with pieces of soft tissues and skull bones. On the neck, cervical vertebrae and larynx cartilages are multiply fractured. The neck and the cervical spinal cord is also squashed. The chest is flattened. Chest organs, the lungs and the heart, part of the thoracic spine and ribs are squeezed through the ruptured diaphragm into the abdomen. On the left side of the chest there is a gunshot entrance wound measuring 2:1 cm. A large laceration of the abdominal wall is also found, with the abdominal organs protruding from the opening. The loops of the small intestine, as well as the liver, spleen and the kidneys are also squashed. Multiple fractures of thoracic vertebrae and all bones of both arms are found.

Pathoanathomical Diagnoses:

Conquassation of the head, neck, chest, abdomen and arms
Conquassatio capitis, colli, thoracis, abdominis et extremitatum superiorum

Lacerocontusion of the head, abdomen, arms and the right thigh
Vulnera lacerocontusa capitis, abdominis, extremitatum superiorum et femoris dextri

Multiple open fractures of skull bones, cervical and thoracal vertebrae, and bones of both arms
Fracturae multiplices multifragmentales complicatae ossium capitis omnium, columnae vertebralis, cervicalis et thoracalis et ossium extremitatum superiorum omnium

Conquassation and destruction of the cerebrum and cerebellum, pons, medula oblongata and cervical and thoracal spinal cord
Conquassatio et destructio cerebri, cerebelli, pontis, medullae oblongatae et medullae spinalis, cervicalis et thoracalis

Total disruption of the diaphragm
Ruptura diaphragmatis completa

Conquassation and protrusion of the heart, lungs, stomach, liver, spleen, kidney, and small intestine
Conquassatio et exenteratio cordis, pulmonum, ventriculi, hepatis, lienis, renum et intestini tenuis

Cause of Death:

Conquassation of the head, neck, chest and abdomen
Conquassatio capitis, colli, thoracis et abdominis

Opinion: The described squashing of the body was inflicted by extreme mechanical force - a tank, as admitted by the YFA. Prior to that, the victim was wounded by the tank machine-gun fire.

DECEDENT: R.A., male, aged 36.

Autopsy Code: 212/91.

Figure 1. The survivors and relatives of victims from Škabrnje and Nadin in the sad procedure of identification.

Figure 2. Dead bodies from Škabrnje and Nadin in front of Zadar Pathology Ward in the presence of EC monitors.

Comment: The victim was tortured and killed on November 18, 1991. The autopsy was performed on November 23, 1991.

External Examination: The cadaver is without left ear which was cut off by a sharp object, such as knife. A circular wound measuring 5.5 cm in diameter is found in the same region (Fig. 4). In front of the wound, open external auditory meatus is visible with sharply cut cartilage (Fig. 4). On the skin of right cheek, a stellate entrance gunshot wound, measuring 2.5 cm in diameter was found, surrounded by narrow marginal abrasion. In the beginning of the wound track, signs of firing by-products are found (Fig. 5). The exit gunshot wound is found in the left occipital region, measuring 5.5 cm in diameter. Through the exit wound, squashed brain tissue is protruding (Fig. 4). On both sides of the face, especially on the nose base

Figure 3. Decedent R.K. Head, neck and chest are completely squashed.

and around the eyes, excoriations and blood suffusions are found. On the skin of the right side of forehead and the cheek, chin and the right side of the neck, ten linear and parallel 12 cm long excoriations are found (Fig. 5). On the left side of the neck, violet suffusions are found. The suffusions are also found in the right loin and left flank. The excoriations are also found on the right sides of both knees.

Internal Examination: Multiple fractures are found on the skull base and occipital squama. On the right side of the occipital bone near the great foramen, a circular opening is found, measuring 1.5 cm in diameter. On the left side of the occipital bone, a defect measuring 7 cm in diameter is found. Basal part of both occipital and left temporal lobes, cerebellum, pons and brain stem are squashed. Fractures of both upper horns of thyroid cartilage and both big horns of hyoid bone with numerous suffusions in the surrounding tissue, mucosa and neck muscles are found. In the cortex of the right kidney as well as on the base of penis and both epididymi, a reddish contused areas suffused with blood are found. The heart dilatation with blood stasis, and edema of the lung and brain are found.

Pathoanathomical Diagnoses:

Gunshot wound of the head
Vulnus sclopetarium capitis

Multiple fractures of the skull vault and base
Fracturae multiplices basis et calvariae cranii.

Conquassation of cerebrum, cerebellum, pons and brain stem
Conquassatio cerebri, cerebelli, pontis et medullae oblongatae

Fracture of upper horns of the thyroid cartilage and bigger horns of the hyoid bone
Fractura cornu superioris cartilaginis thyreoideae et cornu majoris ossis hyoidei utriusque

Hematoma of the skin and muscles of the neck, soft paralaryngeal tissue and oesophageal and laryngeal mucosa
Haematomata cutis, subcutis et musculorum colli, textus mollis paralaryngealis et mucosae laryngis et oesophagi

Violent amputation of left ear
Amputatio violenta auriculae sinistrae

Linear skin excoriations of the right face and neck
Excoriationes lineares cutis faciei et colli lateris dextri

Contusions of the face, left eye, left kidney, penis and both epididymi
Contusiones cutis faciei et oculi sinistri, renis sinistri, penis et epididymidis utriusque

Bruises of the right flank skin and left thigh skin
Hematoma cutis regionis lumbalis dextrae et femoris sinistri

Skin excoriations of both knees
Excorationes cutis genus utriusque

Cause of Death:

Conquassation of the cerebrum, cerebellum, pons and brain stem
Conquassatio cerebri, cerebelli, pontis et medullae oblongatae

Opinion: Several different types of wounds caused by different mechanisms and weapons were found: gunshot wound of the head, manual strangulation bruises and contusions of neck skin and

Figure 4. Decedent R.A. Left ear was cut by a sharp object. The exit gunshot wound in left occipital region is seen with the squashed brain tissue protruding from the opening.

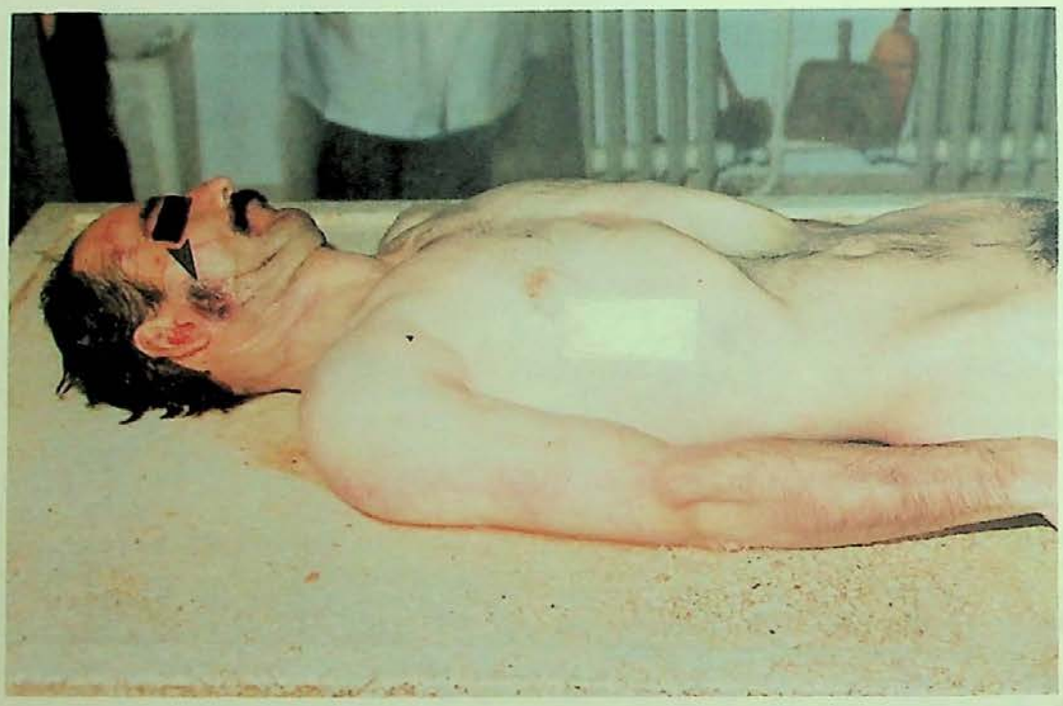

Figure 5. Decedent R.A. Entrance gunshot wound of the right cheek. Numerous linear excoriations are seen on the right forehead and right cheek.

neck soft tissue, fracture of the larynx cartilage and hyoid bone, linear excoriations most probably inflicted by human nails (a female Serbian terrorist), stabbing wound of left ear, injuries inflected by heavy mechanical force; blunt objects, hands or legs (contusions of face skin, left eye, left kidney, penis; blood suffusions of the trunk, left leg and both knees). The gunshot wound was characteristic of a close-range gunshot wound.

DECEDENT: P.G., male, aged 36.

Autopsy Code: 197/91.

Comment: The victim was killed in Škabrnje on November 18, 1991. The autopsy was performed on November 23, 1991.

External Examination: In the left and right occipital regions, two stellate entrance gunshot wounds with the signs of firing by-products are

Figure 6. Decedent P.G. Entrance gunshot wound of the left occipital region. Three entrance gunshot wounds in the back and one exit gunshot wound in the right shoulder are also visible.

found (Fig. 6). The entrance wound in the left side of occipital marginal abrasion 2:1.5 cm while the right one measures 1.5 cm in diameter. Each wound has a contusion band and the right also has a thin band of gunsmoke. The exit wound of the left entrance wound is found in the left temporoparietal region as a large defect of the scalp and the skull, measuring 11:9 cm. The left parietal and temporal lobes are squashed and squeezed out through the skull defect. The gunshot canal of the right entrance gunshot wound ends blindly in the skull. A tangential gunshot wound is found on the skin of the chin. Numerous redbrown excoriations are found on the skin of the forehead, nose and the right cheek. On the back side of the chest, 5 oval entrance gunshot wounds measuring 4-6 mm and encircled by a marginal abrasion are found. One exit gunshot wound is found on the left shoulder, measuring 3.5 cm, while the other four are found on the front side of the chest measuring 1-5 cm in diameter. One entrance gunshot wound is found in the left gluteal region. A gunshot wound of the left forearm is also found with fractures of the radius and ulna.

Internal Examination: Multiple fractures of the skull vault and base are found. The cerebrum, cerebellum and pons are squashed. On the back of the right temporal pyramid, a deformed bullet is recovered. On the chest, a double fracture of the breastbone, fracture of the left claviele and the 9th thoracic vertebra with squashed spinal cord are found. On the back of the chest, fractures of the 4th, 9th and 10th left are ribs are found. In both lungs, two lacerations measuring 1-3 cm are found. About 350 ml of blood is found in each thoracic cavity. The gunshot wound track in the left gluteal region ends blindly in the broken left hip bone. A deformed bullet is recovered near the left hip bone.

Pathoanathomical Diagnoses:

Gunshot wounds of the head, chest, pelvis and left forearm
Vulnera sclopetaria capitis, thoracis, pelvis et antebrachii sinistri

Multiple fractures of the skull vault and base
Fracturae multiplices calvariae et basis cranii

Conquassation of the cerebrum, cerebellum, pons and thoracic spinal cord
Conquassatio cerebri, cerebelli et pontis et medullae spinalis thoracalis

Fractures of the sternum, 4th, 9th, and 10th left ribs, left claviele, hip, radius and ulna and 9th thoracic vertebra
Fracturae sterni, costae 4, 9 et 10 sinistrae, claviculae sinistrae, ossis ilei coxae sinistrae et ossium antebrachii sinistri et vertebrae 9 thoracalis

Lacerations of both lungs
Vulnera lacerata (canales) pulmonis utriusque

Hemorrhage into both thoracic cavities
Haematothorax bilateralis

Cause of Death:

Conquassation of the cerebrum, cerebellum and pons
Conquassatio cerebri, cerebelli et pontis

Opinion: Nine gunshot wounds were found. Two gunshot wounds found in occipital region were characteristic of close-range gunshot wound. All others were long-range gunshot wounds. Gunshot wounds of the head caused the squashing of cerebrum and cerebellum and pons. The excoria-

Figure 7. Decedent Ž.R. Entrance gunshot wound of the right occipital region.

tions on the face were inflicted by a heavy blunt object.

DECEDENT: Ž.R., male, aged 62.

Autopsy Code: 193/91.

Comment: The victim was killed in Škabrnje on November 18, 1991. The autopsy was performed on November 23, 1991.

External Examination: In the right occipital and posterior part of the right parietal region, two entrance gunshot wounds are found (Fig. 7 and 8). The one in the right occipital region measures 8 mm in diameter (Fig. 7), while the other is of stellate appearance with barely visible contact impression of the gun, measuring 1.5 cm in diameter. In the beginning of the gunshot track, a signs of gunsmoke are found. The exit gunshot wounds are found behind the left ear (4:2 cm) and on the left side of the neck (2.5:2 cm). On the left side of the chest, a gunshot wound is found, and the exit wound is found on the left shoulder. The gunshot track is continuing through the left upper arm. The entrance wound measures 1.5 cm in diameter, while the exit gunshot wound measures 4:2 cm. On the abdominal wall, two entrance gunshot wounds are found, one on the left side of the abdomen, measuring 8 mm, and the other on the right side, measuring 7 mm. Both of them are surrounded by marginal abrasions measuring 3 mm in diameter. One exit gunshot wound is found just beneath the right costal arcus (4 cm in diameter). A part of omentum is protruding from the wound opening. The exit of this wound is found in the left gluteal region. In the lateral upper part of the right thigh, an entrance gunshot wound is found, measuring 8 mm in diameter and encircled by a marginal abrasion measuring 3 mm in width, while the exit wound is found on the outside aspect of the upper part of the left thigh, measuring 2:1 cm. On the forehead and left cheek, red-brown excoriations are found. On the nose base, a laceration measuring 1.5 cm and a fracture of nose bones is found.

Internal Examination: Fractures of the right parietal bone, occipital bone and left temporal bone caused by gunshot wounds are found. The first two cervical vertebrae are broken. Both occipital lobes, left temporal and right parietal lobe, left hemisphere of the cerebellum, the pons, brain stem and the cervical spinal cord are squashed. In the right parietal and occipital regions, bone defects measuring 1 cm in diameter are found. In the left occipital region two defects measuring 2 cm in diameter are found. In the abdominal cavity, 300 ml of blood is recovered. Lacerations of the liver and small intestine are found. Multiple fractures of the left hip bone and both pubic bones are found.

Pathoanathomical Diagnoses:

Excoriations of the face and lacerocontusion of the nose
Excoriationes cutis faciei et vulnus lacerocontusum cutis nasi

Open fractures of nasal bones
Fractura complicata ossium nasalium

Gunshot wounds of the head, neck, chest, abdomen, left forearms and both thighs
Vulnera sclopetaria capitis, colli, thoracis, abdominis, brachii sinistri et femoris utriusque

Multiple fractures of the skull vault and base, 1st and 2nd cervical vertebrae and pelvic
Fracture multiplices calvariae et basis cranii, vertebrae cervicalis I et II et pelvis

Figure 8. Decedent Ž.R. Entrance gunshot wound of the back of the head, below the entrance gunshot wound described in Fig. 7. The exit gunshot wounds are visible behind the left ear and on the left side of the neck.

Conquassation of cerebrum, cerebellum, pons, brain stem and cervical spinal cord
Conquassatio cerebri, cerebelli, pontis, medullae oblongatae et medullae spinalis cervicalis

Rupture of the liver and small intestine
Ruptura hepatis et intestini tenuis

Hemorrhage into abdominal cavity
Hematoperitoneum

Cause of Death:

Conquassation of the cerebrum, cerebellum, pons, brain stem and cervical spinal cord
Conquassatio cerebri, cerebelli, pontis ac medullae oblongatae et medullae cervicalis

Opinion: A total of 6 gunshot wound were found: two on the head, two on the abdomen, one on the thighs, and one on the chest and left upper arm. The directions of the head gunshot wound tracks are downward, forward and to the left, causing the fractures of vault and the base of the skull, cervical vertebrae as well as squashing of the cerebrum, cerebellum, pons, brain stem and cervical spinal cord. These wounds were inflected from close range. The directions of other wounds differ. The direction of the gunshot canal of the chest is to the left. One of the abdominal gunshot wounds is directed upward and to the right, while the direction of the other is backward and to the left. The direction of the wounds on the thighs is to the right, fracturing both pubic bones. Gunshot wounds of the trunk and thighs were inflected from the distance greater than 1 m. The signs of bleeding in the abdominal cavity indicate that they may have been inflicted before the gunshots wounds to the head. The excoriations and lacerations of the nose and the fracture of the nose bones were inflicted by a blunt mechanical force.

DECEDENT: A.N., male, aged 26.

Autopsy Code: 224/91.

Comment: The victim was killed in the village of Nadin, on November 19, 1991. The autopsy was performed on November 26, 1991.

External Examination: Three stellate entrance gunshot wounds measuring 1.0, 1.5 and 1.8 cm in diameter are found on the chin. The signs of gunsmoke and marginal abrasions are also found (Fig. 9). The head is deformed; on the left cheek, nose and left orbital cavity without the eye, an exit gunshot wound measuring 6 cm in diameter is found (Fig. 9). From the middle of the forehead through the top of the head a laceration is found, measuring 19:10 cm. The skull is empty and completely open, without brain. Multiple fractures of the skull vault and base, as well as the face bones are found. On the front half of the right neck, an entrance gunshot wound measuring 8 mm in diameter is found. The exit wound is found on the right shoulder, measuring 3:2 cm. Eight entrance gunshot wounds are found on the chest, measuring 7-8 mm. Exit gunshot wounds are found on the back and measure 1.5 to 5 cm in diameter.

Internal Examination: The cerebrum is squashed and completely squeezed out from the skull. The left eye is missing. On the chest, fractures of the right clavicle, sternum, four ribs on each side and 10th thoracic vertebra with squashed spinal cord are found. Lacerations of both lungs are found. Lacerations of the diaphragm, heart

Figure 9. Decedent A.N. Three entrance gunshot wounds of the chin. Thue skull is open and empty.

and liver are also found, with signs of bleeding into the pleural and abdominal cavity.

Patoanathomical Diagnoses:

Gunshot wounds of the head, neck, chest and abdomen
Vulnera sclopetaria capitis, colli, thoracis et abdominis

Multiple fractures of the skull bones
Fracturae multiplices ossium capitis omnium

Conquassation and destruction of the cerebrum and the left eye
Conquassatio et destructio cerebri et oculi bulbi sinistri

Fractures of the ribs, sternum, right clavicle and 10th thoracic vertebra
Fracturae costarum, sterni, claviculae dextrae et vertebrae X thoracalis

Conquassation of the thoracic spinal cord
Conquassatio medullae spinalis thoracalis

Laceration of the lungs, heart, liver and diaphragm
Vulnera lacerata (canales) pulmonum, cordis, hepatis et diaphragmatis

Hemorrhage into the pleural and abdominal cavities.
Haemascos et haematothorax bilateralis

Cause of Death:

Conquassation and destruction of the cerebrum
Conquassatio et destructio cerebri

Opinion: A total of 12 gunshot wounds were found: 3 of the head, one of the neck and 8 of the chest. The directions of the head gunshot wounds were toward the left cheek and left parietal region with complete destruction of the cerebrum. This injury caused an instantaneous death. Head gunshot wounds were inflicted from a close range. Chest gunshot wounds were inflicted before the head wounds, from a distance greater than 1 m.

Decedent: Š.G., female, aged 80.

Autopsy Code: 205/91.

Comment: The victim was killed in Škabrnje, on November, 18, 1991. The autopsy was performed on November 23, 1991.

External Examination: On the left side of the chest, two oval entrance gunshot wounds are found, one above and the other on the left brest, measuring 9:5 mm and 8:4 mm, respectively, with a marginal abrasion measuring 3-6 mm in width (Fig. 10). Exit wounds are found on the right side of the back, the first one above the right scapulae measuring 1.5 cm in diameter and the second one near the 10th thoracic vertebra on the right side, measuring 1.3 cm. An entrance gunshot wound is found on the ulnar side of the forearm, measuring 7:3 mm, while the exit wound is found on the dorsal side, measuring 1.5 cm in diameter. Open fractures of ulne and radius are also found.

Internal Examination: In the area of the chest entrance gunshot wounds, fractures of the 3rd and 7th left ribs are found. In the area of the exit gunshot wound, the right scapula and 10th thoracic vertebra are broken. In both thoracic cavities, blood is found (800 ml in left and 400 ml in the right half). Lacerations of both left lung lobes and right upper lung lobe, representing gunshot

Figure 10. Decedent Š.G. Two gunshot wound in the left chest and one on the left forearm (arrow).

tracks, measuring 1.5-2.5 cm in diameters, are found with the ruptured bronchi and lung blood vessels.

Pathoanathomical Diagnoses:

Gunshot wounds of the chest and the left forearm
Vulnera sclopetaria thoracis et antebrachii sinistri

Fractures of the 3rd and 7th left ribs, right scapulae and 10th thoracic vertebra
Fractura costae III et VII sinistrae, scapulae dextrae et vertebrae X thoracalis

Laceration of both lungs
Vulnera lacerata (canales) pulmonis utriusque

Blood in both pleural cavities
Haematothorax bilateralis

Open fractures of left radius and ulna
Fractura complicata radii et ulnae sinistrae

Cause of Death:

Haemorrhagic shock
Shock haemorrhagicum

Opinion: An old women was killed by three shots, two in the chest and one in left forearm, from the distance greater than 1 m. The nature and location of the wounds of the forearm indicate that the decedent tried to protect herself by rising the arm. The decedent was alive after the gunshot wound of the head and died because of haemorrhagic shock (bleeding from the lungs).

Conclusion

The majority of the 48 victims of Škabrnje and Nadin massacre (36 of them) were killed by close-range gunshot wounds. In twenty persons killed, only one gunshot wound was documented. Two or three close-range gunshot wounds were documented in 16 victims. The majority were killed by shots to the head (29). This massacre is yet another piece of evidence of the extreme brutality of Serbian terrorists and the soldiers of the Yugoslav Federal Army. After the massacres in Škabrnje and Nadin, several others occurred near Zadar: 21 civilians were murdered in the villages of Bruška (eleven), Zemunik Donji (four), Jasenice (five) and Zaton Obrovački (one). These cases have not been investigated yet because the territory is still controlled by the YFA and Serbian terrorists.

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Deliberate Killings of Reporters and TV and Radio Personnel in the War against Croatia

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Abstract. Many members of TV and newspaper crews were killed in the war against Croatia. Up to January 1, 1992, 14 deaths of journalists and TV and radio maintenance workers were recorded by the Croatian Medical Corps Headquarters. This paper presents a part of the medical forensic evidence regarding their deaths. The majority of killed reporters were Croatian citizens, and all were killed while performing their professional duty. Several foreign reporters were also killed.

Key words: *Croatia; forensic expertise; reporters; war crime*

Introduction

Up to January 1, 1992, 14 deaths of news and TV reporters were recorded on the Croatian side by the Croatian Medical Corps Headquarters (1-3). Five reporters were wounded (1-3). Two Russian reporters are listed as missing, and the hope that they are alive is diminishing. Nine reporters were killed in the Banija region, 3 in East Slavonia, 1 in Lika and 1 in Kordun. They were mostly Croatian citizens, working for Croatian TV and Radio, but several of them were foreign citizens. The following are transcripts of forensic autopsy records, regarding the deaths of several reporters and TV or radio personnel.

East Slavonia

The first and the last victims among reporters in the war against Croatia, were killed in Vukovar and those cases have still not been investigated properly. The body of S.P., a reporter from Radio Vukovar, was never found but witnesses state that he was shot and burned during the YFA attack on the villages od Dalj, Aljmaš and Sarvaš in the beginning of August (4). The fate of the last victim, S.G., a Radio Vukovar reporter and the organizer of a radio-school for 2,000 children imprisoned in Vukovar (5), is not known, but we still hope that he is alive. However, many prisoners from Serbian concentration camps declared that he was dead. According to the collected data, he was arrested by the YFA after they had entered Vukovar, and was taken in an unknown direction. The fate of B.P., the head of the Radio Vukovar technical crew is similar. Although he is of Serbian nationality, the YFA arrested him and took him away together with S.G.

Several other reporters were wounded in Vukovar and three were killed: M.Ž., a correspondent for a Belgrade newspaper, was killed in an attack on Vukovar on October 9; J.Č., a correspondent for a Belgrade newspaper, was killed by an ar-

tillery shell on November 12, 1991; and B.M., a freelance journalist, was killed in an attack on Vukovar on November 16, 1991.

One reporter and one TV technician were killed near Osijek.

DECEDENT: D.P., aged 37, Croatian citizen

Autopsy Code: S-400/91, Osijek General Hospital

Occupation: TV and radio maintenance worker, Croatian TV

Comment: killed from a YFA plane while working on *Belje* TV transmitter on August 23, 1991.

Pathoanatomical Diagnoses:

Advanced putrefaction of the body
Stadium putrefactionis

Fracture of cervical spine
Fractura vertebreae cervicalis

Conquassation of cervical spinal cord
Conquassatio medullae spinalis

Cause of Death:

Conquassation of the cervical spinal cord
Conquassatio medullae spinalis

Opinion: The body of the decedent D.P. was recovered 10 days after death, so that the putrefaction process was very advanced. Therefore, the nature of the wounds could not be established with certainty. The fracture of the cervical spine with consequent squashing of the spinal cord was found. The wounds were inflicted by mechanical force, either by shrapnel or by a projectile.

DECEDENT: Ž.K., aged 42, Croatian citizen

Autopsy Code: S-397/91, Osijek General Hospital

Occupation: TV cameraman, Croatian TV, Zagreb

Comment: killed by a tank machine-gun while filming the situation in Osijek on August 28, 1991. The YFA later claimed that they mistook his camera for a rocket launcher.

Pathoanatomical Diagnoses:

Gunshot wound of the head
Vulnus sclopetarium capitis

Conquassation of the head and upper part of the face
Conquassatio capitis et partis superioris faciei

Cause of death:

Gunshot wound of the head and face
Vulnus sclopetarium capitis et faciei

Opinion: According to the collected data, the decedent Ž.K. was shot on duty by the YFA. The external examination and autopsy, revealed the conquassation of the skull vault and the brain, with multiple fractures of the rest of the skull. Conquassation and multiple bone fractures of the forehead and upper right part of the face were also found. The injuries were most probably inflicted by a projectile of a very high kinetic energy. A projectile from a tank machine-gun cannot be excluded. All injuries were inflicted while the decedent was still alive and the death was instantaneous.

Just before the conclusion of this paper, another reporter was killed near Osijek: R.C.W., Swiss citizen, a journalist. He was killed on January 6, 1992, and his death was classified as homicide. The investigation is still open and medical data cannot be disclosed as yet.

Banija

Nine reporters were killed in this region. The first victim was E.S., German citizen, a German correspondent; he was killed on July 26, 1991. The next victim was G.L., a TV cameraman for Croatian TV, killed on August 10, 1991. On October 8, 1991, Belgrade TV crew (Z.A., B.P., D.M. and S.I.) were killed near the village of Mokrice. This village was not controlled by Croatian forces.

The following are the transcripts of the autopsy reports on dead reporters autopsied in Sisak Medical Center or Zagreb School of Medicine.

DECEDENT: E.S., aged 44, German citizen

Autopsy Code: Kir. 267/91

Occupation: Journalist

Comment: E.S. was killed early in the war against Croatia, in the village of Prekopakra on July 26, 1991. That village was one of the Serbian terrorists' headquarters. Only one gunshot wound was found on his body, in the genital region, suggesting that he may have been executed by sniping rifle fire.

Pathoanatomical Diagnoses:

Gunshot wound of the genitals and abdomen
Vulnus sclopetarium penis et abdominis

Gunshot lesion of the urinary bladder and small intestine
Laesio sclopetaria vesicae urinariae et intestini tenuis

Gunshot lesion of the aortal bifurcation with consequent hemorrhage into the peritoneal cavity (1,900 ml)
Laesio sclopetaria bifurcationis aortae cum haematoperitoneo in quantitate ml MCM

Cause of Death:

Gunshot wound of the abdomen with lesion of the aortal bifurcation and subsequent hemorrhage into the peritoneal cavity
Vulnus sclopetarium abdominis bifurcationem aortae laedens cum haematoperitoneo in quantitate ml MCM

Opinion: According to the data received from the investigator and the police from Sisak, the decedent E.S. was wounded on duty in the village of Prekopakra on July 26, 1991. He was transported to the Sisak Medical Center, where he was pronounced dead on admittance. The autopsy revealed that the decedent died from a gunshot

wound of the abdomen with the injury of the aortal bifurcation and hemorrhage into the peritoneal cavity. The death was violent.

The external examination revealed an entrance gunshot wound measuring 12 mm in diameter and encircled by an even 2 mm-wide contusion band in the upper third of the right side of genitals. Many superficial defects measuring 1-3 cm were found on the skin of the outer side of the right thigh and inner side of the left foreleg. The external examination revealed approx. 1,900 ml of blood in the abdominal cavity. The wound track started just above the symphysis, penetrated the distal part of the small intestine in four places, ruptured the left side of the aortal bifurcation and ended in the left side of the 5th lumbar vertebra, where a deformed lead bullet was recovered. The wound track was directed upwards and to the left, forming and angle of 45° with the sagittal plane.

DECEDENT: G.L., aged 33, Croatian citizen

Autopsy Code: Sp. 52.488-864/91

Occupation: TV cameraman and reporter, Croatian TV, Zagreb

Comment: G.L. was killed by Serbian terrorists and the YFA near Hrvatska Kostajnica at 7:00 p.m. on August 10, 1991. The terrorists wounded him, and the Army refused to ensure his urgent transportation to the Clinical Center in Zagreb. That day, G.L. joined a police unit. While filming a reconnaissance expedition, he was first shot by automatic rifle fire. Rifle fire was followed by a mortar attack. Croatian police officer, Mr. Cindrić, contacted YFA officials, trying to organize an urgent helicopter flight to Zagreb, but the YFA generals Štimac and Rašeta refused to provide the helicopter. Moreover, they refused to secure the flight of a Croatian police helicopter. They expounded their reluctance with mortar fights continuing in the area, although YFA helicopters flew over several times. At 9:00 p.m. the police decided to transport G.L. to Zagreb in an ambulance. Although he received multiple direct blood transfusions from police officers, it was too late and he died halfway to Zagreb.

Pathoanatomical Diagnoses:

Gunshot wound of the right gluteal region involving iliac alae, 5th lumbar vertebra, spinal cord and left kidney
Vulnus sclopetarium regionis glutealis lateris dextri cum laesio allae ossis ilei dextri, vertebrae lumbalis V, medulae spinalis et renis sinistri

Gunshot wound of the left calf and right thigh
Vulnus sclopetarium cruris dextri et femoris sinistri

Explosive wound of the left forearm with multiple fractures of the left radius and ulna
Vulnus explosivum antebrachii sinistri cum fractura radii et ulnae sinistrae

Explosive wounds of the chest
Vulnera explosiva thoracis

Contusion of the right lung and aspiration of the blood
Contusio pulmonis dextri cum aspiratione sanguinis

Explosive wound of the left part of the back
Vulnus explosivum dorsi sinistri

Hemorrhage into the thoracic and abdominal cavity
Hematothorax and hematoperitoneum

Cause of Death:

Traumatic and hemorrhagic shock
Shock haemoragicum et traumaticum

Opinion: According to medical records, the decedent G.L. was dead when admitted to the Surgical Ward of the Clinical Center Zagreb on August 10, 1991. The autopsy of the decedent revealed that the death was violent, caused by traumatic and hemorrhagic shock.

An entrance gunshot wound is found in the right gluteal region, measuring 0.6 cm in diameter, 110 cm from the soles of the feet and 25 cm from the midline. A contusion band found on the lower margin measured 0.5 cm in diameter. The wound track is directed upward and to the left in an almost sagittal plane. It penetrates the gluteal muscles, the right iliac wing near the sacroiliac joint, the 5th lumbar vertebra, the spinal cord and the left kidney. Two exit wounds are found in the left lateral side of the abdomen, 132 and 136 cm from the soles of the feet, 25 and 27 cm from the midline, respectively.

Another entrance gunshot wound is found on the right calf, 45 cm from the soles of the feet. The wound track is penetrating the calf muscles and is directed upward and backward. The exit wound is found on the inner side of the right calf, 46 to 56 cm from the soles of the feet. A large irregular wound was found on the inner side of the left thigh, measuring 4:2 cm and located 63 to 69 cm from the soles of the feet. The wound track is directed upward and to the left, so that the exit wound (4:2 cm) is found on the latero-anterior aspect of the thigh, 79 to 82 cm from the soles of the feet. This wound is probably associated with the gunshot wound of the right calf, representing a single gunshot wound.

An irregular wound is found on the inner side of the forearm, measuring 7:3 cm. The wound track penetrates the muscles, nerves and blood vessels of the forearm and splits the ulna and the radius. The exit wound is found on the latero-posterior side of the forearm.

Several explosive wounds are found on the chest: one on the right side of the chest, more to the midline, below the right nipple, is located under the skin, and the exit wound is close to the middle of the chest, measuring 6:9 cm. Another explosive wound is found above the right nipple. The wound track runs obliquely under the skin and the exit wound is found on the upper side of the chest, near the neck.

On the back, a small and a big tangential wounds are found, similar to those inflicted by a projectile or its fragment. They are located in the left scapular region, the big one (11:4 cm) more upward and the small one (3:1 cm) more to the middle. The wounds are superficial, involving only the skin, subcutaneous tissue and a part of the underlying muscles.

All of the above wounds collectively represent an injury of such intensity so as to have caused the hemorrhagic and traumatic shock, which was the cause of the death.

Urgent and appropriate surgical help would most probably have saved the life of the decedent. At the time of death the decedent was not intoxicated with alcohol.

DECEDENT: P.B., aged 47, French citizen

Occupation: journalist, France

Comment: killed on duty in Petrinja on September 18, 1991

Pathoanatomical Diagnoses/Cause of Death:

Explosive wounds of the body
Vulnera explosiva corporis totius

Opinion: The external examination of the decedent P.B. revealed that the death was violent, caused by multiple explosive wounds of the whole body. Many irregular wounds were found on the front aspect of the body, with distinct burns in the middle and on the right side of the forehead and face, right side of the neck, right forearm and anterior wall of the chest and abdomen. Many fractures of the feet and lower thirds of both forelegs were found, with pronounced deformity. The wounds were probably inflicted by a close explosion of an explosive device. Direct injuries were caused partly by shrapnel and partly by high temperature and the resulting flame.

Another journalist, D.R., a Swiss citizen was reported killed on the same spot as Frenchmen P.B., but his body has never been recovered.

Kordun

One of the last victims among journalists in the war against Croatia was Ž.K., Croatian citizen, a correspondent for WTN. He was filming devastated houses in the village of Turanj near Karlovac when a shell fell close to him. Another correspondent for a foreign newspaper agency, P.B., Canadian citizen, was killed by a direct grenade hit while filming the events in Karlovac on October 6, 1991.

DECEDENT: Ž.K., aged 37, Croatian citizen

Autopsy code: 715/91

Comment: killed on duty in the village of Turanj near Karlovac

Pathoanatomical Diagnoses:

Explosive wound of the left arm
Vulnus explosivum brachii sinistri

Explosive wound penetrating into the left thorax, injuring the left side of the diaphragm, pancreas and the splenic vein
Vulnus explosivum perforatum thoracis lateris sinistri cum laesione diaphragmata lateris sinistri, pancreatis et venae lienalis

Rupture of the right hepatic lobe
Ruptura hepatis lobi dextri

Retroperitoneal hematoma of both lumbar regions with hemorrhage into the peritoneal cavity
Haematoma retroperitoneale et haematoperitoneum

Conquassating explosive wound of the right knee and foreleg
Vulnus explosivum conquassatum genus et cruris dextri

Cause of Death:

Traumatic and hemorrhagic shock after multiple explosive wounds
Shock traumaticum et haemorrhagicum propter vulneram explosivam

Opinion: The external examination of the decedent Ž.K. revealed an explosive wound of the left arm, left side of the chest, right knee and foreleg. The internal examination revealed the wound track beginning from the explosive entrance wound on the left side of the chest, descending obliquely downward and medially through the 11th intercostal space, perforating the left half of the diaphragm, the body and the tail of the pancreas and rupturing the splenic vein. This caused extensive hemorrhage into the retroperitoneum and peritoneal cavity. The described explosive wounds caused traumatic and hemorrhagic shock, which caused the death.

Lika

DECEDENT: N.S., aged 51

Occupation: TV maintenance worker

Comment: Killed in an air attack on the Gospić TV transmitter on September 15, 1991

Pathoanatomical Diagnoses:

Explosive wounds of the body
Vulnera explosiva corporis

Conquassation of the lungs
Conquassatio pulmonum

Rupture of the liver, thoracic aorta and mesenterium
Ruptura hepatis, aortae thoracicae et mesenterii

Fractures of the right ribs 7-10
Fracturae costarum VII-X lateris dextri

Hemorrhage into thoracic and abdominal cavity
Haematothorax bilateralis et hematoperitoneum

Putrefaction of the body
Stadium putrefactionis

Cause of Death:

Multiple explosive wounds of the body

Laesiones multiplices graves propter vulneram explosivam

Opinion: The external examination and autopsy of the decedent N.S. revealed multiple explosive wounds of the body. A piece of metal was recovered from the right lung. Conquassation of the lungs, rupture of the liver, mesenterium and aorta were revealed by autopsy. A large defect on the front side of the left thigh was also found. Death was violent and instantaneous, caused by multiple explosive injuries.

Conclusion

One of the characteristics of the war against Croatia is deliberate obstruction of gathering and spreading the information on the dirty war against Croatia. This has taken a form of destruction of numerous TV and radio transmitters in Croatia, and worst of all, deliberate killing of domestic and foreign reporters and TV and Radio personnel. Many reporters have been wounded, and others, arrested by the YFA, abused and accused of spying for the Croatian side. The lucky ones only had their equipment confiscated. The majority of killed reporters were Croatian citizens, and all were killed while performing their professional duty. Tragically, some of them even filmed their deaths. Several foreign reporters were also killed, which shows that for the YFA the nationality or citizenship does not matter, since they aim at preventing the information from going on the air.

References

1 Medical Corps Headquarters, Republic of Croatia: Daily report on the dead and wounded in Croatia. January 1, 1992.

2 Ministry of Information, Republic of Croatia. New victims among journalists. In: Thirty days of the war against Croatia, October 1991.

3 Ministry of Information, Republic of Croatia. New victims among journalists. In: Thirty days of the war against Croatia, November 1991.

4 Marcikić M, Kraus Z, Marušić A. Civilian massacre in Dalj. Croat Med J 1992;33(War Suppl 1):29-34.

5 Njavro L. Dr. Juraj Njavro, my husband. In: Marušić M, editor. Medical testimony of the Vukovar tragedy. Zagreb: Croatian Medical Journal, 1992:54-56

6 Kovačević S. Moral of the war against Croatia: A forensic picture. Croat Med J 1992;33(War Suppl 1):25-7.

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Civilian Victims of the War against Croatia in the Kordun Region

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Abstract. Autopsy records of 19 killed civilians from the Kordun region up to November 25, 1991, were analyzed. Most of the victims were of older age (range 21-81 yrs, median 50-60 yrs). Autopsy findings revealed gunshot wounds as the cause of death in 58% of them, which is unusual for civilian deaths in the war against Croatia (explosive wounds are more frequent than gunshot wounds). The work of forensic experts and police inspectors has been greatly impaired by intensive Yugoslav Federal Army and local Serbian terrorists' military operations in the region, including the Karlovac hospital.

Key words: *Croatia; forensic expertise; massacres; war crime*

Introduction

Up to November 25, 1991, 58 dead civilians from the Kordun region were recorded by the Medical Corps Headquarters of the Republic of Croatia. This number includes 1 child, 1 member of medical personnel and 1 reporter. In many cases, it was difficult to undertake a thorough and complete medico-legal investigation due to several reasons. Kordun is a region subject to intensive attacks by the Yugoslav Federal Army and Serbian terrorists. Villages with mostly Croatian population are mixed with those populated by Serbs.

Karlovac, the center of the region, has been under heavy artillery fire for months. Artillery attacks were so intensified that by the end of the year more than 60% of the town had been destroyed. For all these reasons, access to some villages with dead civilians, and proper forensic expertise in the hospital are almost impossible. The hospital itself has been the target of several artillery attacks and the quality of work has been considerably impaired (see article in this issue).

Victims

Table 1 presents results of the autopsies performed on 19 dead civilians in the period from September 23 to November 25, 1991.

The age of the victims ranged from 21 to 81, with a median of 50-60 years. Eleven out of 19 (58%) died from gunshot wounds, which differs from the number of gunshot wounds when the whole civilian population is analyzed (1). While explosive wounds are most frequent in the civilian population, only 7 civilians brought to the Karlovac General Hospital died from explosive wounds, while one women was burnt in her own house. The reason for this discrepancy may be that the Serbian terrorists in this region are mostly recruited from villages populated with Serbs, the type that are closely interwoven with those inhabited by the Croatian population. The terrorists stay in the region and the killings may be the result of their knowledge of their Croatian neighbors. The killing of Croatian neighbors has been the practice of Serbian terrorists in this war. In two instances, members of the same family

Table 1. Autopsy reports of 19 killed civilians in the Kordun region, September 23 to November 25, 1991

Decedent	Age	Sex[+]	Cause of Death	Comment
I.j.S.	72	F	Combustiones	burnt in her house
M.S.**	47	M	Vulnera sclopetaria abdominis	4 wounds, shot from the back in his yard
D.S.**	21	M	Vulnera sclopetaria thoracis	4 wounds, shot from the back in his yard
I.M.	50	M	Vulnera explosiva corporis et extremitatum	multiple wounds
J.G.	55	M	Vulnus explosivum femoris sinistri	
M.Ž.	60	M	Vulnera explosiva capitis, thoracis et extremitatum	multiple wounds inflicted by ofensive bomb M75
J.M.	65	F	Vulnus explosivum femoris sinistri	
I.O.	50	M	Vulnera sclopetaria capitis, trunci et extremitatum	found in underwear and barefooted in his yard; 4 wounds, shot from the front and side
J.B.	70	M	Vulnera sclopetaria thoracis et abdominis	2 wounds, shot from the front
A.M.	63	M	Vulnus sclopetarium thoracis et abdominis	weapon: shotgun fired from the front
N.M.#	70	M	Vulnera sclopetaria capitis, corporis et extremitatum	multiple close-range gunshots, fired from the front
N.M.Jr#	38	M	Vulnera sclopetaria capitis, corporis et extremitatum	multiple close-range gunshots, fired from the front and side
M.M.#	60	F	Vulnera sclopetaria capitis, colli, thoracis et extremitatum	multiple close-range gunshots, fired from the front
B.C.#	80	F	Vulnera sclopetaria capitis, colli et extremitatum	multiple close-range gunshots, fired from the side
M.B.	30	F	Vulnera sclopetaria trunci et extremitatis inferioris sinistri	multiple long-range gunshots, fired from the side
N.Š.	40	M	Vulnera sclopetaria trunci	multiple long-range gunshots, fired from the front and side
M.P.	56	M	Vulnera explosiva trunci et extremitatum	
M.M.	52	M	Vulnera explosiva capitis, trunci et extremitatum	
S.H.	81	M	Vulnera explosiva capitis, trunci et extremitatum	

[+] M - male, F - female

* father and son

father, son, mother and grandmother

were killed. A father and a son (M.S. and D.S.) were killed by gunshots fired into their backs. This happened in their own yard. Another family, a father, mother, son and grandmother, were killed in their house. The autopsy revealed that they all had multiple gunshot wounds. Two had extensive injuries of the head, whose origin could not be determined with certainty. There are indications they could have been inflicted by blunt mechanic force, but an intensive artillery attack on the site did not permit proper investigation.

The civilians in Karlovac have been wounded and killed by heavy artillery fire that have been continuously pouring onto the town from the Yugoslav Army barracks in Cerovac, Kamensko and Mekušje Gornje, settlements on the outskirts of Karlovac.

Conclusion

The work of forensic experts in the Kordun region is impaired by many factors, including intensive artillery attacks on Karlovac and its hospital, and a great accumulation of Serbian terrorist forces. Up to the end of the year, 65 civilian deaths have been recorded by the Croatian Medical Corps Headquarters, including children, medical personnel and news reporters. Most of the civilians were shot with fire-arms,

Figure 1. Decedent M.Ž. from Belajske Poljice. Multiple wounds were inflicted by an offensive bomb M75.

which is characteristic of villages in this region. The population of Karlovac, the center of the region, mostly suffered from explosive injuries. Civilians constitute 58% of total deaths in this region of intensive Yugoslav Federal Army military activity.

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Heavy Artillery Attack on the Pulmology Ward of the Osijek General Hospital

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Abstract. In the afternoon of November 27, 1991, a sudden heavy artillery attack was launched by the Yugoslav Federal Army from the Baranya region on the Pulmology and Tuberculosis Ward of the Osijek General Hospital. The building was directly hit with two projectiles and four fell into the yard. Four patients were killed and three wounded on the stairway while trying to take shelter in the basement. The dead and the wounded were patients with advanced tuberculosis or carcinoma of the lungs. This brutal attack showed once more that the Yugoslav Federal Army and Serbian terrorists have no respect for human lives and the Geneva Conventions.

Key words: *Croatia; forensic expertise; hospitals; Red Cross; war crime*

Description of the Event

The following is the English translation of the reports from the Pulmology Ward and the Department of Pathology and Forensic Medicine of the Osijek General Hospital concerning the attack on the Pulmology Ward:

At 5:30 p.m. on November 27, 1991, a sudden heavy artillery attack was launched from the Baranya region on the Pulmology and Tuberculosis Ward of the Osijek General Hospital. Thirty-six patients were stationed on the Ward and the doctors on duty were Drs. V. Fjačko and G. Petrović. The Ward was hit by 6 projectiles: 4 fell in the yard and 2 directly hit the building (Fig. 1). After the first explosion near the walls of the building, the patients were evacuated to the basement. The staircase was used for the evacuation. In that moment, a projectile directly hit the staircase, killing 4 and wounding 3 patients (Fig. 2). Two of the wounded had serious, and one light injuries. The wounded were transported to the Surgery Ward with an ambulance and the dead were transferred to the Department of Pathology and Forensic Medicine.

Killed patients:

1. A.M. (aged 55, from Borovo Naselje, automechanic by occupation); diagnosis: bilateral pneumonia (*Pneumonia abscendens bilateralis in sanationem - Pseudomonas aeruginosa*);

2. M.S. (aged 57, from Bračevci, farmer by occupation); diagnosis: cancer of the lungs with metastases (*Carcinoma lobi superioris pulmonis lateris dextri, metastases hepatis*);

3. V.M. (aged 48, from Petlovci, electrician by occupation); diagnosis: tuberculosis of the lungs (*Tbc fibrocaseocavernosa lobi superioris pulmonis bilateralis*).

Wounded patients:

1. I.M. (aged 55, from Branjine, unemployed)

Diagnosis: tuberculosis of the lungs (*Tbc fibrocaseocavernosa lobi superioris pulmonis bilateralis*); injuries:

Figure 1. Back entrance of the Pulomology Ward, Osijek General Hospital, damaged by direct heavy artillery hits.

Figure 2. Detail of the stairway of the Pulmology Ward, Osijek General Hospital, after the heavy artillery attack.

Multiple explosive wounds of the left side of the face and frontal region
Vulnera explosiva faciei lateris sinistri et capitis regionis frontalis

2. M.B. (aged 61, from Osijek, unemployed)

Diagnosis: tuberculosis of the lungs (*Tbc fibrocaseocavernosa lobi superioris pulmonis bilateralis*); injuries:

Penetrant explosive wound of the left frontal region
Vulnus explosivum cranii penetrans regionis frontis sinistri

Explosive fracture of the parietal bone
Fractura explosiva ossis parietalis sinistri

Intracerebral hematoma in the frontal lobe
Hematoma intracerebrale lobi frontalis sinistri

Figure 3. Decedent M.S., aged 55, hospitalized at the Pulmology Ward for the metastatic carcinoma of the lung. Explosive wounds of the head, chest and right arm.

Multiple explosive wounds of the face
Vulnera explosiva faciei multiplices

3. S.A. (aged 55, from Bilje, tractorist by occupation)

Diagnosis: tuberculosis of the lungs (*Tbc fibrocaseocavernosa lobi superioris pulmonis bilateralis*); injuries:

Explosive wound of the left thigh
Vulnus explosivum femoris sinistri

Explosive wound of the left supraciliar region
Vulnus explosivum regionis supraciliaris sinistri

Multiple explosive wounds of the face
Vulnera explosiva faciei multiplices

Contusion and excoriation of right pectoral and lumbal region
Contusio et excoriatio regionis pectoralis dextri et regionis lumbalis dextri

Forensic Findings

DECEDENT: A.M., aged 55

Autopsy Code: S-774/91

Pathoanatomical Diagnoses:

Bilateral fibrothorax
Fibrothorax bilateralis

Bronchopneumonia

Explosive wounds of the head and the chest
Vulnera explosiva capitis et thoracis

Fracture of the nose
Fractura nasi

Traumatic rupture of the aorta, pulmonary artery and heart
Ruptura traumatica aortae, arteriae pulmonalis et cordis

Multifragmented fracture of the thoracic vertebra VII
Fractura comminutiva vertebrae thoracicae VII

Conquassation of the spinal cord
Conquassatio medullae spinalis

Cause of Death:

Explosive wounds of the thorax
Vulnus explosivum thoracis

Opinion: The external examination and the autopsy of the decedent A. M. revealed that the death was violent and caused by the explosive wound of the chest with rupture of the large arteries and the heart.

The external examination revealed an explosive wound of the face, with consequent fracture of the nose, and an explosive wound on the anterior aspect of the chest, with consequent rupture of the heart and large arteries, the thoracic spine and spinal cord. The internal examination revealed ruptures of the heart, aorta and pulmonary artery and an extensive fibrothorax and pneumonia.

The wounds were inflicted by fragments released during the explosion.

DECEDENT: M.S., aged 57

Autopsy code: S-771/91

Pathoanatomical Diagnoses:

Explosive wound and conquassation of the right shoulder and upper arm
Vulnus explosivum et conquassatio omeris dextri et partis proximalis humeri dextri

Explosive penetrating wound of the right hemithorax, with penetration into the abdominal cavity
Vulnus explosivum penetrans hemithoracis dextri in abdomine penetrans

Explosive wound and multiple fractures of the cranial bones
Vulnus explosivum et fracturae multiplices ossium cranii

Conquassation of the right brain lobe and brain contusion with hemorrhage
Conquassatio lobi dextri cerebri et contusio cerebri cum haematocephalo

Metastatic microcellular carcinoma of the right upper pulmonary lobe
Carcinoma microcellulare lobi superioris pulmonis dextri metastaticum

Pleural adhesions in the right hemithorax
Adhaesiones pleurae lateris dextri

Generalized atherosclerosis, medium grade
Atherosclerosis universalis gradus medii

Dilatation of the right heart
Dilatatio cordis precipuae dextri

Fatty metamorphosis and passive chronic congestion of the liver
Metamorphosis adiposa et congestion chronica passiva hepatis

Cause of death:

Explosive wounds of the head, chest and right arm
Vulnera explosiva capitis thoracis et humeri dextri

Opinion: The autopsy of the decedent M.S. revealed several explosive wounds of the right side of the body. The death is classified as violent.

The external examination and the autopsy of the decedent reveal the following injuries (Fig. 3):

1. Explosive wound on the lateral and lower aspect of the right hemithorax, penetrating into the right thoracic cavity, outer part of the lower lobe of the left lung and the diaphragm, and entering the abdominal cavity;

2. Explosive wound and contusions of the right shoulder and upper third of the right arm;

3. Multiple small explosive skin lacerations of the anterior and outer side of the right arm and the outer aspect of the right side of the trunk, with visible skin burns;

4. Explosive wound of the right fronto-parietal region, with impressive skull fracture on the projectile penetration site, multiple fracture of the vault and the basis of the skull, conquassation of the right half and contusion of the left half of the brain.

The autopsy also revealed carcinoma of the upper lobe of the right lung, pleural adhesions on the same side, general atherosclerosis of the medium grade, dilatation of the right ventricle, cirrhosis and fatty metamorphosis of the liver and several large oval metastatic nodi in both liver lobes and port and by the abdominal aorta.

DECEDENT: V.M., aged 48
Autopsy Code: S-773/91

Pathoanatomical Diagnoses:

Explosive wounds of the head, back and right arm
Vulnera explosiva capitis, dorsi et brachii dextri

Fracture of the vault and the basis of the skull
Fractura calvariae et baseos cranii

Conquassation of the left cerebral hemisphere
Conquassatio hemispheri sinistri cerebri

Conquassation of the left eye
Conquassatio oculi sinistri

Fractures of the left ribs VI-VIII
Fracturae costarum VI-VIII lateris sinistri

Conquassation of the inferior lobe of the left lung
Conquassatio lobi inferioris pulmonis sinistri

Spleen ruptures
Rupturae lienis

Fracture of the right humerus
Fractura humeri dextri

Skin excoriations of the face and back
Excoriationes cutis faciei et dorsi

Fibrocaseous tuberculosis of the superior lobe of the right lung
Tbc fibrocaseosa lobi superioris pulmonis dextri

Generalized atherosclerosis, medium grade
Atherosclerosis universalis gradus medii

Cause of Death:

Explosive wounds of the head, back and right arm
Vulnera explosiva capitis, dorsi et brachii dextri

Opinion: The external examination and autopsy of the decedent V.M. revealed that the death was violent, caused by explosive wounds of the head, back and right arm.

The external examination revealed an extensive explosive wound of the head, with conquassated scalp, multiple fractures of the vault and the base of the skull, destruction of the left cerebral hemisphere and conquassation of the left eye (wound No. 1) The external examination also revealed two entrance explosive wounds of the left side of the back (Nos. 2 and 3), one entrance wound of the right side of the abdominal wall (No. 5) and one entrance wound of the right arm (No. 4).

The autopsy revealed the wound canal No. 2 to penetrate into the left hemithorax, with consequent fractures of the 6th to 8th left rib, ruptures of the pleura and the inferior lobe of the left lung. The wound No. 3 is shallow, ending in the soft tissues of the retroperitoneum, probably causing the spleen rupture. The wound canal No. 4 on the posterior aspect of the right arm penetrates the soft tissues of the upper half of the right arm, ending as a fracture of the humerus. The wound canal No. 5 on the right side of the abdominal wall ends in the soft tissues.

The autopsy also revealed fibrocaseous tuberculosis of the superior right pulmonary lobe. This was confirmed by histologic analysis. Generalized atherosclerosis of the medium grade was also found.

The wounds were inflicted by explosive particles.

DECEDENT: Š.B., aged 55

Autopsy Code: S-772/91

Pathoanatomical Diagnoses:

Fibrocaseocavernous tuberculosis of the lungs
Tbc fibrocaseocavernosa pulmonum

Pleural adhesions
Adhaesiones pleurarum

Explosive wounds of the head, trunk and extremities
Vulnera explosiva capitis, corporis et extremitatum

Fracture of the skull
Fractura cranii

Subdural and subarachnoidal hemorrhage
Haemorrhagia subduralis et subarachnoidalis

Cerebral contusion
Contusio cerebri

Traumatic rupture of the right lung
Ruptura traumatica pulmonis dextri

Traumatic rupture of the right side of the diaphragm and the liver
Ruptura traumatica diaphragmae dextri et hepatis

Traumatic rupture of the left common iliac artery
Ruptura traumatica arteriae iliacae communis sinistri

Traumatic rupture of the small intestine
Ruptura traumatica intestini tenuis

Peritoneal hemorrhage
Haematoperitoneum

Fracture of the left ulna and radius
Fractura antebrachii sinistri

Cause of Death:

Explosive wounds of the head, chest and abdomen
Vulnera explosiva capitis, thoracis et abdominis

Opinion: The external examination and the autopsy of the decedent Š.B. revealed that the death was violent, caused by explosive wounds of the head, chest and abdomen.

The external examination revealed multiple explosive wounds of the head, trunk and extremities. The explosive wound of the head caused the fracture of the skull and brain conquassation. Explosive wounds also caused ruptures of the right lung and diaphragm, liver, small intestine and pelvic arteries, with consequent internal bleeding. The patient also had extensive fibrocaseocavernous tuberculotic lesions of the lungs.

The injuries were inflicted by numerous fragments released during explosion.

Conclusion

Osijek General Hospital has been the target of numerous and deliberate heavy artillery attacks by the Yugoslav Federal Army and Serbian terrorists. The attacks inflicted extensive damage on almost all hospital buildings (1). Moreover, one member of the hospital personnel was killed and three severely wounded by direct fire (1). The latest tragedy at the Pulmology and Tuberculosis Ward clearly shows the brutality of the aggressor and deliberate violations of the Geneva Conventions and the Committee of the Red Cross Rules (2,3). Particularly appalling is the fact that patients with such devastating illnesses as advanced tuberculosis or metastatic carcinoma of the lungs, patients who did not have much life in front of them, are victims of the war against Croatia.

References

1 Glavina K, Tucak A, Janoši K, Karner I, Hanzer J, Pajtler M, et al. Deliberate military destruction of the General Hospital in the city of Osijek. Croat Med J 1992;33(War Suppl 1):61-9.

2 International Committee of the Red Cross. Basic Rules of the Geneva Conventions and Their Additional Protocols. Geneva:ICRC,1983.

3 International Committee of the Red Cross. Rules for the Behavior in Combat, Geneva:ICRC,1985.

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War Victims in Eastern Slavonia

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Abstract. This report presents the analysis of autopsy records from the Department of Pathology and Forensic Medicine, Osijek General Hospital, in the period from May 2, 1991, when 12 Croatian policemen were killed in an ambush in Borovo Selo, until November 30, 1991. In that period, 496 autopsies were performed, constituting 42% of all the deaths recorded in Eastern Slavonia for that period. Ninety-six percent of all autopsies were cases of violent deaths. Approximately 48% of all deaths were civilian ones. Explosive wounds were the most frequent cause of death, followed by gunshot wounds. In civilian population, 62% died from explosive wounds, indicating that the aggressor's main strategy is the destruction of civilian targets from the air or by heavy artillery fire from a safe distance.

Key words: *Croatia; forensic medicine; victims; war*

Introduction

Osijek and its hospital have been a target of numerous attacks launched by the Yugoslav Federal Army (YFA) and Serbian paramilitary troops. The hospital has been severely damaged by direct heavy artillery fire from the YFA barracks stationed across the street (1). The attacks left one nurse dead and two doctors and a hospital porter seriously injured (1). The last major attack on the hospital, on November 27, 1991, resulted in the deaths of four patients from the Pulmonary Ward (2). Although all hospital wards were damaged, the hospital continued its work and is providing care for a large number of patients. The Department of Pathology and Forensic Medicine have also faced a sudden increase in its work. The average number of autopsies in the Depatment was 600 to 700 per year. In 1991, in the period from the beginning of May until the end of November, 496 cadavers were autopsied at the Department. The number of violent deaths (murder and manslaughter) recorded in the Department was 20-30 per year, while 478 violent deaths were recorded in the studied period of 1991. This paper presents a short study of the autopsies performed in the Department of Pathology and Forensic Medicine in Osijek.

Results

On December 3, 1991, the Croatian Medical Corps Headquarters recorded 12,749 wounded and 2,472 dead persons (4,533 and 1,254 civilians, respectively) in Croatia (3). 42% of the wounded and 48% of the dead were recorded in Eastern Slavonia (Table 1). This number does not represent the total number of war casualties because many persons are still missing (e.g. at least 300 persons are presumed dead in Dalj, which is under the YFA control).

The whole of Eastern Slavonia is under the jurisdiction of the Osijek District Court and the Department of Pathology and Forensic Medicine, Osijek General Hospital, provides official forensic expertise in legal proceedings. That means that

Table 1. Victims of the war against Croatia in Eastern Slavonia

	Wounded	Dead
Croatian Forces:		
Police	517	106
National Guard	2564	396
Civilians	2286	637
Total	5367	1175

Table 2. Profession of the dead persons autopsied at the Department of Pathology and Forensic Medicine in Osijek

	Number	%
Croatian Forces:		
Police	37	7.5
National Guard	191	38.5
Territorial Defense	2	0.4
Civilians	237	47.8
Terrorist	11	2.2
Yugoslav Federal Army	5	1.0
Unknown	13	2.6
Total	496	100

Table 3. Age distribution of the dead persons autopsied at the Department of Pathology and Forensic Medicine in Osijek

Age (yrs)	Total	Civilians
- 10	3	3
11- 20	21	11
21- 30	126	24
31- 40	88	40
41- 50	38	25
51- 60	38	34
61- 70	26	24
71- 80	7	7
81- 90	3	3
91-100	1	1
Unknown	145	65
Total	496	237

the Department receives cases from all ten communities in Eastern Slavonia: Podravska Slatina, Donji Miholjac, Valpovo, Našice, Đakovo, Osijek, Vinkovci, Vukovar, Županja and Beli Manastir. At the beginning of the war, the Department received cases from the whole region, but the intensification of the aggression blocked communications among the towns and new cases from several war points stopped arriving to the Department. As a result, the Department received only 42% of the recorded victims from Eastern Slavonia territory. The hospital in Vinkovci has its own pathologist, while the tragedy of Vukovar and its Medical Center left many deaths unrecorded and unaccouted for (estimated 600 Croatian soldiers and 1100 civilians; source: the Croatian Medical Corps Headquarters).

Table 4. Manner of death of the persons autopsied at the Department of Pathology and Forensic Medicine in Osijek

	Total	Civilians	(%)
Gunshot wound	222	82	(37)
Explosive wounds	252	147	(58)
Burns	2	2	(100)
Stabbing wound	2	2	(100)
Suicide	6	2	(33)
Traffic accident	2	0	(0)
Unknown	7	2	(29)
Total	496	237	(48)

Tables 2-4 present a short epidemiologic study of the deaths recorded in the Department of Pathology and Forensic Medicine in the period from May 2 to November 30, 1991. Out of 496 deaths recorded in the period from May 2, when 12 members of the Croatian Police were ambushed and killed in Borovo Selo, to November 30, 1991, almost 48% were civilians (Table 2), which corresponds to the percentage of civilian deaths in the region (54%) and the whole of Croatia (51%). Most of the victims were males (84%). When age distribution is examined for total recorded deaths, the majority of victims fall in the 21-40 age group (Table 3). In the civilian population, all age groups are represented and some victims were more than 80 or even 90 years old (Table 3).

Most of the deaths occurred in the city of Osijek (30%), while the next most frequent place of death was the Osijek General Hospital (17%), where the wounded were brought from many villages in Slavonia (55 of them were recorded at the Department). The largest number of deaths recorded in an individual village was in Četekovac, where Serbian paramilitary troops killed 23 civilians who had remained in the village (4).

Explosive wounds were the most frequent cause of death, followed closely by gunshot injuries (Table 4). In civilian population, explosive wounds were by far the most frequent cause of death, comprizing 62% of all civilian deaths (Table 4). It is interesting to note that all victims of traffic accidents were soldiers, and that those killed by stabbing or burning were all civilians.

When the inflow of victims into the Department is analyzed as a function of time, the daily number of cadavers that arrived to the Department was between 1 and 10. Several dates, when

number of the dead arriving to the Department was larger that 10, should be emphasized:

1. July 22: 15 dead, all from Mirkovci, 4 civilians (3 females) and 11 Croatian soldiers.

2. August 1: 33 dead from Aljmaš, Sarvaš and Dalj. On that day, the YFA and Serbian paramilitary troops launched a large offensive on these villages and occupied the Baranya region, killing a large number of Croatian soldiers and civilians. Thirty-three dead bodies, including only 3 civilians, were delivered to the Croatian side.

3. September 3: 38 dead (23 from Četekovac). This was the day after a Cease-fire Agreement was signed in Belgrade.

4. September 17: 19 dead (6 civilians shot on the streets of Osijek, 3 killed during an air and heavy artillery attack on the city). This was the day of the Cease-fire Agreement signed in Igalo.

5. October 16: 10 dead (7 civilians killed during an air and heavy artillery attack on Osijek). This was 12 days after a Cease-fire Agreement was signed in Hague.

6. October 31: 12 dead, all civilians, killed during an air and artillery attack on Osijek and Belišće.

7. November 20: 18 dead (6 civilians), killed during an air and heavy artillery attack on Osijek, Čepin and Antunovac.

8. November 27: 19 dead, 4 of them patients of the Pulmonary Ward of the Osijek General Hospital. This was 4 days after the 14th Cease-fire Agreement, signed in Geneva.

9. November 30: 11 dead (5 civilians), killed during a heavy artillery attack on Osijek, Ernestinovo, Čepin i Valpovo.

Discussion

Every war brings pain and loss of human lives, but the one waged against Croatia is characterized by the aggressor's disregard of the international martial laws and international Red Cross rules. The data collected in the Department of Pathology and Forensic Medicine in Osijek are an example of evidence for this savage and brutal war. The fact that 48% of the victims were civilians, and that the hospital itself has been the target of deliberate YFA military attacks, indicates that the main strategy of the aggressor is the destruction of Croatian civilian population and its material property. Civilians of all ages were affected, so that even children younger than 10 and persons older than 90 were killed. The observation that civilians constituted 58% of all deaths caused by explosive wounds and 62% of all civilian deaths indicates that the YFA tactic is to use heavy artillery and its air force to destroy villages, towns and cities from a safe distance, knowing that the Croatian forces do not have weapons powerful enough to provide an effective defense.

References

1 Glavina K, Tucak A, Janoši K, Karner I, Pajtler M, et al. Deliberate military destruction of the General Hospital in the city of Osijek. Croat Med J 1992;33(War Suppl 1):61-9.

2 Marcikić M, Kraus Z, Dmitrović B, Fjačko V, Hećimović I, Marušić A. Heavy artillery attack on the pulmology ward of the Osijek General Hospital. Croat Med J 1992;33(War Suppl 2):75-77.

3 Medical Corps Headquarters, Republic of Croatia. Daily report on war casualties, December 3, 1991.

4 Marcikić M, Kraus Z, Dmitrović B, Mošunjac M, Marušić A. Civilian Massacre near Podravska Slatina. Croat Med J 1992;33(War Suppl 1):49-54.

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War Against Croatia: A View through Human Casualties in the Region of Bjelovar, Grubišno Polje, Daruvar and Pakrac

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Abstract. The war against Croatia has not bypassed the regions of Bjelovar, Grubišno Polje, Daruvar and Pakrac in Northern Croatia. Besides immense economic losses, the aggression of Serbian terrorists and the Yugoslav Federal Army (YFA) has caused numerous human tragedies. From August 15 to November 23, 1991, 397 casualties (109 civilian) were recorded. The civilians were more often killed or severely wounded, while light wounds were more frequent in Croatian guardsmen and policemen. The main targets of Serbian terrorists and the YFA were civilian: towns, villages, medical institutions, churches and cultural monuments. After the aggressor's retreat from some occupied territories, several cases of civilian massacres were discovered.

Key words: *casualties; Croatia; massacres; war crimes*

Introduction

Bjelovar, Grubišno Polje, Daruvar and Pakrac are agricultural regions in Northern Croatia, about 100 km northeast of Zagreb. From the north and east they are surrounded by three mountains: Bilogora, Papuk and Psunj. To the south and west lowlands extend. Together, the four regions are spread over 2,350 km^2 and are populated by over 180,000 inhabitants. The majority are Croats but numerous other nationalities including Hungarians, Czechs, Slovaks, Serbians and Russinians live there. Economically, the regions are moderately developed.

No major criminal activity or ethnic confrontations were recorded in this area until the Yugoslav Federal Army (YFA) armed and supplied Serbian terrorists who began their campaign of terror and destruction in August of 1991. By September, Serbian terrorists were openly joined by the YFA units stationed in these regions and those invading from Bosnia and Herzegovina through Okučani and Psunj. All types of weapons, including heavy artillery, tanks, helicopters and aircraft were used. The aggressor did not restrain from using even internationally banned weapons, such as cluster and napalm bombs. The main targets of the YFA and Serbian terrorists, as elsewhere in Croatia, were civilian: towns and villages, especially churches, hospitals and monuments of historic and cultural value.

Although the economic losses are immense, they are reparable, while nothing can compensate loss of human lives and numerous other human tragedies. This paper presents a partial summary of human casualties in the war against Croatia in this region, according to the place and date of the incident. It also documents the brutality and cruelty of this war through some tragic events that occurred in this area from August 15 to November 23, 1991.

Sources of Materials and Data

The data and materials presented in this paper were gathered by the authors from:

1) Records, databases and video documentation of the Police station in Bjelovar, central police station for these four regions.

2) Records and photographic documentation of the Police station in Grubišno Polje.

3) Records of the medical institution in Grubišno Polje.

4) Records and databases of the Medical Corps Headquarters, Republic of Croatia.

5) Testimonies of inhabitants of these regions.

Results

Figure 1 presents the cumulative number of casualties in relation to the odd dates from August 15 to November 23, 1991. From August 15 to 19, the number of casualties was small and all of them were civilian. From then onward, the number of casualties steadily increased and by November 23, 1991 reached 397, 109 of whom were civilian. The number of civilian casualties may be even higher, as the status of 66 recorded victims was uncertain and they were not included in the civilian casualties but in the total number. Of the civilian victims 63.3% were male 25.7 % female and 11% were unknown or unrecorded. Of the total number of casualties, 107 persons were killed, 87 severely wounded and 20 were missing.

Figure 1. The cumulative number of casualties in relation to the odd dates from August 15 to November 23, 1991.

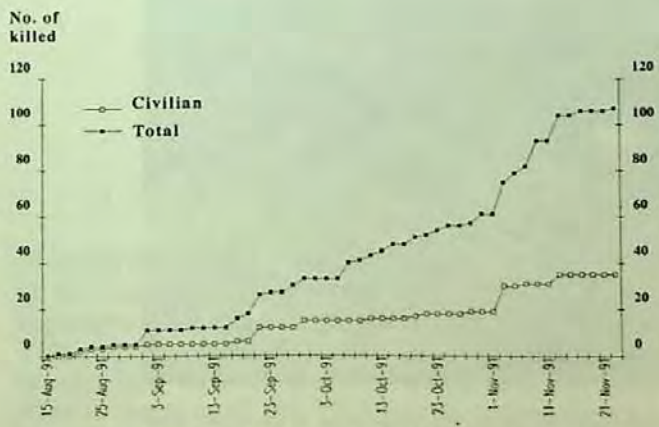

Figure 2. The cumulative number of killed persons in relation to the odd dates from August 15 to November 23, 1991.

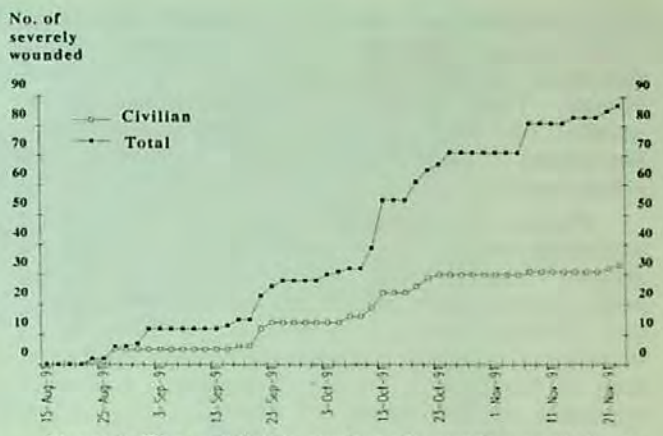

Figure 3. The cumulative number of severely wounded persons in relation to the odd dates from August 15 to November 23, 1991.

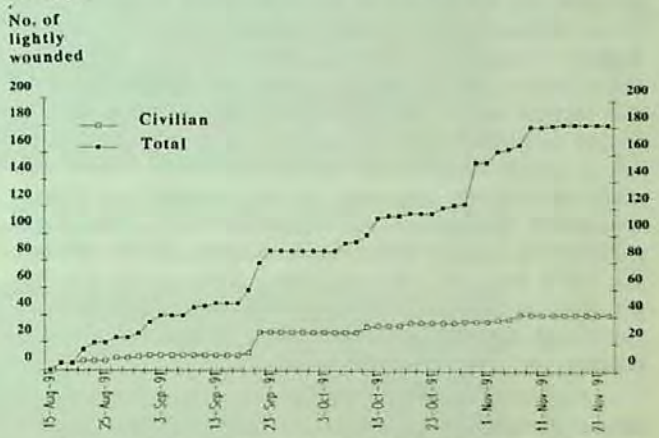

Figure 4. The cumulative number of lightly wounded persons in relation to the odd dates from August 15 to November 23, 1991.

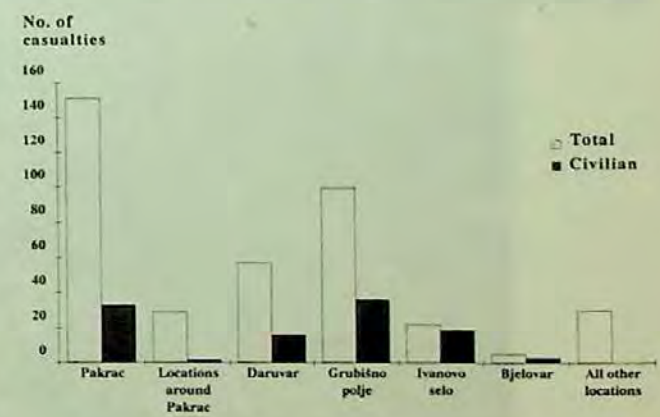

Figure 5. The number of casualties in different parts of the Bjelovar, Grubisno Polje, Daruvar and Pakrac regions from August 15 to November 23, 1991.

Figure 2 shows the cumulative number of killed persons in relation to the odd dates from August 15 to November 23, 1991. During August, civilians comprised 80% of the dead. After a small increase on September 1, the number of total and civilian victims did not change significantly in the first half of September. From September 15 to 21, there was a sharp increase in the total number of

killed followed by a steady incline which lasted until November when the number of killed persons increased sharply again, reaching 107 killed (35 civilians). There were two sharp increases in the number of killed civilians, on September 21, and November 3. Until October, 50% or more were civilian deaths.

Figure 3 shows the number of severely wounded persons in relation to the odd dates from August 15 to November 23, 1991. The number and relation of total to civilian victims is similar to Figure 2 except that there is no sharp increase in the number of severely wounded civilians in the beginning of November. The total number of severely wounded on November 23 was 87, 33 of whom were civilians.

Figure 4 shows the number of lightly wounded persons in relation to the odd dates from August 15 to November 23, 1991. Until August 21, all the lightly wounded were civilians. From then on, there was a steady increase in the total number of the lightly wounded with three sharp increases: 1) From September 21 to 23; 2) From October 5 to 15; 3) From October 31 to November 9. There was only one sharp increase in the number of lightly wounded civilians, on September 21. The total number of lightly wounded civilians, on November 23, 1991 was 183 (41 civilians). Except for the beginning of August, civilians made up only 20% of the total number of the lightly wounded persons during the analyzed period.

Figure 5 presents the number of total and civilian casualties in different parts of this region from August 15 to November 23, 1991. The largest number of casualties occurred in Pakrac (151), of whom 21.9% were civilian. In the regions gravitating towards Pakrac there were 29 casualties, 2 civilian (6.9%). In Daruvar, there were 57 victims (28% civilian). In Grubišno Polje there were 100 casualties, 36 civilian. In Ivanovo Selo, a village northeast of Grubišno Polje, there were 22 victims, 19 civilian (86.4%). In Bjelovar, there were 5 victims, 3 civilian.. In all other locations, mostly villages on the slopes of Bilogora and Papuk, there were 30 casualties (none civilian).

Discussion

The data on human suffering in the regions of Bjelovar, Grubišno Polje, Daruvar and Pakrac, are a testimony about the war in this region. It is as complete as possible, considering the difficult circumstances under which the evidence was collected, i.e. often under direct terrorist fire. The number of wounded is close to the actual number, except for those who were directly evacuated to other regions of Croatia and were not recorded in medical institutions of this region. The number of the dead and missing is probably much greater than recorded, because large areas are still under terrorist and YFA control and a large part of the population has been displaced to other parts of Croatia, which made exact assessment impossible.

As shown in Figures 1-3 the number of casualties during August is relatively small. Yet, nearly all of them are civilian. This can be explained by the fact that local Serbian terrorists, terrorists imported from Serbia and the YFA intelligence (KOS) personnel attacked undefended villages and unarmed individuals. During September, members of the Croatian police and National guard were sent to protect these unarmed inhabitants. This can be seen in Figures 1-4, as the number of total casualties grew more than the number

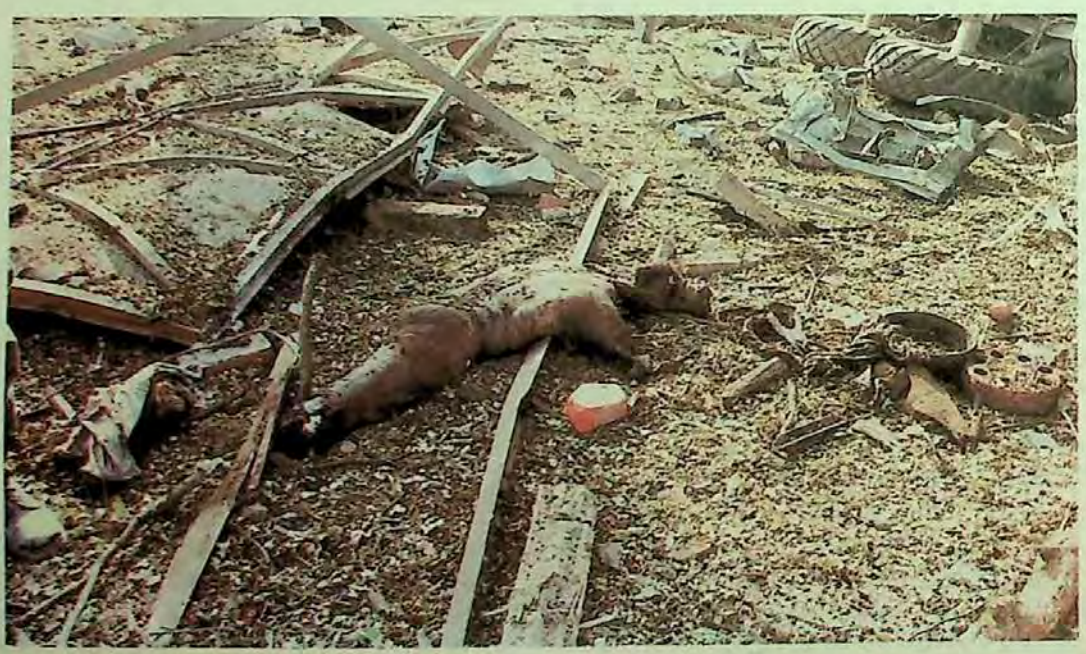

Figure 6. Consequences of the explosion of the ammunition and explosives repository in Bedenik, near Bjelovar. A mutilated human body, parts of the building and equipment can be seen.

Figure 7. The school in the village of Velika Peratovica. Serbian terrorists used its basement as a prison for hostages. The hostages were killed by Serbian terrorists before they left the village. The arrow points to the barred window of the cellar where on November 3, 1991, bodies of five hostages were found.

Figure 8. The inside of the school basement.

of civilian casualties. Small arms fire caused most of the casualties in August and the first half of September. In the second half of September, the YFA supplied terrorists with mortars. After that, heavier and heavier artillery was constantly supplied to them until the YFA openly joined Serbian terrorists towards the end of September. From then on, all kinds of weapons were used and explosive injuries became the dominant type of injuries, especially in civilian population.

The first major terrorist mortar attack was launched on the village of Ivanovo Selo on September 21. The results were catastrophic: 22 casualties were reported, 9 dead, 4 severely and 9 lightly wounded. The majority (19) were civilians. It was due to surprise that there were so many civilian vic-

Figure 9. The body of B.J., aged 30, one of the 5 civilian hostages killed by Serbian terrorists in the school basement of the village of Velika Peratovica.

Figure 10. A burned house and part of the yard in the village of Mali Grdevac. The body of the owner I.K., aged 58, can be seen beside the house as it was found on November 2, 1991.

tims. All consequent fierce bombardments, by all types of heavy arms and ammunition never resulted in such a large number of civilian casualties.

On September 29, the YFA opened artillery and machine gun fire from their garrison on the town of Bjelovar. Long negotiations were held before that, but the commanding officer refused to surrender, although he was ordered to do so by his superiors, who surrendered the Varaždin Corps. The army tried to break out of Bjelovar but finally surrendered after fierce fighting. They destroyed the houses and buildings surrounding the garrison. Other parts of the town were not spared either. Artillery projectiles hit the hospital yard, Retirement Home and a church where three civilians,

Figure 11. A close view of the body of I.K., seen on Fig. 10. Thermal changes can be seen on his clothes and the abdominal skin.

women who hid there from the shelling, were killed.

Outside Bjelovar, in Bedenik, there was an ammunition and explosives repository. During the negotiations, the commanding officer, Major T., deliberately activated the explosives, killing about 10 YFA soldiers (recruits aged 18-20), the negotiating team of the Croatian National Guard and several policemen. The explosion left a giant crater, destroyed the surrounding forest and broke all windows in a 10-20 km radius (Fig. 6). The investigation on the identities of all the victims has not yet been completed, therefore the data from this event were not included in this paper. The epilogue to this event was that the Serbian part of the Federal Presidency pronounced Major T. the first National Hero after the Second World War.

About the same time, the YFA units that invaded Croatia from Bosnia and Herzegovina joined the terrorists on Psunj and Papuk and opened fire on the regions of Pakrac and Daruvar. Most of the people from Pakrac and the surrounding area fled to other regions of Croatia or were captured by the terrorists. The number of captured civilians and their fate is unknown, but some eye-witnesses who managed to escape testify about massacres of the civilian population. Most of the fighting from then on occurred on the slopes of Bilogora, Papuk and Psunj so that Pakrac, Daruvar and Grubišno Polje have the largest number of casualties (Fig. 5). In Pakrac and Daruvar, where most of the population had fled, civilian casualties accounted for only 20% of total casualties. In Grubišno Polje, where the majority of the population had remained, civilians accounted for more than 36% of all victims. Civilians were more often killed or severely wounded while members of the Croatian guard and police forces were more often lightly wounded. This can be explained by the fact that the civilians were usually victims of unexpected attacks, while Croatian soldiers and policemen were usually expecting an attack and were better prepared.

Meanwhile, many cease-fire agreements were signed, but the terrorists and the YFA forces did not stop the fighting in this region, but even intensified it after each cease-fire, as seen in Fig. 1.

In the beginning of November, the Croatian guard and police units launched an offensive and forced the terrorists and the YFA units to retreat from their positions on Bilogora. This can be seen on Figures 1-4 as an increase in the number of total casualties and practically no increase in the number of wounded civilians. Unfortunately, a sharp rise can be seen in Figure 2 representing an increase in killed civilians. This is the result of the discovery of many massacred civilians in the villages from which the terrorists had retreated. People captured earlier by Serbian terrorists and held hostages were brutally murdered. Five massacred civilians were found in the school basement of the village of Velika Peratovica (Figs. 7-9) and five more were found in the village of Mali Grdevac. The civilians were of Croatian, Czech and Hungarian nationality, and one was Albanian. One of the killed civilians was K.I. of Hungarian nationality who was found massacred and burned beside his

burned house (Figs. 10, 11). Before he was killed other members of his family had been killed or maltreated. After such findings the fear for other missing persons is justified.

On November 13, another crime was committed by terrorists and the YFA when they ambushed two medical vehicles, properly marked with red cross signs, killing a doctor, A.V., his driver and six members of the Croatian guard medical unit. Once again, we were reminded that medical institutions and personnel are primary targets of Serbian terrorists and the YFA who do not abide by the international rules and conventions. Former Yugoslavia's signature is on all of them.

Hopefully, some of the data and materials presented in this paper showing human tragedies will help, if only slightly, to stop this war and serve as a reminder to all who would ever contemplate on a war again.

Acknowledgement

The authors would like to thank people who risked their lives to collect the information and materials used in this paper, the management and staff of the police stations in Bjelovar and Grubišno Polje who helped and provided us with the data, video and photographic documentation, the doctor and staff of the mobile unit of the hospital in Bjelovar who accompanied us and the medical personnel in the medical institution in Grubišno Polje.

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War Casualties in the Split Region

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Abstract. This paper presents the war victims recorded in the Department of Pathology and Forensic Medicine, Split Clinical Hospital Center, from May to December 1991. Two case reports are presented, one regarding a civilian killed by torture in the Yugoslav Federal Army (YFA) jail in Knin, and the other regarding a member of the Croatian Police reserve forces, tortured and killed by Serbian terrorists and the YFA.

Key words: *Croatia; forensic expertise; massacres; war crime*

Introduction

In the period from May to December 1991, 64 dead bodies were autopsied at the Department of Pathology and Forensic Medicine in Split Clinical Hospital Center. This is not the total number of deaths in the region of Dalmatia; many dead persons cannot yet be recovered as they are on the territory controlled by the Yugoslav Federal Army (YFA) and Serbian terrorists. Forty-two of the autopsies concerned the deaths of members of the Croatian National Guard and Police, and 22 were civilian deaths. Among the civilian deaths, five were underage persons from the Center for Handicapped Children in Vrlika, who died from nonspecific causes but all related to the war circumstances in their institution (1). The youngest and the oldest victim of the war were civilians: a child aged 8 and a woman aged 85.

Table 1 presents the location of deaths that were recorded in the Department. The largest number of dead on the Croatian National Guard and Police side was in Sinj (6 in the village of Maljkovo, 3 in Satrić and 3 in Hrvace), while the largest number of dead civilians was recorded in Split. These data can be explained by intensive military activities in the Sinj region and several air and sea attack on the city of Split, respectively. Most of the deaths occurred in September and October (24 and 13 victims, respectively) due to the intensification of YFA attacks in that period.

Most of the victims died from explosive wounds (25 members of the Croatian National Guard and Police and 10 civilians). A total of 22 persons died of gunshot wounds and three had multiple mechanic injuries (lacerations, contusions and fractures). The bodies of 17 members of the Croatian National Guard and Police showed advanced putrefaction. Eleven of them were received at the Department after the exchange of dead bodies between the Croatian and YFA side; more than 10 days had passed from time of death and the putrefaction process was very advanced.

Case Reports

The following are transcripts from two autopsy records: one civilian from the YFA prison in Knin, killed by torture, and a member of the Croatian Police reserve force, who was tortured, and then executed by gun-fire.

Table 1. The location of deaths recorded in the Department of Pathology and Forensic Medicine, Clinical Hospital Center, Split

	Croatian Forces	Civilians	Total
Split	8	10	18
Sinj	19	4	23
Drniš	5	3	8
Knin	2	2	4
Šibenik	1	0	1
Benkovac	0	1	1
Imotski	0	2	2
Omiš	1	0	1
Metković	1	0	1
Ploče	1	0	1
Dubrovnik	4	0	4
Total	42	22	64

DECEDENT: A.K. civilian from Lovinac, Croat, aged 75

Autopsy Code: 455/91

Autopsy record of October 10, 1991

Pathoanatomical Diagnoses:

Skin hematomas of the head, trunk, scrotum and all extremities
Haematomata cutis capitis, corporis, scrotii et extremitatum

Lacerations of the head and both hands
Vulnera lacerocontusa capitis et manus utriusque

Fracture of the nasal bone, maxilla and right second hand finger
Fractura ossis nasalis, maxillae et digiti II manus dextrae

Multiple fractures of the 3rd to 9th left rib and 6th to 9th right rib
Fractura multiplex costarum sinistrorum III-IX et dextrorum VI-IX

Heart contusion and rupture of the left atrium with consequent hemorrhage into the pericardium
Contusio cordis et ruptura atrii sinistri cum haematopericardio

Contusion of the lungs
Contusiones pulmonum

Hemorrhage into the posterior abdominal wall with hemorrhage into the peritoneal cavity
Haemorrhagia retroperitonealis cum haematoperitoneo

Dermatitis after hypostasis in both forelegs
Dermatitis hypostatica cruris utriusque

Cause of Death:

Multiple injuries
Laesiones multiplices

Opinion: From the scarce data obtained from the District Court officials, it can be concluded that the decedent was an unidentified male, transported from Knin on October 10, 1991. The external examination revealed that the decedent was an older, 172 cm-high, partially bold male of strong constitution, medium-sized head, oval face, 11 cm-long white hair, bushy black eyebrows, pale blue eyes, wide nose, unshaved beard (0.7 cm-long bristles), and defective dentures. The cadaver was dressed in a grey-green shirt and trousers without underwear, indicating a prisoner's outfit.

The external examination and autopsy of the decedent revealed that the death was violent, caused by multiple injuries with consequent contusion of the heart, and hemorrhage into the pericardial cavity. This was probably the immediate cause of death. The external examination also revealed multiple hematomas, lacerations and fractures inflicted by intensive blunt mechanical force:

1. Transverse 3 cm-long laceration in the left temporal region;

2. Contusion, measuring 3:0.3 cm, of the posterior parietal region;

3. Blood suffusion of the eyes, hematoma of the left eye and left side of the chin;

4. Deformed nose with fractured nasal bone;

5. Fracture of the upper jaw;

6. Edema of the right side of the mouth and several lacerations of the lower lip;

7. Large confluent hematomas on both sides of the chest, more pronounced on the left side. Hematomas of the right side extended to the anterior abdominal wall. On both sides, multiple fractures of the ribs were found, and the internal examination revealed contusion of the heart and rupture of the left atrium;

8. Shallow excoriation, measuring 3:1 cm, on the left dorsum with multiple violet hematomas along the outer aspect of the left forearm and arm;

9. Fracture of the right index finger with deep laceration, measuring 4:0.5 cm, on its palmar side;

10. Dark purple and edematous scrotum with shallow excoriations;

11. Large confluent violet and yellow-green hematomas on anterior aspect of both thighs and upper third of the left thigh. The hematomas measured 14 cm in length and 3-6 cm in width and resemble the impressions of an elongated round object, like a police rod;

12. Edema of both forelegs, colored dark-blue to black. A necrotic skin defect was found in the middle of the left foreleg.

All described injuries were inflicted during life. Most of the hematomas were 1-2 days old.

Addendum to the Autopsy Report, December 13, 1991: The identity of the decedent brought to the Department from Knin on October 10, 1991, was established on November 20, 1991. The identification was performed by the decedent's son, M.K., who unequivocally recognized his father, A.K, born in 1916 in Lovinac - Gračac and deceased in the jail in Knin.

Comment: According to the testimony of his son, M.K., and other villagers, the decedent A.K.

Figure 1. Decedent A.K., civilian, aged 75, killed in the YFA prison in Knin. Elongated coalescent hematoma of the chest, inflicted by an elongated blunt object; edema of the right side of the lips, laceration of the lips and chin; fracture of the upper jaw (left). Elongated coalescent hematoma of the thighs; edema and hematomas of the scrotum (right). All wounds were inflicted by blunt mechanical force.

was taken prisoner in Lovinac, Lika, on August 5, 1991. Five of his neighbors were killed on the spot (2), and he was taken to the YFA prison in Knin. There he was tortured and, eventually, died from the torture. He was brought to the Department on October 10th, in an exchange of the dead between the Croatian and YFA side (three YFA soldiers from the Split military harbor Lora for 4 civilians and Croatian soldiers).

DECEDENT: A.R, from Hrvace near Sinj, Croat, aged 35

Autopsy Code: 417/91

Autopsy record of September 27, 1991

Pathoanatomical Diagnoses:

Laceration of the left temporal region with fracture of the skull and conquassation of the brain
Vulnus lacerocontusum capitis regionis temporalis sinistrae cum fractura ossium capitis et conquassatione cerebri

Fracture of the cervical spine
Fractura columnae vertebralis cervicis

Gunshot wounds of the right side of the chest and abdomen with the injury of lungs, heart and liver and fractures of the 6th thoracic vertebra and 4th to 6th right ribs
Vulnera sclopetaria thoracis et abdominis lateris dextri cum laesione pulmonum, cordis et hepatis et fractura vertebrae thoracalis VI et costarum dextrorum IV-VI

Explosive wounds of the neck, left shoulder, forearm, abdomen and gluteal region
Vulnera explosiva colli, omeris sinstri, antebrachii sinistri, abdominis et regionis glutealis sinstrae

Putrefaction of the body
Status putrefactionis gradus medii

Cause of death:

Laceration of the left temporal region with fractures of the skull and conquassation of the brain
Vulnus lacerocontusum capitis regionis temporalis sinistrae cum fractura ossium capitis et conquassatione cerebri

Opinion: According to the data received from the District Court Investigator and Police station in Sinj, it can be concluded that the decedent is A.R., member of the police reserve forces, killed while on a reconnaissance expedition with two other colleagues in Hrvace near Sinj on September 23, 1991.

The external examination and the autopsy of the body revealed that the death was violent, caused by extensive head injury of the left temporal region with fractures of all skull bones and the conquassation of the brain and the fracture of the cervical spine. Injuries of the lungs, heart and liver and the fracture of the thoracic spine by a projectile have added to the lethality of the injury.

The following injuries were found on external examination:

1. Two skin defects in the left temporal region, involving the upper part of the auricle. The defects confluenced into each other and had ragged margins with tissue bridges and blood suffusion. They measure 10:3 cm and involved the bones and a multiple fracture of all bones of the skull vault and the base. The brain tissue was protruding from the defect;

2. Skin defect, measuring 2.5 cm in diameter and 2 cm in depth, on the left side of the chin;

3. Skin defect, measuring 1:1.5:2 cm, on the right side of the neck, 4 cm from the clavicle;

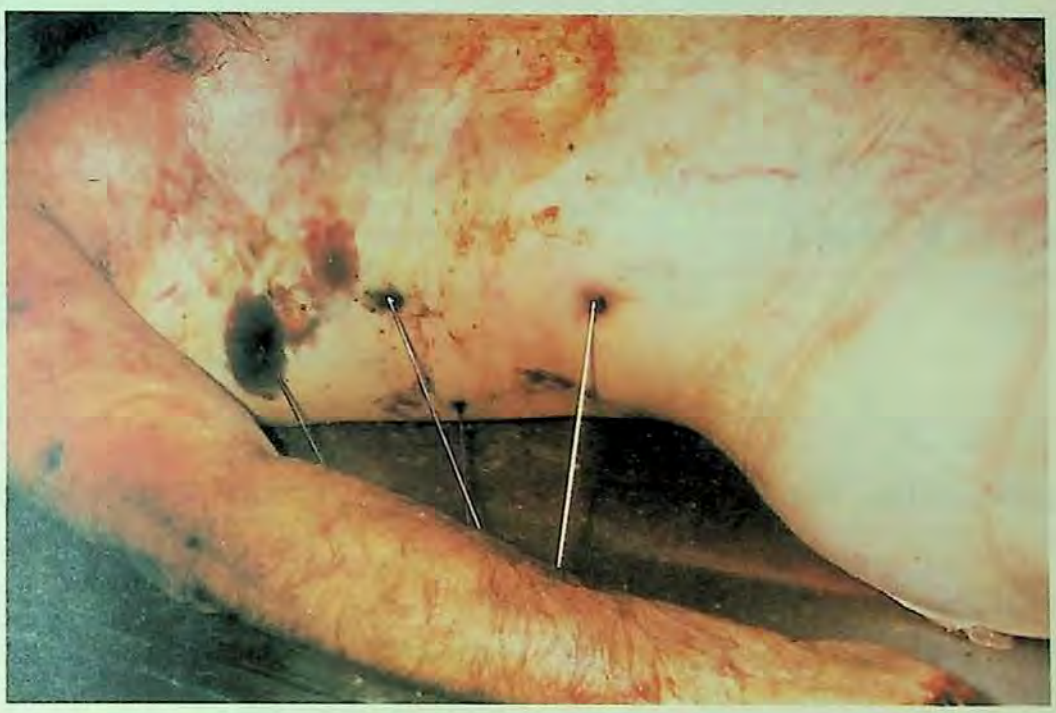
4. Skin defect, measuring 1.5:1:2.5 cm, on the left side of the neck, right over the clavicle;

Figure 2. Decedent A.R., member of the reserve Croatian Police force, aged 35, killed in action in Hrvace near Sinj. Lacerocontusion of the left temporal region with fractures of all skull bones and conquassation of the brain; protrusion of the left bulbus. All wounds were inflicted by intensive blunt mechanical force (top). Explosive wounds of the left shoulder, chest and chin. Other two pointers indicate the bone defect in the left parietal region with protruding brain tissue (middle). Four entrance gunshot wounds on the right side of the chest and abdomen (facing page).

5. Skin defect, measuring 1.7:1:1.5 cm, on the outer side of the shoulder;

6. Four entrance gunshot wounds on the right side of the chest and abdomen and more to the back. Each wound measured up to 0.8 cm and each was surrounded by an oval brownish contusion band, measuring up to 0.4 cm. The wounds were equidistant, 8 cm apart form each other;

7. A skin defect in the lower abdominal wall, just above the symphysis, measuring 3.5 cm in depth and with sharp elongated margin. The vital reaction was weak;



8. Skin defect, measuring 2:1:2 cm, in the middle of the left gluteal region;

9. Three necrotic, confluent skin defects on the lateral side of the forearm, together measuring 3:7:2 cm.

Head injury described as the wound No. 1, together with the fractures of the skull and conquassation of the brain and the fracture of the cervical spine, compose a single injury, inflicted by an intensive blunt mechanical force. The wounds were inflicted during life. The wounds described as Nos. 2, 3, 4, 5, 7, 8 and 9 were most probably inflicted by fragments of an explosive device (bomb or a hand grenade). They were inflicted during the life of the decedent.The wound described as No. 6, together with the internal injuries (ruptures of the lungs, heart and liver and fractures of the thoracic spine and ribs) was inflicted by several projectiles. According to the position of the entrance wounds, the direction of shooting was probably upward and to the left.

Comment: According to the report of his colleague, the decedent A.R., was killed in action near Otišić, a village near Sinj, on September 23, 1991. He and his three colleagues went from Hrvace for a reconnaissance expedition into the neighboring village of Hrvace. They were caught in the nearby forest by Serbian terrorists (their neighbors) and the YFA soldiers. One of them was lagging behind and managed to escape. The decedent and two other policemen (M.M. and C.D.) were killed on the spot. The decedent was first beaten, and later executed by gunshots. Then a bomb was thrown onto the bodies. Other two bodies were not tortured and had gunshot and explosive wounds. The bodies of 3 members of the reserve Police force from Hrvace and 4 others from Maljkovo, received at the Department on September 27, 1991, were a part of the exchange agreement between the Croatian and YFA side.

Conclusion

The atrocities described in this paper are yet another example of the dirty and brutal war against Croatia. The killing of a 75 year-old civilian in a YFA prison by beating is an unprecedented case recorded so far in this war. We fear that many such cases lie unaccounted for and undescribed in the villages occupied by Serbian terrorists in the so-called Krajina of Knin. The savage murder of a member of the Croatian police force in Hrvace, near Sinj, is another case of a war crime. The bodies that arrived to the Department after the exchange between the Croatian and YFA sides were mostly in advanced stages of putrefaction, which was a deliberate YFA tactic for inducing fear and resignation among Croatian soldiers and civilians; their message to the fellow soldiers who received the bodies and the relatives who came to recognize members of their family was: this is what we did to them and what you may also expect.

References

1 Pintarić I, Sapunar D, Gudelj I, Anđelinović Š, Kuzmić I. Remember they are humans. Croat Med J 1992;33(War Suppl 2):34-35.

2 Dobi-Babić R, Katalinić P, Gudelj I., Jonjić S. Civilian massacre in Lovinac. Croat Med J 1992;33(War Suppl 1):43-8.

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Manjača - How the Yugoslav Federal Army Treats the Prisoners

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Abstract. The behavior of the Yugoslav Federal Army (YFA) toward 332 prisoners, namely members of the Croatian National Guard (CNG), policemen and civilians during their stay on Manjača, is herein described. A list of remarks from the International Red Cross (IRC) is also enclosed. Most of the remarks had been disregarded until November 1, 1991, when one prisoner died due to deliberate neglect by YFA authorities. Many conditions were improved thereafter, proving that there had been possibilities for better arrangements. A list of the most freuqently diagnosed diseases and injuries from beating is also included.

Key words: *Croatia; prisoners; Red Cross; war*

The Manjača Prison

We arrived in Manjača on September 13, 1991, after we had surrendered in Hrvatska Kostajnica the previous day. The most severely wounded were left in the Banja Luka Hospital, and only a few guardsmen and policemen with less serious wounds came along with us to Manjača. On arrival, we were put into three stables, previously used by the Yugoslav Federal Army (YFA) for cattle and sheep. Each stable was about 60 meters long and 15 meters wide. It was very windy, and we were told that the cattle were known to freeze there in winter when the temperature fell to -35°C. There were huge ventilation openings on the top of each stable, and many holes, doors and wooden windows along both sides of the stable. The stables were divided alongside in three parts by iron fences. In the middle part there was a concrete floor, and the two lateral parts had earthen floors. Only in one stable were these earthen parts dry, while in the other two they were soaked with water, making ponds in which we even saw some frogs. We received some straw and blankets, and our beds were at first made on the concrete part; later on, as the weather became colder, many of us moved to the dry parts of the earthen floor. As a result of these conditions, almost everybody had some rheumatic pains, even in the beginning when it was not so cold.The latrines were only three in number (for more than 300 men) and we were allowed to use them during daytime only; from 8 p.m. till 7.30 a.m., we had to use the corners of the stables.

Food

The food was insufficient both in quantity and quality. During the first three weeks, a canteen van would come by and those who had money were able to buy some extra food, like peanuts, sweets or candies, as well as toilet-paper, razor blades, shaving cream and cigarettes. Eventually, the van stopped coming and the hunger became acute.

Uniforms and the International Red Cross

About a fortnight after our arrival, the International Red Cross (IRC) representatives visited the camp. After we discussed the situation, a list of remarks was made and the IRC promised to pass them on to YFA authorities. However, we were told that the Geneva Convention did not apply in our case, because our status as prisoners-of-war (POW) was not recognized by the YFA, and that the IRC came only because there was a clause in the Convention giving the IRC the right to take measures they themselves found necessary, even if

we were not POWs. Therefore, we were advised to give up our uniforms. Several days before this, the YFA tried to take our uniforms, sending us to take bathes in small groups. After bath, we would get army working suits. One stable refused to take a bath because of the uniforms. Although we did give up our uniforms later, the army refused to give us another bath for the whole time we stayed there.

The IRC list included the following demands:

1. More food in general.

2. More food for those who went to work on the road or in the woods.

3. Baths: twice a week and clothes to change thereafter.

4. Drinking water.

5. Latrines: more latrines for 24-h use.

6. Newspapers.

7. Walking outside the stables.

8. Beds: more straw, more blankets.

9. Health care: a) military doctor who would be responsible and would come at least twice a week; (b) a heated room where the patients could be examined; (c) bandaging material and antiseptics, so that the wounded would not have to be driven to Banja Luka every second day just to change bandages; (d) more medicines and a locker; (e) apparatus for blood pressure measurement; (f) driving to Banja Luka by an ambulance.

10. Things for personal hygiene without charge, e.g., toilet-paper, razor blades, soap, etc.

11. Cigarettes.

12. Playing cards and chess.

Beating

As soon as the IRC representatives had gone away, the beatings began. Quite often we were told to stand still in a line for a long time, so that some of us would collapse. Those who would waver were hit with a stick on the head "to help them fall". Then they called me, a doctor, to help them. When I told a victim to lie down for a while, the military policeman came and shouted at me and scorned me, and the victim was ordered to stand up again. Most severely beaten were those who were distinguished in any way: the commanders of the Guard, commanding staff, those who had any connection with Bosnia and Herzegovina, those who proved brave in the fighting in Kostajnica. At one point the commander of the Croatian National Guard (CNG) was put away in a solitary cell and kept there for 14 days. What is more surprising, Dr. Nikolić, a surgeon, was also put in a cell. He stayed there for 3 days with nothing to eat or drink, and with one meal a day for another 3 days. He was also beaten there. The accusations to justify such treatment of a doctor were quite remarkable, namely that he cut out hearts and other organs from dead Chetniks and that he was sending these organs down the river Una to Hrvatska Dubica, and then to Osijek, where German and other western doctors were paying in foreign currency for them, and that the Croatian Government bought weapons with this money! I think even the Army Counterintelligence (the ill-famed KOS) could not have hoped to prove these wild accusations - it was more a rallying for lynching on the part of the local villagers.

Oddly enough, I, an anesthesiologist, was not charged with this at all.

New Prisoners

When Dr. Nikolić was put away, I was put in charge of health care for prisoners. A rearrangement of the stables then took place. All the CNGs (the Guard) were put into Stable No. 1, all the Ministry of Interior Affairs officers (policemen, active and reserve) were put into Stable No. 2, and I and eight of the most severely wounded were put into Stable No. 3. With time, more wounded came from the hospital in Banja Luka, and there were also prisoners from various other prisons like Knin, Okučani, Gradiška and Titova Korenica, who were transferred to Manjača. These were at first put in separate cells where they were severely beaten, and later, as more new prisoners arrived, they were put in Stable No. 3 with the wounded, so that in the end there were 58 prisoners there. Thirty-three of these were civilians. One of them was an old, demented man with atherosclerotic gangrene of the foot, who also was very severely beaten. After two days with no medical help, during which we asked military policemen to take him to hospital, and when he could not speak anymore he was finally taken to the hospital in Banja Luka. He came back with the last two of our wounded and was exchanged with all of us.

Banja Luka

With many of the wounded, we had to change bandages often - this was not easy because the wounded had to be taken to Banja Luka for that, together with the doctor and a medical technician. This was done in a military van used for driving prisoners, which was probably constructed to be as uncomfortable as possible. There was practically no ventilation, so we all suffered from heat strokes. When we arrived at the military polyclinic, we had to pass through a cordon of Serbian reservists who shouted and spat at us, and wanted to slaughter us. When they saw the sign of red cross on my arm, they became particularly mad and asked whether I was Dr. Nikolić. As a result, many of the wounded refused to go to Banja Luka. We had some first aid bandages that we had brought along from Kostajnica, so we reduced the number of visits to Banja Luka to as few as possible.Near the end of October, the IRC representatives came back and were surprised to learn that very few of their suggestions had been taken into consideration. We were subsequently given aluminum cans in which we brought drinking

water from a cistern-truck; we also received soap and toilet-paper, and got some more straw and blankets, but, as the weather grew colder, it was still not sufficient. On October 19, there was the first snow, and then we had a fortnight of such cold weather that the drinking water in the aluminum cans froze in the morning. I had never before seen so many cold-related injuries.

Death of a Man

On October 31, I warned the military authorities that there was a patient who should immediatelly be taken to hospital - it was a case of acute abdomen pain. Despite the fact that I told them I could not take responsibility for this man under the given circumstances, on two occasions they failed to transfer him to Banja Luka. The next morning he died. The military doctor came by only to try to resuscitate him after we had tried it ourselves, but he was unsuccessful. There must have been an autopsy, but I was not informed of the results, so I do not know whether the cause of this acute abdomen pain was some sort of illness or if it was the result of fierce beating and a possible hemorrhage in the abdominal cavity.

Improvements

This case seemed to have stirred the military authorities up, because they now responded to most of the remarks given by the IRC.

A room for examination of patients was found, and it was warmed. There was a military doctor who came every second day and there were much more medicines that were placed in a locker in the room. I had to write a report every morning, in which I put the names of all those who were ill in any way and we got enough bandages and antiseptics to dress all wounds. At last, we could administer antitetanic vaccines, with a delay of about 14 days, to four patients. More food was also given for those who worked on the road and in the woods. Some army newspapers came and we got more blankets in Stable 3, so that now each prisoner had more than 3 blankets on an average. I was told that for urgent cases, I could demand that patient be transferred to hospital at any time, even during the night. This was in sharp contrast with previous state of affairs, when I was even forbidden to go from one stable to another, and at night, if any sound was heard in the stables, the soldiers would shoot from their rifles. However, even now I was threatened that I was not to misuse this right to send patients into hospital, or else...

Suddenly, the Geneva Conventions were mentioned. When I repeated that a military doctor who could take the responsibility was needed, I was told that, according to the Geneva Conventions, I was a "formation doctor" and had to do primary health care. It seems that the Geneva Conventions applied only when it suited the YFA. In these last few days (November 1-November 8), although the medical care improved considerably, some of the wounded with open wounds still had to lie on straw, and we could not X-ray those with pneumonia and fractured bones and ribs.

In conclusion, what should I say about the army which had for so many years pretended to be "people's"? Although there were some officers who were quite correct, most of them were malicious. When the man died on November 1, one of them sneered and said: "At last, you have begun dying." This same gentleman took five prisoners out of the bus and beat them, even in Bosanski Šamac, where we went to be exchanged.I would like to thank the IRC for, although being neutral, giving us a feeling of some connection to the normal, logical world, and although their remarks were mostly disregarded by YFA, we felt a sort of relief by their putting our names in their computer, so we knew that none of us could simply disappear.

List of diseases

The following were the most frequent diseases in the camp: common cold; sinusitis; tonsillolaryngitis; purulent angina; bronchitis; pectoral myalgia; pneumonia; one case, previously treated for tuberculosis, started to cough again; cold injuries; edema of the hand or fingers, consequential circulatory problems in fingers, paresthesias; rheumatism; gastritis; exacerbations of ulcus duodeni and ulcus ventriculi; constipation; watery stools (not enough to fulfil the criteria for diarrhea); diarrhea; blood in feces; hemorrhoids; one case of suspected ulcerative colitis; urinary tract infections, mostly cystides; urinating blood after being beaten; one case of blocked urine flow in the right ureter; allergy, cutaneous manifestation; one case of scabies; gangrene of the foot; mycosis; toothache; dental granulomas; headache; anxiety reactions; vagal collapse; hypertension; exacerbated neuritis.

Injuries from beatings were: bruises; lacerocontusions; arterial bleeding from a finger after being pushed into thorn fence; fractured V metacarpal bone; fractured ribs.

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Medical Status of Prisoners-of-war from Manjača and Glina Camps

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Abstract. A large group of Croatian soldiers was captured by Yugoslav Federal Army (YFA) units in Hrvatska Kostajnica, on September 12, 1991. More than 300 prisoners-of-war were taken to a camp on Manjača, a mountain near Banja Luka in Bosnia and Herzegovina. The camp is held by YFA. On the same day, a smaller group of Croatian soldiers was captured by Serbian extremist military formations (Chetniks) and deported to their camp in Glina. Twelve more prisoners from other Chetnik camps were transferred to the Manjača Camp some time later. All prisoners were held there for about two months. After they were exchanged, 218 prisoners-of-war were examined and medically treated at the University Hospital of Infectious Diseases in Zagreb; 105 were hospitalized and the other 113 released after treatment. This paper presents a description of both camps and the treatment of prisoners-of-war, with emphasis on their physical and psychological maltreatment. All the prisoners-of-war in the Glina Camp were physically maltreated: 41.5% of them were tortured with electric shocks and 53.6% had severe body injuries. In 56.1% of the cases, psychological disorders were registered. An epidemic of bacillary dysentery (*Sh. sonnei)* was also registered in the camp. In the Manjača Camp, 50 of the prisoners-of-war were physically maltreated. Light body injuries were found in 20.3% and psychological disorders in 18.8% of the prisoners. Acute respiratory disease was recorded in 68.8% and pneumonia in 7.8% out of 64 hospitalized soldiers.

Key words: *camp; Croatia; infections; medical examination; prisoners; war*

Introduction

After the siege of Hrvatska Kostajnica by Serbian extremist military formations (Chetniks), supported by Yugoslav Federal Army (YFA) units on September 12, 1991, a number of Croatian soldiers were captured. A large group of them was taken to Bosanska Kostajnica, and on the next day to the YFA military camp on Manjača, near Banja Luka in Bosnia and Herzegovina. The other group were captured by Chetniks on the neighboring hill Djed on the same day, and taken to the nearest village, Kukuruzari. They were kept there until September 16, 1991, when they were transported to a Chetnik camp in Glina. On Manjača mountain (1,214 m above sea-level), there is an YFA camp where prisoners-of-war, not only Croatian soldiers but also civilians previously captured by Chetniks, were transported to from various areas of Croatia (Fig. 1). Close cooperation between the YFA and Chetniks is obvious. A group of prisoners-of-war from the Chetnik camp in Glina was released by exchange on October 31, 1991 and the other larger group from the Manjača Camp was exchanged on November 9, 1991. All exchanged prisoners-of-war arrived in Zagreb. At the request of the Department of Health, the examination of prisoners-of-war was made by infectologists at the place of their arrival, i.e. the *Panorama* hotel.

Manjača Camp

According to data obtained from the prisoners-of-war, the YFA and Chetniks treated prisoners-of-war in different ways, although both treatments were brutal and illegal. In the Manjača Camp, the prisoners-of-war were put in aban-

Figure 1. Locations of the main prisoners-of-war camps and places of exchange. Closed triangles - main camps; closed circles - assembly camps; closed squares - places of exchange.

doned stables. They slept on concrete floors covered only with straw. In the beginning, they had only two thin blankets, in spite of the cold. Only after representatives of the International Red Cross Organization had visited the camp, were they given more blankets. Food was so insufficient that all soldiers lost about 10-15 kg in body weight during 58 days of inprisonment. Sanitary conditions were inadequate, below minimal civilizational standards. During their stay in the camp, the prisoners were not allowed to wash themselves even once. Most of them were forced to do hard physical work; cutting tree trunks, pulling out potatoes, digging ditches, separating sick sheep from the flock and burying the dead ones. All prisoners-of-war were psychologically maltreated through threats, humiliation, abuse and insults, some were forced to sing Chetnik songs. They were told that they would be executed, that the Croatian authorities gave them up and that nobody was taking care of them. Besides psychological abuse, they were also physically maltreated. They were beaten with fists, feet and various blunt objects. Smaller groups of prisoners-of-war from other locations also arrived in the Manjača Camp (6 soldiers and 6 civilians captured by Chetniks). They changed a few camps before they reached the Manjača Camp. Four of them were captured in Lipik, then taken to Bijela stijena, Stara Gradiška and finally to Manjača. Two of them were captured in Saborsko near Ogulin, then took to Plaški, Titova Korenica, Željava and then to Manjača. The rest (six) were prisoners from Vaganac who spent two weeks in the prison in Titova Korenica before their deportation to Manjača. At all intermediate stops, the treatment was the same or worse, than the treatment in Glina.

Glina Camp

A group captured by Chetniks was taken to the village of Kukuruzari and then to the Glina Camp. They were maltreated during the first four days in Kukuruzari, and later in Glina. They were put into overcrowded cells in the same building where the Chetniks lived. Food provisions and basic hygienic conditions were below all civilized standards. All of them were beaten up several times. Day or night, Chetniks would enter their cells, especially after their drinking-bouts, take prisoners out of the building, force them to take off their clothes, pour cold water over them and

Table 1. Acute ilnesses in hospitalized prisoners-of-war

Illness	Concentration camp			
	Glina (N=41)		Manjača (N=64)	
	No	%	No.	%
Acute respiratory disease	9	22.0	40	62.5
Pneumonia	1	2.4	5	7.8
Acute sinusitis	0	0	4	6.3
Lung tuberculosis	0	0	1	1.6
Urinary tract infections	0	0	2	3.1
Dysentery				
bacteriologically unconfirmed	24	58.5	21	32.8
Shigella sonnei	9	22.0	0	0.0
Hepatic lesions	8	19.5	11	17.2
Rush	2	4.9	7	0.9

Table 2. Physical maltreatment of the prisoners-of war

Camp	No.	Physical maltreatment		Electric shock maltreatment	
		No.	%	No.	%
Glina	41	41	100.0	17	41.5
Manjača	52	26	50.0	0	0.0
Others*	12	12	100.0	0	0.0
Total	105	79	75.2	17	16.2

*Prisoners-of-war from other assembly camps successively deported to Manjača concentration camp.

torture them in the most brutal way (punching, treading on, jumping from the table onto tied prisoners' chest or stomach, etc). Prisoners-of-war described that they were hit in their faces with pistols, over the chest and head with rifle-butts and guns, whipped with electric wire rope and specially made iron maces, and that a gun was put into someone's mouth, etc. The Chetniks tortured the prisoners with electric shocks from the field-telephone generator, forcing them to hold iron sticks in their hands while closing the electric circuit. Some of them could not endure those tortures, and as a result three of them died. None received any medical help.

Assessment of Prisoners' Medical Status

All the prisoners-of-war from the Glina Camp (n=41) were hospitalized at the University Hospital of Infectious Diseases in Zagreb. Among 333 Manjača prisoners, 177 were examined at the Hospital and 113 of them were released after treatment, whereas 64 needed hospitalization. Outpatient and hospital treatment included the examination by a surgeon, forensic medicine expert, specialists in industrial medicine, psychiatrists and infectologists. Psychological testing and analysis were performed separately. Physical examinations were performed and basic data collected on the subjects' movement, place of capture, who captured them (Chetniks or YFA); on the treatment

Table 3. Number and location of contusions found in the prisoners-of war

	Camp		Total	(%)
	Glina	Manjača		
Head	2	3	5	(6.3)
Trunk	12	13	25	(31.6)
Head and trunk	11	12	23	(29.1)
Head, trunk and extremities	9	6	15	(19.0)
Trunk and extremities	7	4	11	(14.0)
Total	41	38	79	(100.0)

during captivity and all relevant facts that could lead to the occurrence of some infectious diseases. All injuries were registered. Hematologic and biochemical analyses of most important functions were also performed. X-ray examination of the lungs, paranasal sinuses and bones, and CT were performed where necessary. Several patients had to undergo endoscopic tests, ultrasound examination of the abdomen, ECG, EEG, audiometry, etc. Stools for bacteriologic tests for *Shigellae, Salmonellae, Campylobacter* and *Yersinia* were taken from all patients. Other bacteriologic tests were also performed (swabs, urino-culture, cultures of blood and sputum). According to data on respiratory diseases, serologic tests of the sera for Q-fever, Legionnaires' disease, *Psittacosis*, *Mycoplasma pneumoniae* and respiratory viruses (A and B Influenzae, Adenoviruses, Respiratory Sintitial Virus) were performed.

Findings and Discussion

A group of 113 prisoners-of-war from the Manjača Camp was treated as outpatients. Acute respiratory disease was found in 29 and diarrhea in 12 patients. From 41 prisoners-of-war from the Glina Camp, 33 (80.5%) had dysentery. Dysentery appeared epidemically in the camp 2-3 weeks before the exchange. *Sh. sonnei* was isolated from stool samples in 9 patients. Most of the prisoners from the Manjača Camp (62%) suffered from acute respiratory infection (Table 1). Pneumonia was found in 5 and acute sinusitis in 4 patients. Acute cavernous tuberculosis of the lungs was found in one patient. In spite of wide bacteriologic and serologic examination, the agent responsible for the acute respiratory infection was not identified. Considering the epidemiologic data on close contacts with sheep in the camp, a Q-fever epidemic was suspected, but was not serologically confirmed. In both groups, 20% of prisoners had increased values of serum aminotransferases (2- to 3-fold the normal level) over 2-3 weeks. The etiology was left open after viral hepatitis (A, B and C) and Q-fever had been excluded. Physical torturing of the prisoners-of-war is presented on Table 2. The difference between the camps is obvious. In the Glina Camp, all prisoners were physically tortured, and 17 (41.5%) of them were tortured with

Table 4. Number and location of fractures and other serious injuries in prisoners-of war

	Camp		
	Glina	Manjača	Total
Fractures			
Skull base	2	3	5
Ribs	8	5	13
Vertebrae	2	0	2
Pelvis	2	0	2
Ulna	1	0	1
Phalanges	2	0	2
Dental injury with teeth fractures	0	2	2
Distortion of joints	3	3	6
Ulnar nerve injury	2	0	2
Total	22	13	45

electric shocks. In all other camps held by Chetniks, all prisoners were maltreated. Among hospitalized prisoners-of-war from the Manjača Camp, 52 were physically tortured by YFA. Similar relations were found when the contusion sites were evaluated (Table 3). Severe body injuries, mostly broken bones, were registered in 35 hospitalized patients (Table 4). Furthermore, this type of injuries was found in every other prisoner from the Glina Camp (n=22). Most frequently, fractures involved the ribs (n=8). One patient had a skull-base fracture with consequential nasal liquorrhea. Severe body injuries were registered in 1/5 of the prisoners-of-war from the Manjača Camp. In spite of the fact that both groups of the prisoners-of-war were subjected to most brutal tortures without respect to any ethical and human norms, the data obtained still pointed to a significant difference between them. While all the prisoners-of-war from the Glina Camp kept by Chetniks were tortured, 50% of the prisoners from the Manjača Camp had no visible signs of physical maltreatment. Apart from the group of 64 prisoners-of-war from the Manjača Camp hospitalized at the University Hospital of Infectious Diseases, 113 were treated as outpatients. Broken ribs were found in two, broken sternum in the other two, and contusions in 27 of them. All the prisoners-of-war were exposed daily to various psychological tortures. A diagnosis of posttraumatic stress syndrome was made in 35 hospitalized and 31 outpatiently treated subjects. Psychological disorders were registered in 56.1% of the prisoners-of-war from the Glina Camp. Psychiatric treatment was suggested for 15 of the prisoners from the Manjača Camp. Eight prisoners-of-war from the Glina Camp (every fifth) were advised to undergo further psychiatric treatment (Table 5).

Table 5. Number of prisoners-of war with established psychical maltreatment and psychiatric disorders

Camp	Total	Psychical maltreatment	Posttraumatic psychotic stress syndrome	Psychiatric follow-up
	No.	No.	No.(%)	No.(%)
Glina	41	41	23(56.1)	8(19.5)
Manjača (hospitalized)	64	64	12(18.8)	4(6.3)
Manjača (outpatients)	113	113	31(27.4)	3(2.7)
Total	218	218	66(30.3)	15(6.9)

Conclusion

Accommodation and feeding conditions, as well as basic hygienic needs in the Manjača and Glina Camps were below any civilized level. The treatment of the prisoners-of-war was brutal, without respect for any norms of human dignity and ethics. All the prisoners-of-war were daily psychologically tortured and most of them exposed to physical tortures, including electric shocks. A great number of severe body injuries and psychic disorders were observed. The torture was more brutal in the Chetnik camp in Glina. A close collaboration between the YFA and Serbian military extremists, the Chetniks, was clearly confirmed by the very fact that a number of civilians had been captured by Chetniks and then deported from smaller Chetnik camps to the YFA Manjača Camp. Acute intestinal infectious disease (Glina) and acute respiratory disease (Manjača) was most probably caused by poor hygienic conditions.

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Psychic Status of the Manjača Camp Prisoners

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Abstract. Mental status of 150 prisoners released after 58 days from the Yugoslav Federal Army (YFA) Manjača camp for prisoners-of-war (near Banja Luka, Bosnia and Herzegovina) was examined by a psychiatrist and a psychologist. Psychiatric examination revealed symptoms of mental disorder in 54 (36%) of the subjects. Psychologic examination showed psychopathologic symptoms in a smaller number of subjects. Analysis based on MMPI and PIE questionnaires showed that the subjects as a group did not significantly deviate from the normal data ranges. Individual deviations existed in those individuals for whom the psychiatric examination revealed mental disorder symptoms. According to DSM III Classification, the deviations were classified as a post-traumatic reaction to a stress situation.

Key words: *combat disorders; Croatia; Geneva Conventions; prisoners; war*

Description of the Event

After heavy fighting and siege by the Yugoslav Federal Army (YFA) and Serbian paramilitary forces, members of the Croatian police (active and reserve forces) and Croatian National Guard (CNG) surrendered on September 12, 1991, in Hrvatska Kostajnica. The next day they were taken to Manjača, near Banja Luka in Bosnia and Herzegovina, where the enemy had established a prisoner-of-war camp. According to the agreement between the Croatian government and YFA, under the supervision of the European Community Monitoring Mission, they were released after 58 days, on November 8, 1991.

Introduction

The Third Geneva Convention from 1949 (1) precisely determines the categories of persons who can be considered prisoners-of-war. The Convention was accepted by 143 countries, including Yugoslavia. The Convention also defines the limits of treatment of prisoners, and states that they should be submitted to the captor's authorities, not to individuals or military forces who captured them, i.e. that the state is responsible for them. An international humanitarian organization (e.g., International Red Cross) or some patron country is supposed to control implementation of these rules. The purpose of the Convention is to assure the war rights be respected and human relationships between the belligerents established, so that the suffering of the captives is reduced. According to the Convention, the prisoner-of-war status is granted to the members of armed forces, police and voluntary units, as well as to the members of resistance if they have a commander responsible for them, weapons, recognizable uniforms and respect the war conventions and laws. In addition, the status can be granted to other persons in strictly defined situations (1). Accordingly, the members of the Croatian National Guard and Police who were imprisoned in Manjača camp should have been considered prisoners-of-war. The Convention also clearly specifies that food, clothes, lodging and sanitation services must be satisfactory to preserve a prisoner's health. General recommendations contain human relationships and an obligation to support the prisoners. Working

obligations and conditions, right to contact families and legal protection are also specified (1).

Subjects and Methods

The Croatian Medical Corps Headquarters organized a team of professionals to determine the physical and mental health status of prisoners, in order to meet their need for medical, psychologic and psychiatric help, and to plan preventive actions for the future. The team consisted of a surgeon, industrial medicine doctor, infectologist, psychiatrist and clinical psychologist. The examination, with all respective laboratory tests was performed at the Infectious Diseases Hospital, from November 9 to November 29, 1991.

Subjects

According to the official records, a total of 333 persons were imprisoned in Manjača (134 guardsmen, 130 policemen, 30 wounded and 30 civilians). Our examination included 150 men, who responded to our radio call for contact and examination. There were 44 guardsmen, and 83 active and 33 reserve policemen, aged 19-52 years.

Test Procedures

The psychiatric examination was performed in the form of clinical interview. It was a psychotherapeutic interview attempting also to create a positive transfer situation (2), i.e. a form of therapy. In addition to an insight into the subject's mental profile, such an interview also provides the possibility of diagnosing a mental disorder, of screening and possibly of ordering incipient medication or starting a psychotherapeutic treatment (3). Psychologic examination was done individually and in small groups. Individual examination was a clinical interview structured according to the six groups of data planned to be examined. The subjects were left to express their answers freely, and to emphasize and explain the facts they considered important. In small groups the examinees answered (in the presence of a psychologist) MMPI scale standardized in Yugoslavia (4), the Beck scale of helplessness, the PIE (5) and the Bogardus scale for examination of social distance (6).

Results

Psychiatric Examination

From the total of 150 tested subjects 54 (36%) showed symptoms of mental disorder, which is close to the distribution of mental disorders in normal population (about 30%). The proportions did not differ among active policemen, police reservists and Croatian National Guard members (Table 1). These were the five most common mental disorders.

Sleep disorders. They include difficulties in falling and staying asleep and change in sleep rhythm and wakefulness. Most subjects had

Table 1. The frequency of mental symptoms in ex-prisoners after their release from Manjača prisoners-of-war camp

Subjects	Total No.	% with symptoms
Police (active)	83	32.5
Police (reserve)	33	39.4
Croatian National Guard	44	31.8
Total	150	36.0

Table 2. Means and standard deviations on MMPI clinical scales

Symptoms	Mean	SD
L-control scale	51.00	2.93
F-control scale	4.68	4.44
K-control scale	13.50	4.73
Hypochondria	13.59	4.73
Depression	12.61	6.21
Hysteria	13.33	4.51
Psychopatic deviations	16.21	3.64
Paranoia	7.17	4.66
Psychosthenia	22.80	4.32
Schizophrenia	25.10	5.64
Hypomania	14.16	2.75

dreams or nightmares of the events from combat and imprisonment (also included in the third group of symptoms). A few also had somnambulism. There were differences in the intensity of the disorder: faster or slower times to fall asleep, staying asleep more or less continually, more or less impressive nightmares.

Mood disorders. Almost all subjects with mental disorder symptoms had mood disorders, with oscillations during the day. They felt tension, anxiety, urge for movement, hypervigilance and a decreased capacity of attention span. They had difficulties in controlling affect, particularly anger and rage, resulting in emotional incontinence. Six subjects demonstrated depressive behavior and in two the symptoms of alcoholism appeared.

Re-experiencing events from combat and imprisonment. Two thirds of subjects with mental disorder re-experienced events from combat and imprisonment during the day. The symptom was expressed in the necessity of retelling the experienced, in painful recollections that spontaneously burst out, mostly at night, disturbing sleep patterns, in the form of memories or thoughts of aforementioned experiences or manifested as nightmares. The subjects would then wake up, walk, smoke or consume alcohol. Physiological symptoms of fear were sweating, wetting, tremor of fingers, tachycardia.

Avoiding recollection of events from combat and imprisonment. It was expressed in a small number of subjects. They did not want to be asked about their experiences, did not want to listen to the news from the battlefield and isolated them-

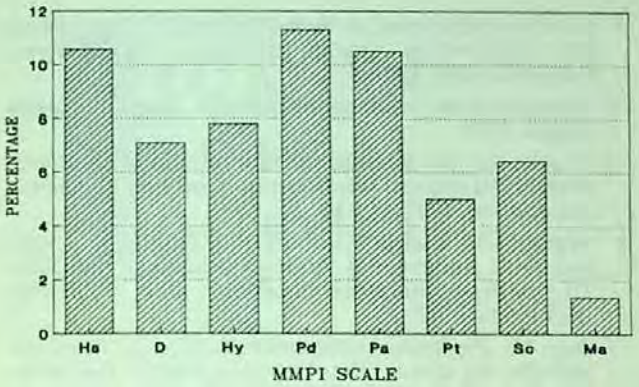

Figure 1. Percentage of deviations (high score) on MMPI subscales of 150 prisoners-of-war from Manjača camp. Hs - hypochondria; D - depression; H - hysteria; Pd - psychopathic deviations; Pa - paranoia; Pt - psychosthenia; Sc - schizophrenia; Ma - hypomania.

selves avoiding communication even with members of their families.

Psychosomatic Symptoms

In addition to mentioned physiologic symptoms of fear, there were also dermatitides, psychologic breathlessness and reactivations of gastric ulcers (each symptom two subjects, respectively). With respect to the underlying event and the time between it and the examination, the symptoms can be classified as post-traumatic reactions to stress (7,8).

Because of the dominant depressive symptom ("paralyzed depression") two patients were admitted for hospital treatment, two went to an internist for the treatment of psychosomatic symptoms, two to a dermatologist and two to a neurologist. Twenty patients received the medicaments: benzodiazepine (thirteen), nitrazepan (two), flurazepan (two), and sulprid (two). All subjects had the choice to contact the psychiatrist if necessary, and 54 with mental disorder symptoms were obliged to do so.

Psychological Examination

The PIE and MMPI interview data are presently available. They provide the following groups of data.

1. Stress situations due to capture and incarceration at Manjača: hunger, lack of information, care and fear for family members, misinformation about the events on the battlefield and in the rear, verbal insults, beating, hard physical labor, poor hygienic conditions, lack of cigarettes.

2. Coping strategies: group support, keeping company, daydreaming about the future, remembering pleasant events from the past, physical activity, prayer, withdrawal, sleep.

3. Present disorders: sleep disorders, lack of appetite, various pains, concern about the future, anxiety, inability to relax, depressiveness, suspiciousness.

Table 2 shows the data obtained by MMPI questionaire, which measures psychopathologicaleviations such as hypochondria (Hs), depression (D), hysteria (Hy), psychopatic deviations (Pd), paranoia (Pa), psychostenia (Pt), schizophrenia (Sc) and hypomania (Ma). It is obvious that the subjects as a group (on an average) did not show deviations on the psychopathological scales applied. Naturally, there were individual deviations, but they did not exceed the limits of normal data (Fig 1).

A profile index of emotions (PIE) also revealed results similar to that obtained in the normal population (not shown). The positive emotions prevailed, which were probably due to the fact that the examination was done several days after the release.

Discussion

The personal experience of the subjects differed in estimating and emphasizing the most painful experiences, but, except for beatings, the events listed in Results section were mentioned by all of them. Similarly, except for a small percentage of subjects, all considered the help of the group or friends as the most supportive factor. The following description is the best illustration: "As soon as they noticed that I (or somebody else) was in a bad shape, the others would immediately try to communicate, engage me in some activity, or start talking about imminent release". Friendships were made to last a lifetime.

All subjects emphasized the importance of the high morale and good mood of the doctors who were imprisoned with them and took care of them. All data suggest very important influence of various group processes like support of the group, cohesiveness, common aims, etc; this is concordant with data from literature (9). The reported disorders also correspond to the findings of other authors (9,10). The data obtained by the application of the MMPI questionnaire fall within the normal limits (Table 2) which is at variance with the data obtained by the psychiatric interview (Table 1). This may be due to the relatively low proportion of subjects with mental disorder symptoms (Table 1); also, psychiatric diagnoses do not correspond to deviations on particular psychologic scales, and psychosomatic symptoms are common among soldiers (11).

The increase on the scale of hypochondria (Hs, Table 2) could be attributed to the fact that our patients had lost a considerable portion of body weight (physical status of our patiens was assessed by a respective group of experts, ref. 12), which is accompanied by a series of physical symptoms, and their orientation towards observation of their own body is understandable. Increased values on psychopathic deviations (Pd) should be considered in relation with hypochondria (Hs) and paranoia (Pa) scales (Figure 1). Increased results on the Pd-scale suggest an immaturity, decreased tolerance to frustration, and impulsiveness. These

persons are also expected to have physical symptoms and suspiciousness measured by the Pascale, particularly in conditions of psychological pressure and unfavourable living conditions as was the case with our patients.

Although volunteers, most of them had been preselected before joining the police or the Croatian National Guard. This was done on the basis of normal physical and mental characteristics for healthy young men. The results of this study suggest that the selection was appropriate. In view of their experience of heavy combat against a much stronger enemy, siege, surrender and a two-month stay in the prisoner-of-war camp under terrible conditions, their symptoms and reactions can be considered normal.

Refereces

1 Konvencija o postupanju sa ratnim zarobljenicima. U: Ženevske konvencije o zaštiti žrtava rata. Beograd: Državni sekretarijat za inostrane poslove, 1949;81-4.

2 Nikolić S, Klain E, Vidović V. Osnove medicinske psihologije. Zagreb: Medicinski fakultet Sveučilišta u Zagrebu, 1990:151-7.

3 Watson CG, Juba MP, Manifold V, Kucala T, Anderson PED. The PTSD interview: rationale, reliability, and concurrent validity of DSM-III- based technique. J Clin Psychol 1991;47:179-89.

4 Biro M, Berger J. Praktikum za primenu i interpretaciju MMPI - 201. Beograd: Savez društava psihologa SR Srbije, 1985.

5 Baškovec-Milinković A, Bele-Potočnik Ž. Priručnik za PIE profil indeks emocija. Ljubljana: Zavod za produktivnost dela, 1979.

6 Zvonarević M. Socijalna psihologija. Zagreb: Školska knjiga, 1978.

7 Diagnostic and statistic manual of mental disorders, revised 3rd edition. Washington; American Psychiatric Association, 1987:245-51.

8 Watson CG, Kucala T, Juba MP, Manifold V, Anderson PED, Anderson D. A factor analysis of the DSM-III post-traumatic stress disorder criteria. J Clin Psychol 1991;47:205-15.

9 Star AS. Psychoneurotic symptoms in the army. In; Stouffer AS, editor. The American Soldier. Princeton; Princeton Univ Press 1949;2:411-55.

10 Burke HR, Mayer S. The MMPI and the post-traumatic stress syndrome in Vietnam era veterans. J Clin Psychol 1985;41:152-7.

11 Meichenbaum D, Jeremko ME. Stress reduction and prevention. New York; Plenum Press, 1983.

12 Borčić D, Kuzman I, Bobinac E, Beus I, Schoenwald S. Medical status of prisoners-of-war from Manjača and Glina camps. Croat Med J 1992;33(War Suppl 2):93-6.

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Migratory Dynamics Due to the War in Croatia

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Abstract. Person displacement from the demographic point of view is analyzed. Two indicators were defined: population burden due to immigration and population loss due to emigration. Indicators are presented in ten regions of Croatia through five points in time. Monotonous trend of increase of population burden was observed as well as the trend of population loss with the exception of Istra. The graphic presentation of the region-time association was found by application of correspondence analysis. Istra and Primorje were very similar regarding the burden and loss at the beginning and at the end of the studied period. In December, Istra, Primorje and Northwest Croatia showed the heaviest burdens, while Lika and Zagora showed the highest loss. The greatest inertia was found in regions with extreme burdens or extremely high losses (Istra, Primorje, Northwest Croatia, Lika, Zagora, East Slavonia). The analysis of the population burden and loss represents the crucial element of decision making for handling the problem of displaced persons.

Key words: *displaced persons; migratory dynamics; population burden; population loss*

Introduction

In the case of continuous person displacement in the Croatian population, a number of demographic consequences are inevitable. There are a lot of severe problems, many being rather difficult to solve either on the individual level or on the population level. The displacement in Croatia still persists. By the beginning of December it had reached to over half a million displaced persons. In a previous paper (1) we described person displacement patterns. The objective of this paper is to describe immediate demographic consequences of the person displacement phenomenon in communities of Croatia, i.e. to identify donor populations as well as recipient populations, and discuss some organizational aspects for the mitigation of the problems on the population level.

Population and Methods

Data presented in the study came from regional registration centers and were recorded by the Committee for Refugees, Republic of Croatia from July to December 1991 (2). To assess certain demographic consequences, we defined two indicators: relative increase of a population of a community, and relative decrease of the population size of a given community. The first one was named "population burden due to immigration", and the other "population loss due to emigration from the community". Indicators were calculated as an increase or a decrease of the population size in relative frequencies per thousand for regions and communities in Croatia (3).

Data were presented in two-dimensional contingency tables, time in month intervals, and space in ten regions of Croatia, respectively. Time points were August 16, September 13, October 16, November 11 and December 12. Space was defined as following: Northwest Croatia, East Slavonia, West Slavonia, Banija and Kordun, Lika, Gorski Kotar, Istra, Primorje, Dalmatia and Zagora. To find a graphic representation of the region-time association, correspondence analysis (weighted

Table 1. Migratory dynamics in Croatia from August to December 1991 - *'displacement to'*

Region (population)	Date of registration reports with number of immigrants and popuulation burden (per thousand) Aug. 16	Sep. 13	Oct. 16	Nov. 11	Dec. 12
N-W Croatia	8,731	31,758	59,692	77,996	121,686
(1,789,345)	(5)	(18)	(33)	(44)	(68)
E. Slavonia	5,795	13,433	19,233	21,101	21,388
(725,384)	(8)	(19)	(27)	(29)	(30)
W. Slavonia	152	2,285	3,538	6,384	6,935
(305,536)	(1)	(8)	(12)	(21)	(23)
Banija-Kordun	1,998	6,259	6,655	16,195	16,195
(341,685)	(6)	(18)	(20)	(47)	(47)
Lika	94	166	166	166	299
(83,927)	(1)	(2)	(2)	(2)	(4)
G. Kotar	226	141	738	910	1,223
(59,294)	(4)	(3)	(13)	(15)	(21)
Istra	3,396	1,909	6,152	9,171	17,557
(195,605)	(17)	(10)	(32)	(47)	(90)
Primorje	5,403	9,385	16,665	22,303	42,601
(315,682)	(17)	(30)	(53)	(71)	(133)
Dalmatia	8,697	14,746	31,762	46,318	52,415
(726,874)	(12)	(20)	(44)	(64)	(72)
Zagora	98	250	518	716	1,005
(217,154)	(1)	(1)	(2)	(3)	(5)

Table 2. Migratory dynamics in Croatia from August to December 1991 - *'displacement from'*

Region (population)	Date of registration reports with number of emigrants and population loss (per thousand) Aug. 16	Sep. 13	Oct. 16	Nov. 11	Dec. 12
N-W Croatia	0	41	439	1,226	1,802
(1,789,345)	(0)	(0)	(0)	(0)	(1)
E. Slavonia	19,826	39,230	58,345	69,915	104,051
(725,384)	(27)	(54)	(80)	(96)	(143)
W. Slavonia	87	6,312	22,326	22,448	26,536
(305,536)	(0)	(21)	(73)	(74)	(87)
Banija-Kordun	8,108	14,260	23,958	30,032	37,992
(341,685)	(24)	(42)	(70)	(88)	(111)
Lika	437	4,361	7,161	7,882	9,098
(83,927)	(5)	(52)	(85)	(94)	(108)
G. Kotar	108	1,175	1,396	1,343	1,926
(59,294)	(2)	(20)	(24)	(23)	(32)
Istra	0	0	0	0	0
(195,605)	(0)	(0)	(0)	(0)	(0)
Primorje	0	1	13	16	16
(315,682)	(0)	(0)	(0)	(0)	(0)
Dalmatia	253	1,597	8,569	13,812	28,097
(726,874)	(0)	(2)	(12)	(19)	(39)
Zagora	1,697	5,125	9,876	19,960	20,449
(217,154)	(0)	(24)	(45)	(92)	(94)

principal component analysis of a contingency tables), was applied (4).

Results

Tables 1 and 2 present data on total population, the number of temporary immigrants and emigrants, population burden and loss per region, according to the time points of registration reports. Both immigration and emigration trends monotonously increased for all regions with the exception of emigration rate in Istra. Although population burden in absolute numbers was the heaviest in Northwest Croatia, the heaviest relative burden was noticed in the population of Primorje, followed by Istra, Dalmatia, Northwest Croatia etc. In December, some communities within the Primorje region had a population burden larger than 365 per thousand, ranging from 66 (Senj) to 240 (Opatija, Buzet), and 365 (Crikvenica).

Table 3. Row profiles

	August		December	
	Burden	Loss	Burden	Loss
N-W Croatia	0.067568	0.000000	0.918919	0.013514
E. Slavonia	0.038462	0.129808	0.144231	0.687500
W. Slavonia	0.009009	0.000000	0.207207	0.783784
Banija-Kordun	0.031915	0.127660	0.250000	0.590426
Lika	0.008475	0.042373	0.033898	0.915254
Gorski Kotar	0.067797	0.033898	0.355932	0.542373
Istra	0.158879	0.000000	0.841121	0.000000
Primorje	0.113333	0.000000	0.886667	0.000000
Dalmatia	0.097561	0.000000	0.585366	0.317073
Zagora	0.009259	0.074074	0.046296	0.870370

Table 4. Column profiles

	August		December	
	Burden	Loss	Burden	Loss
N-W Croatia	0.069444	0.000000	0.137931	0.001626
E. Slavonia	0.111111	0.409091	0.060852	0.232520
W. Slavonia	0.013889	0.000000	0.046653	0.141463
Banija-Kordun	0.083333	0.363636	0.095335	0.180488
Lika	0.013889	0.075758	0.008114	0.175610
Gorski Kotar	0.055556	0.030303	0.042596	0.052033
Istra	0.236111	0.000000	0.182556	0.000000
Primorje	0.236111	0.000000	0.269777	0.000000
Dalmatia	0.166667	0.000000	0.146045	0.063415
Zagora	0.013889	0.121212	0.010142	0.152846

Table 5. Inertia and chi-square decomposition

Singular values	Principal inertias	Chi-squares	Percents	18 36 54 72 90
0.73868	0.54564	679.870	92.23%	**********
0.19656	0.03863	48.139	6.53%	**
0.08569	0.00734	9.148	1.24%	
	0.59162	737.158	(Degrees of freedom = 27)	

The largest population loss was recorded in East Slavonia, followed by Banija and Kordun, Lika, Zagora and West Slavonia.

The first and the last column in Tables 1 and 2 were processed by the correspondence analysis method. The row profiles (Table 3) show different burdens and losses in the first and the last time period for different regions. According to the row profiles, Istra and Primorje were found to be very similar regarding the burden and loss. They are characterized by no losses, relatively heavy burden in August, and an extremely heavy burden in December. East Slavonia, Banija, Kordun and Gorski Kotar represent the second group - with both increased burden and loss. West Slavonia and Dalmatia are characterized by absence of losses in August, and Lika and Zagora by very heavy losses in December. Northwest Croatia has a special profile, with a small loss and extremely heavy burden. The column profiles (Table 4) show nearly the same patterns.

The inertia and chi-square decomposition table obtained by the correspondence analysis showed that there were three nontrivial dimensions in the table (Table 5), but that the association between rows and columns was almost entirely one-dimensional. The plot (Figure 1) and row coordinates (Table 6) showed that burdens characterized the upper side of the first dimension, losses the lower one. In December, Istra, Primorje and Northwest Croatia had the highest burdens (they are so close to each other that in the picture they were nearly overlaid), while Lika and Zagora showed the largest loss. Other regions in the plot were between these two extremes. The highest inertia (Table 7) was found in regions with extremely heavy burdens or losses (Istra, Primorje, Northwest Croatia, Lika, Zagora, East Slavonia).

Finally, Istra, Primorje and Northwest Croatia were identified as the absolute recipient populations in August. In December, Istra and Primorje had the same characteristic, but the pattern

Table 6. Row coordinates

	Dim. 1	Dim. 2
N-W. Croatia	1.07671	-0.02312
E. Slavonia	-0.54675	0.23238
W. Slavonia	-0.47228	-0.35792
Banija-Kordun	-0.34563	0.25938
Lika	-0.82442	-0.23502
Gorski Kotar	-0.06057	-0.09413
Istra	1.09412	0.02350
Primorje	1.09905	0.00295
Dalmatia	0.46052	-0.13111
Zagora	-0.79876	-0.08520

Table 7. Summary statistics for the row points

	Quality	Mass	Inertia
N-W. Croatia	0.955763	0.059390	0.121821
E. Slavonia	0.997295	0.166934	0.099856
W. Slavonia	0.990477	0.089085	0.053385
Banija-Kordun	0.985273	0.150883	0.048336
Lika	0.999580	0.094703	0.117689
Gorski Kotar	0.719421	0.047352	0.001394
Istra	0.977736	0.085875	0.177800
Primorje	0.998893	0.120385	0.246064
Dalmatia	0.978023	0.098716	0.039114
Zagora	0.999998	0.086677	0.094540

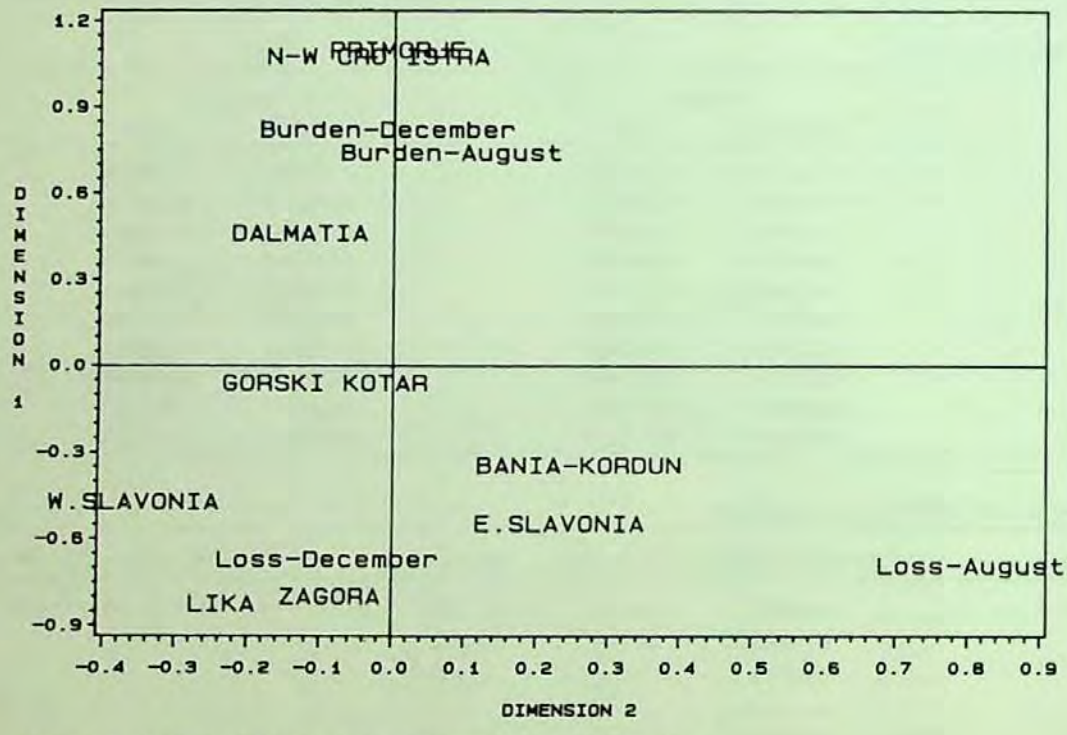

Figure 1. Regions and loads in the correspondence analysis plot

for Northwest Croatia had changed. It was not the absolute recipient population anymore but, according to its population, it was the relative recipient population. At the same time, none of the regions was an absolute donor population.

Discussion

New social and economic developments in Croatia were partialy interrupted by intensive population movements. A variety of displaced population groups entered new communities, causing marked population problems. Devastating war events made it clear that we cannot pursue our development without paying maximal attention to the problem of displaced persons.

Two population phenomenons define these problems. One is population loss, which represents not only a loss of people of a given community, but a loss of capital and income. The other is new population burden of the communities accepting displaced population groups, causing many health, economic, and lifestyle problems.

It is clear from our analysis that Croatia could be divided in three types of aggregated communities. The first is characterized by a marked population loss, the second by a marked population burden, and the third represents the communities that, within these four months, had both the population loss and the population burden. A wealth of literature on the subject of how to cope with health, socio-economic, lifestyle and environmental problems caused by displacement of persons are available (5,6). We shall narrow our discussion to the urgent problem of the coordination and monitoring of population-loss and population-burden problems. The estimation of population loss and population burden is necessary. After such a disaster, immediate burden and loss should be calculated in order to develop a relief plan as soon as possible. This is essential in order

to mitigate the direct effects of the disaster (7): human lives should be saved, supplies should be adequately distributed to the displaced persons. The homeless should be sheltered, victims should be treated, livestock moved to safe areas and personal property of all kinds recovered.

According to the United Nations compendium of current knowledge for disaster prevention and mitigation, the following actions have to be prepared. These actions depend on the phenomenon in question and the means used by the community. Two kinds of effects should be estimated, direct and indirect or secondary (8). Direct effects include: (1) physical calculation of damage: extent of damage to perennial crops (destruction rate); number of dwellings and buildings damaged; category and degree of damage; stocks destroyed or damaged; (2) evaluation of losses: cost of replacing crops, repairing and/or reconstructing buildings; value of personal properties: houses, shops, industries; cost of repairing transport networks. (3) Direct losses of income.

The latter are more difficult to calculate, except in the agricultural areas (ruined harvest). In urban areas, two approaches are possible: evaluation of losses of jobs on the basis of the last Census in the affected communities, and the evaluation of industries, businesses and services whose activities have been interrupted.

As no systematic and exhaustive analysis has been made so far, the problem of indirect and secondary losses caused by displaced persons movement, are open to scientific challenge. Indirect and secondary effects are occurring on the health and psycho-social level.

New methodological approaches are needed, based on comprehensive and holistic principles. This means that one of the most urgent requirements is the creation of an information system for displaced persons with incorporated decision-support diagnostic procedures. This is the *sine qua non* for effective care of displaced persons and the lowering of the system's tendency toward anarchy.

References

1 Kujundžić M, Kern J, Ivanković D, Budak A, Dragun D, Vuletić S. Person displacement pattern in Croatia. Croat Med J 1992;33(War Suppl 1):55-60.

2 Cumulative report on violation of the cease-fire in Croatia and on the crimes against civilians and violation of Geneva conventions for the period from August 1 to December 12, 1991. Zagreb: Medical Headquarters of the Republic of Croatia, 1991.

3 Popis stanovništva, domaćinstava, stanova i poljoprivrednih gospodarstava u 1991. godini: Prethodni rezultati, po općinama. Zagreb: Saopćenje Republičkog zavoda za statistiku Republike Hrvatske 1991;21.4:1-9.

4 SAS Institute Inc. SAS technical report P-179, additional SAS/STAT procedures, Release 6.03, Cary, NC: SAS Institute Inc., 1988.

5 Krill F. ICRC action in aid of refugees. Int Rev Red Cross 1988;265:328-350.

6 United Nations High Commissioner for Refugees. Handbook for emergencies. Part one: Field operations. Geneva: United Nations, 1982.

7 Environmental health management after natural disasters. Washington:Scientific Publication No. 430, Pan American Health Organization, 1982.

8 De Ville de Goyet C, Seamen J, Geijer U. The management of nutritional emergencies in large populations. Geneva: World Health Organization, 1978.

9 Disaster prevention and mitigation. A compendium of current knowledge. Volume 7. Economic Aspects. New York: UNDRO, 1987.

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Psychological State of the Croatian Refugees in the Republic of Hungary

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Abstract. Psychological state of a group of 100 refugees aged 10-82 yrs (mean, 38 yrs) was assessed by a psychiatric interview using a questionnaire designed especially for this study. The aim of the study was to evaluate the adaptive capacities of Croatian refugees from Baranya temporarily accommodated in the Republic of Hungary. The interview was conducted 6 weeks after their arrival in the camp (a social care institution) in Maria Gyud, a small town in Hungary. The refugees were found to have fled their homes and Homeland in fear from cruel enemies, i.e. local Serbs whom they identified as terrorists, and the Serbian governmental authorities backed up by the Yugoslav Federal Army. The refugees had to leave their homes and Homeland suddenly, but still of their own free will.The departure from home was accompanied by fear, anxiety, disbelief, despair, anger and, rarely, panic. First of all, they feared for their children, which was followed by fear from torture and mutilation by terrorists, whereas fears for their own life, relatives and properties were less pronounced. During the interview, homesickness and concern about the future predominated in 61% of subjects. Emotional and psychosomatic disturbances, clustered around Beard's "neurasthenic syndrome", were recorded in 42% of subjects. Actual psychiatric aid was sought by 5% of the refugees, mostly by those who had had some psychic problems before this forcible displacement. The Croatian refugees from Baranya were found to experience adaptive problems manifesting as emotional and psychosomatic reactions, even after 6 weeks of their stay in Hungary. Provision of a systematic professional and lay psychologic assistance and support from their Homeland is advised.

Key words: *adaptation, psychological; Croatia; refugees*

Introduction

Distressing events have always influenced human behavior. With the advances in scientific medicine, especially in psychiatry, they have become a subject of scientific studies. Development of psychogenic disturbances and morbid ideas can be induced by such events and they can act as precipitating factors for abnormal reactions (1). In 1918, Kretschmer related the character and responses to distressing events (2), whereas Schneider declared them to be behavioral variations of the normal psychic life (3). Meyer considers the individual genetic constitution to be responsible for the type of reaction in crisis (4). Miller and Ingham focus on the dimension of experience in finding adaptive behavior or answer to a distressful event (5). Lazarus and Delongis found a correlation between the time distance and a distressful event, and the reaction to it (6). The person's behavior in crisis (tension to paroxysm, motor anxiety, muscle tension, etc) is a sign of active struggle against one or a number of problems occurring in both mentally healthy and ill subjects. A crisis is not just a danger, but also a chance. Some persons, groups, institutions, even whole communities, are incapable of maintaining the biophysical balance, which results in impaired system functioning, possibly even in a complete breakdown. The biopsychosocial balance will be more or less unstabilized, depending on self-reliance acquired through previous experience, psychic and physical health, concern about the mental disease as well as about the threatening situation, which points to a correlation between cognitive and emotional ca-

pacities of persons and groups on one hand, and the severity of a distressing event on the other.

The aim of this study was to assess the adaptive abilities of Croatian refugees from Baranya, temporarily provided shelter in the Republic of Hungary. Their decision to leave their homes and social environment, subjective feelings on departure, the motive of departure, danger identification, orientation and the level of satisfaction in the new environment, and actual psychic state, were also the objective of the study.

Methods

A week after the announced visit of a psychiatrist to the Croatian refugees in Maria Gyud, a small place in Hungary, a psychiatrist known to the refugees (one of the authors) held 1-hour group sessions with children and adults. When a friendly contact had been established, a structured interview was conducted according to a prepared questionnaire for refugees. After that, the refugees could ask for psychiatric medicamentous aid when needed.

Results

The psychiatric interview was conducted using the questionnaire prepared. It was used in all refugees older than 10 who happened to be in the camp and who had already been staying there for 6 weeks after fleeing their homes and Homeland. The men fit for work and engaged in grape harvest on that day were excluded from the study. A group of 100 subjects, 45 females and 55 males, were included in the study. The youngest subject was aged 10, and the oldest 82 years (Table 1). The mean age of the subjects was 38 years. The camp had a common mess-room, 2 bathrooms, 7 toilets and 19 rooms for 162 refugees to sleep in. Different families were accommodated in the rooms. Children were not separated from their families. There was no lounge except for the mess-room, where the refugees spent the whole day. There were 50 families in the camp, 42 Croatian, 5 Hungarian, and 1 Ukrainian, Gypsy and Serbian. According to their education and occupation, they were mostly farmers, housewives and craftsmen. Only one man had university education, two were students, and children were attending primary and secondary school.

Although evacuated in emergency, they all left their homes and Homeland of their own will. Six families had lost some of their members in the war, whereas 12 families had lost their properties before departure. As they had to leave their homes in fear and all of a sudden, they could only take the most important things along. So, they went into the unknown, thinking "if the others manage to survive, I will too".

Results of the psychiatric interview, and answers to the questionnaire with the respective frequency of subjects are shown in the following tables. Thus, table 2 shows the rating of feelings prior to the flight. Fear occupies the leading place. This new state which changed their settled orders, caused fear (31%), anxiety (25%), suspicion (18%), despair, weeping and wail (8%), anger (6%) and panic or panic-equivalent (4%) in the refugees. Twelve subjects, mostly school children

Table 1. Sex and age distribution of the Croatian refugees in Hungary

Age group (yrs)	F	M	Total	%
10-20	13	12	25	25
21-30	8	12	20	20
31-40	5	7	12	12
41-50	3	5	8	8
51-60	5	6	11	11
61-70	3	7	10	10
71-80	7	5	12	12
>80	1	1	2	2
Total	45	55	100	100

M-males, F-females

Table 2. Grading of feelings before the refugees' flight from Homeland

Feeling	No.	%
Fear	31	31
Anxiety	21	21
Suspicion	18	18
Calmness	12	12
Despair (weeping, wail)	8	8
Anger/rage	6	6
Panic	4	4
Total	100	100

Table 3. Grading of recognized fear before the refugees' flight from Homeland

Fear	No.	%
Fear for children	31	31
Fear from torture/mutilation	25	25
Fear for one's own life	12	12
No fear	12	12
Fear for parents	9	9
No answer	6	6
Fear for property	5	5
Total	100	100

Table 4. Grading of psychosomatic disturbances in the refugees

Psychosomatic disturbance	No.	%
Insomnia	15	35.7
Fatigue	8	19.0
Depression	8	19.0
Aphagia	5	11.9
Irritability	3	7.1
Functional disturbances	3	7.1
Total	42	100

Table 5. Grading of predominant psychic states in the refugees

Psychic state	No	%
Homesickness	36	36
Concern about future	25	25
Fear for home and property	18	18
Anger	8	8
Grief	3	3
Satisfactory state	10	10
Total	100	100

Table 6. Main culprit for the refugees' fate

Responsible culprites	No	%
Local Serbian terrorists	31	31
Serbian government	27	27
Serbian government and YFA	10	10
Serbian government and local terrorists	10	10
YFA	10	10
Croatian and Serbian governments	5	5
Croatian government	4	4
Other	3	3
Total	100	100

aged 10-12 years, did not feel fear. They were calm and steady, and it could only be accounted for by an otherwise calm intrapsychic dynamics of the period of latency (Table 2).

Table 3 gives a survey of recognized fears, revealing the fear for children to be present in the greatest number of refugees. Table 4 ranks the psychosomatic disturbances, showing insomnia to predominate, whereas the frequency of individual psychic states in exile is presented in Table 5. Homesickness and yearning for Homeland were the most frequent feelings among the refugees. Table 6 provides the refugees' answers concerning culprits for their bitter fate: according to their answers, local Serbian terrorists are to be primarily blamed for the refugees' fate, followed by the Communist Serbian government. In general, the reception and accommodation in the camp satisfied the refugees' needs, albeit they believed the life could still be better organized there. They asked for more attention to be paid to children, whereas adults should be included in daily activities to a greater extent, e.g., housewives in the preparation of the food, and others in doing various jobs equalled to and evaluated as those done by residents. They also asked for more information on the events in Croatia and in their native places in particular (e.g., regular receipt of local newspapers, etc) They strongly hoped to return home soon.

Five refugees sought some medicamentous aid too. They were aged between 50-60 years, and have been suffering from some physical and psychic diseases even before having to leave their homes.

Discussion

Six week prior to the interview, the study subjects were abruptly thrown into an emergency situation, having to flee their homes and Homeland in fear of the Serbian terrorists and Yugoslav Federal Army (YFA) forces. They experienced immediate threat to their lives and properties, and their usual activities were abruptly interrupted.

The results presented in Table 3 differ from those obtained in a study conducted by Holmes and Rahe (7), who designed a social readjustment rating scale and encoded particular events in one's life. Distressing events in one's life are classified into three spheres, representing typical, painful and stressful life events, i.e. the spheres of the self, the innermost feelings and the accomplishments. These three spheres are dynamically interreacting. The sphere of innermost feelings is encoded highest (50%), followed by that of achievements (40%) and of the self, i.e. the capacity, with only 10% of the points (7). After the initial stage of pulling themselves together, adjustment to the new situation gradually occurred in the study subjects. The loss of socio-cultural and environmental reality induced a state of stress and crisis in the refugees, which in turn triggered the cognitive evaluation and emotional responses. Depending on their cognitive and emotional capacities, a mature behavior appeared or turned toward regression, requiring increased adaptability, which then entailed physiologic disfunctions or emotional disturbances tending to progress into psychosomatic diseases. They were all faced with a new serious situation, forced to flee their homes and Homeland. A prolonged stress caused the body defense mechanism exhaustion in a number of subjects. They could not master the new situation and developed psychosomatic disturbances, i.e. insomnia (15%), fatigue (8%), depression (8%), aphagia (5%), and anxiety or functional disturbances (3% each). Thus, 42% of the subjects had psychosomatic disturbances that could be grouped around the "neurasthenic syndrome" caused by prolonged stress and uncertainty, whereas 5% of the subjects also sought psychiatric aid. A similar stress-induced syndrome was reported by other authors (7). Homesickness induced bad humor in 35% of the study subjects. It actually was consequential to the lack of daily life stimuli, leading to decreased awareness, mild time disorientation, anxiety and changed biological rhythm, which in turn resulted in monotony and apathy. New regulatory changes toward the outer world occurred. The environmental system changed. The usual stability diminished, which led to changed reasoning, irrational consideration, tension, instability, muscle tension and physical discomforts, actually the signs of active struggle against one or more problems. In our subjects, these difficulties were expressed as concern about the future, fear for home, anger, grief, feeling of helplessness or feeling of guilt (Table 5). Crisis and stress elicited complementary actions upon the study subjects.

The refugees recognized the enemy and identified the culprits for their fate as the local Serbian terrorists (31%) and Serbian government (27%), followed by Serbian government and the YFA or YFA alone. Disagreements between the Croatian and Serbian governments, and the responsibility of the Croatian government occupied the last places in the list.

The refugees could not find any reasons for such an aggressive attitude of the identified enemies toward them. They fled from their aggressive behavior and recognized pure hatred in them. They reconsidered their relationships with the enemies, analyzed both their good and bad conducts, reconsidered their engagement in the community and care for maintaining a decent way of living there together, and could not find any reasons for such hatred in their behavior. In a conversation with the author, they did not accept it to be an expression of mental disorder. They would rather accept the destructive forces of the enemy to be accounted for by their former privileges, undeserved positions now endangered by democratic changes and conditions, and resulting from their already historic ignoring of the others' needs, primarily and exclusively respecting and satisfying their own instincts and requirements. During conversation with the author, the study subjects readily stated they would refute all these features and could never adopt them for being in contrast to their educative principles.

After 6 weeks of their stay in the Republic of Hungary, the refugees had acquired a new valuable experience. They recognized the powers endangering their sociability and impairing the relationships within a community. They actually had an opportunity to learn that the aggressor only recognized their own needs, ignoring and refusing to learn anything about the needs of the others. Thus, this new knowledge provided the refugees with hope and competence for a more alert and comprehensive watching, assessment and identification of any endangering powers in a community from now on. Now, they have learned how to fight for a better, optimal development and living, for both inner and outer freedom of every member of the community. They wish to comply with universal human values, believing and stating that "there is no need to kill, no need to do harm to anybody for gain". Prospects for their hope and belief in a free Republic of Croatia, to be fully realized soon, make their fears diminish and disappear.

References

1 Jaspers K. Opšta psihopatologija. Beograd: Prosveta-Suvremena administracija, 1978.

2 Kretschmer E. Histerija, refleks i instinkt. Beograd-Zagreb: Medicinska knjiga, 1955.

3 Schneider K. Klinische Psychopathologie. Stuttgart: Thieme Verlag, 1950.

4 Meyer A. The role of the mental factors in psychiatry. Am J Insan 1908;65:39.

5 Miller P, Ingham JG. Are life events which cause each other additive in their effects? Soc Psychiatry 1985;20:31-7.

6 Lazarus RS, Delongis A. Psychological stress and coping. Am Psychol 1983;38:245.

7 Kaplan HI, Sadock JB, editors. Comprehensive textbook of psychiatry. Baltimore: Williams & Wilkins, 1985.

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Croatian Medicine in 1991 War against Croatia: A Preliminary Report

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Abstract. Croatian military medical service was established in the Spring of 1991 by a doctor taking the first aid set from his car and joining Croatian policemen on a battlefield; by the end of the year it served more than 100,000 men in the field. According to the official records of the Croatian Medical Corps Headquarters, 3,023 persons were killed and 16,102 wounded in Croatia from the beginning of the war (Easter 1991) to January 12, 1992. Civilians make 48% of the dead and 31% of the wounded. During the aggression on Croatia, medical personnel, institutions and vehicles were specifically and intentionaly targeted by the aggressor. Material damage to the medical institutions in Croatia is estimated to approximately DEM 1.3 billion. At least 18 medical workers were killed, 38 were wounded, many captured and imprisoned by the enemy and two are missing. At least 5 hospital patients were killed and 6 wounded. The background of the war and the role and achievements of Croatian medicine are briefly discussed.

Key words: *Croatia; hospital; medicine; war*

Introduction

Classical definition of war states that "war is a continuation of politics by other means" (1). That is why wars, beside military, always have ideological and propagandist aspects. Conquerors always tried to present themselves as liberators, robbers as protectors of cultural heritage, and murderers as humanists. With respect to the saying that history is written by winners, the truth about any war is difficult to reach. Croatia still bears the burden, pain and memory of the distorted numbers of World War II victims from Jasenovac and Bleiburg (2). We are thus perfectly aware that an extremely careful and objective gathering of data on the present war against Croatia is instrumental for both a realistic documentation of the historic events and for the prevention of forgeries, distortions and misuse of the tragedy of people for political and other purposes (3,4). In the midst of the war it is however, difficult to preserve emotional distance and technical effectiveness. Therefore, this report is our attempt to delineate the martyrdom, but also the heroic deeds of Croatian medicine in the war imposed on Croatia. We are aware that the facts listed are not complete and that minor imprecisions are possible.

Basic Facts on the War against Croatia

Numerous reports on the war against Croatia have already been published (5-12). We will mention several basic facts that could easily be forgotten due to the multitude of data.

Place of the war: exclusively the teritory of the Republic of Croatia.

Warring sides: the Croatian National Guard and Police forces on one side, and Serbian irregular troops from Croatia and Serbia and the ex-Yugoslav Federal Army (YFA), from which all non-Serbian commanding staff was excluded, on the other.

Cause of the war: (a) results of the 1990 free elections in Croatia, which unequivocally showed that Croatian citizens refuse to live under one-

party communist regime; (b) results of May 1991 plebiscit of the Croatian citizens which unequivocally showed that they want Croatia to be a sovereign country.

Case of the war: alleged threat of the new Croatian government to the rights and existence of the Serbian minority in Croatia (12% of the population). This was never corroborated; famous *Mlinar* case proved to be a political machination. Instead of fighting for minority, cultural and other rights by known and available democratic means and institutions, a number of Serbs (considerable, but not the major portion of the 530,000 population) posed ultimative requests and started armed rebellion in August of 1990, first in scarcely populated areas of Croatia, where they constitute the majority or a considerable minority. However, Serbs living in these areas made only 25% of the Serbian population in Croatia, i.e. 3% of the total population of Croatia. From the very beginning, the terrorists had a strong political and logistic support from the YFA and Federal Government (both strongly dominated by Serbs), which gradually but steadily engaged in the war against Croatia.

Strategic aims: Croatian goals were preservation of parliamentary democracy and constitutional borders defined after World War II (unjust for Croatia, but never questioned). Serbian goal was anexation of Croatian teritories, at least one third of it. Inasmuch as these teritories have never been under Serbian jurisdiction, the slogan "all Serbs in one state" was used to mask the historic pretensions of expansionistic Serbian politics to its neighbors' territories (13). Beside the irrationality and viciousness of such an idea, its absurdity is well illustrated by the fact that Serbs constitute only a minority of the population on the majority of these teritories (14).

It is obvious that the motives for the war of the post-Yugoslav Serbia against Croatia were to conquer and anex parts of Croatia. The complex nature of the area of the former Yugoslavia gives this war an ideological (communist Serbia against postcommunist, democratic Croatia), civil (involvement of Croatian citizens of Serbian nationality), and even civilizational (Orthodox Christianity and Byzantine cultural heritage against Catolic and western) facet.

How Croatian Medicine Grew to Serve a Large-Scale War Medical Needs

Croatia fought for its independence by political means. Serbia rejected confederacy, European Community Monitors, UN troops and all related solutions; together with the YFA it provided an open support (political, material and military) to the Serbian terrorists in Knin. Terroristic actions soon spread to the parts of Croatia where Serbs were not the majority, but the area was nevertheless considered a part of Great Serbia (2,3,13,14). Croatian government tried to negotiate, but in vain. When the terrorists captured the Plitvice National Park, the Croatian Police intervened. It was ambushed on the way to Plitvice, but managed to force the terrorists into a retreat. It was the Easter morning of 1991, which is generally considered the beginning of the present war. Serbs responded with terrorism in East Slavonia (there they do not have the majority in any municipality except a relative one in Pakrac). On May 4, another ambush, in Borovo Selo, took the lives of 12 Croatian policemen and the extent of hatred and characteristics of the coming war were delineated. Croatia and Slovenia declared independence in June and the war against Slovenia started two days later. Only naive ones believed Croatia will be spared due to its politics of peace.

The question whether the war in Croatia could have been avoided and at what costs and whether our country could have faced it better prepared in a millitary sense will be left to the judgement of history. The fact is that the war was imposed on Croatia at a moment when it was not yet internationally recognized and when it had not had its own armed forces. In fact, its territory was "occupied" by the ever more hostile YFA. Since Croatia did not have organized millitary medical care, all the medical care for the sick and wounded in this brutal war had to be taken over by the civil health institutions and personnel. The health care had to be organized for the treatment of a potentially large number of wounded, which would have to be treated within an unknown period of time and at only partly predictable places in Croatia. Therefore, to prepare the health care for operating in the war conditions, a number of organizational and administrative measures was introduced. Only the most important are quoted below (15):

May: On May 2, 1991, 12 Croatian policemen were killed in Borovo Selo. Some of them died because Croatian forces and medical staff were unable to reach them due to continuous terrorist fire and the victims were not instructed in the self-aid. Thereafter, police forces were always escorted by mobile surgical teams. In the middle of May, Medical Headquarters of the Republic of Croatia and the Ministry of Health commenced collecting the help in drugs and medical material from abroad.

June: Store-houses for medical material were prepared.

July: War medical doctrine was created: the Ministry of Health sent circulars with the instructions on the primary treatment of gunshot wounds and the vaccination of wounded.

August: The Ministry of Health decided on the additional education of medical practitioners. A week later, a Manual of War Medicine for Practitioners was printed. On August 18, a meeting of the managers of health institutions was organized at the Zagreb School of Medicine and on August 21, the Ministry distributed a circular on practitioners' involvement in war tasks and a permanent readiness of ambulances was ordered.

September: The Croatian Government introduced the regulation on health care and health insurance in a case of war or a direct imperilment of the independence and integrity of the Republic of Croatia.

These measures were intended to help the health care to cope more successfully with the coming war horrors. The engagement of unselfish and brave medical personnel, fulfilled all tasks regarding the health care. But the price was enormous.

The Role of the International Community: Hypocrisy or Wisdom?

It is very difficult to judge the role of the international community (European Community, United Nations and various states themselves) in the war against Croatia. Croatians felt neglected, even betrayed by the free world. We felt the war could have been stopped by a more energetic peace action and the immediate recognition of Croatia. The events after the recognition (January 15, 1992) appear to prove the notion. The World ended up by forcing the aggressor to sign 15 cease-fire treaties, which resulted in more aggression and Croatian casualties (Table 1). The aggressor also used the periods of "cease-fire" to bring more soldiers and weapons for new attacks. Vukovar fell after the Hague Treaty (October 4, 1991), after facing 35,000 enemy soldiers and 600 armored vehicles. The International Convoy organized by *Medecins sans Frontieres* to evacuate 107 heavily wounded patients from the crowded Vukovar Hospital (October 19, 1991) was used by the enemy to completely encircle the town: under the excuse of securing the Convoy, the aggressor brought his forces to very important parts of the battlefield. Such action would not be possible in fair and open combat.

The role of the international community in the prevention and stopping of the aggression on Croatia will certainly be subject of many future studies. Presently, the data listed in Table 1 indicate that most of the efforts ended up in further escalation of the war and more casualties. It should be emphasized that 48% of the dead and 31% of wounded were civilians. The high proportions of civilians can be ascribed to the intentional destruction of civilian targets by the YFA and Serbian terrorists. In addition, towards the end of 1991, the civilians left most of the war-endangered areas, which spared them of the wounding; those who remained under the rule of the enemy, however, were not spared of slaughter and extinction (5,15); that is why the proportion of civilians is higher among dead than among wounded victims.

Deliberate Destruction of Croatian Hospitals

Yugoslavia participated in the work of the international Committee of the Red Cross and signed a number of international humanitarian conventions.

Table 1. Relation of dates of cease-fire treaties and number of Croatian casualties during the 1991/92 war against Croatia

	Croatian casualties#		
Cease-fire treaties 1991/92*	Dates	Dead	Wounded
Brijuni, July 7	July 7	149	329
Belgrade, September 2	September 4	382	1,743
Igalo, September 12	October 1	624	3,641
Hague, October 4	November 19	2,012	10,593
Geneve, November 23	December 16	2,684	13,969
	January 1	2,866	15,346
	January 12	3,023	16,102

*There were 15 cease-fire treaties signed by Croatian government, Serbian Government, YFA and different members of international community; only major ones are listed.
#Cumulative data of verified casualties are shown (source: Croatian Medical Corps Headquarters).

The conventions are clear. For example, Paragraph 1,19 of the Geneve convention explicitly states: *Military or civilian units are protected by the Conventions and the Protocol. Such units comprise all buildings or fixed installations (hospitals and other similar units, blood transfusion and preventive medicine centres, medical depots and stores) and mobile units (quarantine stations, tents, open air installations vehicles assigned to medical purposes)* (17).

Paragraph 1,21 of the Geneve convention includes a liability: *It is however specified that the protection to which these medical units are entitled may cease if they are used to commit acts harmful to enemy (for example, sheltering unwounded soldiers or installing a military observation post). Protection may only cease, however, after a warning has been given, setting a reasonable time limit, and after such warning has remained unheeded* (18).

The International Committee of the Red Cross in the Regulation of Behaviour in Combat explicitly demands that the personnel and objects marked with the Red Cross or Red Crescent signs are respected (17,18).

The Criminal Law of the Socialist Federal Republic of Yugoslavia, which should indebt the Yugoslav Federal Army, does not anticipate direct destruction of hospitals as a criminal law (the fantasy of the legislator usually does not go so far) but declares: *Who, by breaking the rules of the international law, during a war or an armed conflict orders that the wounded, patients, shipwrecked sailors or medical personnel are killed, tortured or that they are treated in an unhuman way, for biological experiments, or that a great pain or injuries of the body integrity or health, or that great quantities of medical material and supplies of medical institutions or units are destroyed or appropriated , what is not justified by military needs, or who does any of the listed crimes, will be punished by at least five years of inprisonment or capital punishment.* This criminal act is based on the Geneva Convention of

Figure 1. A map od Republic of Croatia with medical institutions afflicted during the war against Croatia, until January 15, 1992. The length of the squares represent the numbers of beds before the war, and the black surfaces the percentages of destructions.

August 12, 1949, which was ratified by the Presidium of the People's Parliment of Federal People's Republic of Yugoslavia by the decision of March 28, 1950 (19).

In the present war against Croatia, medical institutions have been attacked in practically all areas of fighting. The hospitals and medical centers in Vukovar, Vinkovci, Pakrac, Lipik, Gospić and Nova Gradiška were damaged to the level of complete loss of function, whereas those in Osijek, Sisak, Zadar, Karlovac and Daruvar were heavily damaged (Fig. 1).

Destruction of medical institutions in Croatia caused enormous material loss which is difficult to estimate precisely. Experts of the Croatian Ministry of Health classify the losses in three groups (21).

1. Direct costs of the medical treatment of wounded soldiers and civilians (first aid, transportation, hospital treatment, rehabilitation) as well as generally increased expenses of the military organization of health care. Present register reveals 16,102 wounded persons in Croatia. The treatment and rehabilitation of the majority is not finished yet, and the total cost cannot be estimated. On the basis of the average DEM 20,000 cost of the treatment of one traffic accident patient in Croatia, it can be estimated that the total cost of the treatment and rehabilitation of all wounded in this war will exceed DEM 220 million. The expenses of the increased supply of drugs and other medical material should be added to this sum (approximately DEM 100 million), as well as the equipment of mobile surgical teams (DEM 65 million) and organization of the medical service in the war (DEM 250,000).

2. Direct damage inflicted on buildings, equipment and vehicles; rough estimates are presented in Table 2. The exact calculation of the damage is impaired by several difficulties. Some of the medical institutions listed had cultural and historic value (e.g., Lipik Rehabilitation Center); some were old buildings with relatively small general value, but since no other building is available to be used for medical purposes and the old one is beyond renovation, the actual requirement and cost will be the construction of a new building. The numbers in Table 2 concern only the estimates of costs of renewal of the functions of the damaged institutions. To this direct damages, which amount to approximately DEM 770 million, the cost of 195 destroyed and 358 damaged medical vehicles should be added (approximately DEM 22 million).

3. The damages caused by the hindered renewal of medical equipment; this damage is estimated to DEM 100 million.

In general, the present estimates of the total damage to the Croatian medicine imposed by the war against Croatia amount to approximately DEM 1,3 billion. Indirect costs that will be caused by the inability of many wounded to work and live independently are not included. Human tragedies cannot be estimated by numbers and paid with money.

Table 2. Parameters of the sizes of Croatian hospitals and the direct material damages done during the war

	No. of employees	Surface (sq. m.)	No. of beds	Damage (DEM x 10^6)
Bjelovar	930	15,200	518	12.322
Borovo	96	1,000	0	1.265
Daruvar	330	7,850	288	23.765
Dubrovnik	1,213	31,800	481	34.980
Dvor na Uni	85	680	32	2.420
Glina	129	570	110	8.400
Gospić	370	12,000	208	15.000
Hrvatska Kostajnica	54	1,100	0	1.320
Karlovac	664	17,060	644	65.512
Lipik	240	25,000	375	25.000
Nova Gradiška	413	12,000	337	26.400
Novska	95	1,200	0	4.520
Osijek	1,277	50,000	1,609	74.000
Otočac	127	1,910	100	4.498
Pakrac	607	20,540	654	62.116
Petrinja	514	5,580	340	26.107
Podravska Slatina	202	2,400	0	5.095
Požega	717	20,960	391	42.932
Sisak	1,538	3,000	621	31.262
Slavonski Brod	1,671	5,300	795	14.923
Šibenik	947	30,000	691	26.200
Valpovo	215	1,860	0	3.948
Varaždin	1,500	17,570	876	4.759
Vinkovci	709	20,000	530	58.743
Vukovar	663	28,000	421	43.985
Zadar	1,707	19,400	689	28.110
Županja	197	2,280	0	4.840

Sources: Croatian Ministry of Health (January and February 1992), Agency for Health Development of the Republic of Croatia, Health Fund and ref. 20; some of the estimates are not final.

Conduct of the Yugoslav Federal Army and Serbian Paramilitary Forces towards Croatian Medical Institutions

The YFA base *Milan Stanivuković* was located across the street from the Osijek General Hospital, only 50 to 100 m away. By its size and signs, the Hospital was known to the whole military staff of the neighboring base. Many of them were born or treated in this institution. The very fact that the Hospital was hit 94 times by various weapons of great destructive power during just 4 days (September 13 to 17, 1991) excludes the possibility of accidents or poor aiming as causes of destruction. The only interpretation of the events is that the YFA intended to destroy the complex of hospital buildings (22).

Almost identical situation occured in the case of Gospić Medical Center, the central medical institution of the Lika region. A YFA garrison was located accros the street, some 150 m away from the hospital. During the YFA and Chetniks' attack on Gospić, in only two days (September 17 and 18), the Center was hit by six tank and 30 mortar shells (23).

Similar situation occured in Pakrac, where the hospital complex, clearly marked, located on the outskirts of the town, came under heavy fire from the neighboring villages of Šeovica and Japaga (located on the slopes of the Papuk mountain) controlled by Serbian paramilitary troops (24).

For Vukovar Medical Center, it is enough to quote (6,25) that, in addition to tens and hundreds of grenade hits daily, two 250-kg war plane bombs were thrown onto it. The Center was practically destroyed in October, much earlier than the Police building stationed in the close vicinity (the latter

was destroyed by November 10, 1991). The multitude of artillery and air missiles used against the Center allow no doubt of the enemy's intentions.

In Pakrac and Lipik, hospital buildings were also attacked earlier than any other institutions in the towns (24,26).

With respect to the intensity and lenght of the attacks, and war plane hits in particular, there is no doubt that the destruction of the Vinkovci Medical Center was also intentional (27).

There is no obvious explanation for the intentional destruction of medical institutions by the YFA and Serbian paramilitary forces; their soldiers were often treated there, the institutions were well known to them, and actualy "belonged" to many of them - because they themselves were born or treated there. One may ask whether such a conduct was a retaliation for similar act of Croatian forces. Among the YFA military hospitals in Croatia, the one in the city of Split peacefully opted for the Croatian side, and all personnel was disarmed without any incidents and offered the same job and salary; those who wanted it, accepted the offer and are still working there, regardless of their nationality, rank or political belief. In Pula, the YFA hospital was left empty of all equipment after the retreat of the YFA from that region. In Zagreb Military Hospital, most of the employees decided to join the Croatian side, but the superior YFA command forbade the negotiations; by the end of 1991, the case was settled favorably through long negotiations of higher level officials. There was no violence from the Croatian side throughout the negotiating period. All those who wanted, regardless of the function, nationality or political profile, retained their jobs, ranks, positions and salaries. The only Croatian military action against a medical institution occured in Osijek, when the premises of a small doctor's office that contained neither patients nor personnel were captured, without fight. Thus, a retaliation cannot be the cause of the destruction of Croatian hospitals. Unfortunately, it appears that we are left with a conclusion that the attacks on medical institutions constituted a substantial part of the YFA strategy in the war against Croatia.

Casualties among Medical Personnel

During the 1991 war against Croatia, many medical professionals were wounded or killed, and some were kidnapped or arrested; the destiny of a number of them is still unknown. The data on this subject is presently incomplete; the problem is a subject of intensive research and efforts to find and help those that disappeared. The facts listed are based on published reports (22-28) and personal communication with colleagues (see acknowledgement).

The Dead

September 10, 1991: Lj.O. (female, aged 39), a worker in the Vukovar Medical Center photolaboratory was killed in Vukovar by a direct machine-gun fire, on her way home from work.

September 17, 1991: D.P. (female, aged 38), a nurse from Gynecology Ward of Osijek General Hospital was killed by an explosion of a mortar shell inside the hospital.

September 18, 1991: Dr. A.T. (male, aged 57), was killed in Vinkovci. His body was received at the Pathology Department; the circumstances of the death are not known.

September 29, 1991: I.(M.)K. (male, aged 53), medical technician was killed by a mortar shell in front of the Hospital for Neurological Disorders and Rehabilitation in Lipik. He died during the transportation to the Kutina Medical Center.

October 6, 1991: V.V.-A. (male, aged 43), was killed by a direct tank grenade hit on the road in the vicinity of Zadar, in a properly marked ambulance in which hospital clothing was transported.

October 8, 1991: A.H. (male, aged 54), medical technician was killed by a mortar shell, on the way home from the Daruvar Medical Center.

October, middle, 1991: I.R., a fireman in the engine room of the Vukovar Medical Center was killed with shrapnel.

October 21, 1991: Dr. B.B. (male, aged 35), a pulmologist from Jordanovac Lung Disease Hospital in Zagreb, a volunteer in the Medical Service of the Croatian National Guard, was killed on duty in a properly marked ambulance in Turanj (near Karlovac).

October, end of, 1991: E.B. (female, aged 35), a maid from the Daruvar Health Center was killed by a mine in village of Miokovićevo.

November 3, 1991: Ž.K. (male, aged 25), a hospital entrance guard was killed by a mortar shell in the Osijek General Hospital yard.

November 13, 1991: Dr. A.V. (male, aged 43), a gastroenterologist from Bjelovar Medical Center was killed on duty in a properly marked ambulance in the village of Velika Bastaja, together with 6 members of the Croatian National Guard Medical Unit who followed in another vehicle.

November 17, 1991: S.V. (male, aged 56), an orderly, was killed in his appartment which was located within the hospital campus, during the YFA artillery attack on the hospital in Nova Gradiška.

The Wounded

August 25, 1991: Dr. V.H. (male, aged 28), was lightly wounded by a shell in Vukovar.

August 26, 1991: A.K. (male, aged 28), an ambulance driver, was wounded in Vukovar, while helping the wounded after an air attack on Eltz castle. Dr. S.T. (male, aged 29), suffered a middle-ear injury with a damage to the sense of ballance.

September 9, 1991: T.D. (male, aged 24), an ambulance driver, was heavily wounded by a sniping rifle fire in a properly marked ambulance while evacuating a patient, between the Gospić Medical Center and the place called Alovo Brdo. He sustained heavy arm, head and neck injuries.

September 13-17, 1991: Dr. M.D.-Z. (female, aged 28), employed at Psychiatric Clinic of the

Osijek General Hospital, was injured in the leg, on duty, by a mortar shell.

Dr. I.S., female, Osijek General Hospital, was wounded by a mortar shell on her way home from work; she suffered an abdominal injury, with injuries of the external illiac artery and rectum.

September 15, 1991: Z.K. (male, aged 28), a porter from the Osijek General Hospital, was wounded by a mortar shell which caused an abdominal injury with the injury of the rectum.

September 22, 1991: Z.P. (female, aged 56), a laboratory technician, was lightly wounded in the head with the sniping rifle bullet, inside the Pakrac Hospital.

September 24, 1991: M.P. (female, aged 49), hospital waitress, was wounded in the leg by a mortar shell shrapnel in the Pakrac Hospital.

Z.G. (female, aged around 60), a washwoman, was wounded by mortar shell shrapnel and suffered abdominal injuries and the injury of the thigh.

K.V. (female, aged 45), a washwoman in the same hospital, was wounded on duty in the leg by mortar shell shrapnel.

A medical tehnician from Kutina (name unknown), a temporary worker in Pakrac hospital, was wounded in front of the hospital.

September, end of, 1991: I.Š. (male, aged 56), an ambulance driver in the Vukovar Medical Center, was heavily wounded in the thorax by a shell; on October 19, 1991 he was transported with the convoy to Zagreb.

September 29, 1991: I.K. (female, aged 55), a nurse in the Lipik Hospital for Neurological Disorders and Rehabilitation was wounded by a mortar shell.

K.Ž. (female, aged 45), a nurse in the Lipik Hospital for Neurological Disorders and Rehabilitation was heavily wounded in the foreleg with a dum-dum bulet.

October, 1991 (dates not known): M.Z., male, an ambulance driver from the Lipik Hospital for Neurological Disorders and Rehabilitation was wounded in his ambulance near the village of Kukunjevac.

M.V., male, an ambulance driver from the Lipik Hospital for Neurological Disorders and Rehabilitation was heavily wounded in the head, thorax and legs in his ambulance in the village of Dobrovac.

October 5, 1991: T.K., a nurse in Vukovar Medical Center, was wounded on duty by shattered window glass during an air bombing of the Center.

October 7, 1991: I.K. (male, aged 49), medical technician in the Vukovar Medical Center, was lightly wounded in the left shoulder by a shell explosion.

M.B. (female, aged 39), a theater nurse, was wounded in the Vukovar Medical Center (after the fall of Vukovar she chose to remain in the hospital.

October 8, 1991: Dr. M.I. (male, aged around 50), was lightly wounded with a fragmentating bullet in Vukovar (it appears that he was wounded while trying to go over to Serbian forces, but was wounded from that side); after the fall of Vukovar he chose to remain in the hospital.

October 19, 1991: two nurses of the French organization *Medecins sans Frontieres* were injured while evacuating the wounded from the Vukovar Medical Center. Since they were wounded on the territory under the control of agressor's forces, they were transported to the medical institutions in Serbia.

October 21, 1991: M.B. (male, aged 31), 5th-year medical student, was heavily wounded in an artillery attack on a properly marked ambulance in Turanj near Karlovac. He suffered an explosive wound of the head with brain contusion, an injury of the left lumbal region with penetrating wound of the abdomen and the injury of the small intestinum, right gluteal region and the right thigh.

B.T. (male, aged 40), an ambulance driver, was wounded in the same attack. He sustained an explosive injury of the thorax and abdomen, right thigh and fracture of the left ulna and radius.

October 24, 1991: M.B. (female, aged 50) was heavily wounded in Vukovar. She was hit by shell fragments; the muscles (30 x 30 cm) from the left lumbal region were torn off with a penetrating wound of the left kidney.

October 26, 1991: M.Z. (female, aged 38) was wounded in Vukovar.

November 1, 1991: Dr. B.B. (male, aged 57) was wounded in Kutina.

November 4, 1991: Dr. N.M. (female, aged 37) was wounded in Karlovac.

November 1991, beginning: J.P. (female, aged 30), a nurse in the Vukovar Medical Center, was wounded on duty, while visiting a patient. She suffered a brain comotion and skull fracture.

November 11, 1991: B.K. (male, aged 30) was wounded in Našice.

November 16, 1991: Dr. E.S. (female, aged 30) and Dr. N.S. (male, aged 34) were wounded in Zadar.

November 24, 1991: Dr. B.B. (male, aged 33) was wounded (location unknown).

November 25, 1991: D.R. (male, aged 36) was wounded (location unknown).

December 29, 1991: M.M. (female, aged 27) was wounded in Unešić.

Unknown Dates: Dr. Dj. (male, aged 36, location unknown) and A.Dj. (female, aged 38-40, in Vukovar) were wounded. Dr. H.-M. (male) was heavily wounded by shell fragments in an improvized outpatient medical unit in a shelter in Borovo Naselje.

Kidnapped or Dissappeared

During 1991, a number of medical workers dissapeared in the parts of Croatia caught by the war. Several hundreds of them left their jobs of their own choice; some because of fear, some because their homes had been ruined or families set apart or killed, others, mainly Serbs by nationality, because of their political beliefs or simply because their parents, children, relatives and/or friends were on the opposite side. There were those who had been kidnapped or arrested by the Serbian irregular formations or the YFA. At the moment, we know about the following doctors:

September 18, 1991: Dr. I.Š., male, the director of the Lipik Rehabilitation Center was kidnapped by Serbian irregular troops on the way from Zagreb to Lipik. His fate is still unknown.

Dr. M.P., male, a neurology resident at Sisak Hospital was seen last on this day. As far as we know, he left for Cepeliš, his native village, near Petrinja. His fate is still unknown.

September 27, 1991: Dr. V.S., male, was kidnapped in Pakrac Hospital by Serbian irregular troops. He was exchanged in January 1992.

November 19, 1991: After the fall of Vukovar, on November 19, YFA in Vukovar Hospital arrested and imprisoned in Srijemska Mitrovica: Dr. Juraj Njavro, Dr. Vesna Bosanac, Dr. Sadika Biluš, Dr. Tomislav Djuranc, Dr. Vlado Emedi, Dr. Ladislav Farkaš, Dr. Hišam-Mala, Dr. Ladislav Nadaš and two stomatologists from Borovo Naselje: Dr. Robert Mataušek and Dr. Rudi Terek. They were kept in prison for several weeks. Only a few were given the opportunity to perform their professional duty and take medical care of their fellow inmates. They were released mostly through the process of prisoners of war exchange (28).

According to the known, incomplete evidence, it is obvious that during the war against Croatia in 1991 at least 18 medical workers were killed, among them three doctors. It is known that 5 of medical workers were killed in the attacked hospitals and 9 in ambulance vehicles, all while performing their professional duties. Our investigation revealed that at least 38 medical workers were wounded, 13 were captured and 11 released through an exchange of prisoners-of-war, while two are still missing. Although this data is incomplete, it is obvious that during the 1991 war against Croatia, medical workers were targeted by the enemy. It is not possible to judge objectively to what degree the medical workers strived to protect their patients as much as possible.

Patient War Casualties

Patients in hospitals were also killed or wounded because of attacks on medical institutions. Presently, we have the following data.

August 19-21, 1991: L.B. (male, aged 61), was injured above his ear by a sniping rifle bullet in the Pakrac Hospital.

September 24, 1991: K.M. (female, aged 47), was injured in the gluetal region by a fragment of a mortar shell in the Pakrac Hospital.

September 24-25, 1991: a hemodialysis patient was killed during the attack on the Pakrac Hospital.

November 27, 1991: four patiens of the Department for Lung Diseases of the Osijek General Hospital were killed on the stairs on their way to shelter (Š.B., aged 57 years, V.M., aged 48 years, A.M., aged 55 years and M.S., aged 57 years); three patients were wounded.

December 31, 1991: a policeman V.P. (male, aged 34), was injured in the Daruvar Rehabilitation Center. The explosion of a 250-kg bomb next to the hospital building threw him out of the room so that he fell down from the second floor together with his bed.

Health Services in Shelters

In spite of all the destruction and continual life threat to the medical personnel, hospitals kept working and are still working all over the unoccupied territory of the Republic of Croatia. On the other side, the blocking of the Croatian air corridors, other difficulties (Vukovar is an example) and the partial break of comunications brought about the situation in which the health care had no other alternatives but to accept the conditions as they are and keep up with its activities. It was extremly difficult to organize the health care for the defenders of Vukovar and 15 thousand civilians who remained in the city. The shocking testimonies on the health care functioning in cellars and shelters of the partially or completely destroyed hospitals in Vukovar, Osijek, Vinkovci, Sisak, Karlovac, Gospić etc, are published in the Croatian Medical Journal, Liječnički vjesnik, Medicinski vjesnik etc. Here we quote some of the data:

In Vukovar Hospital 1,750 wounded and ill were treated, among them some 800 civilians and 7 enemy soldiers. 15 children were born.

Until January 15, 1992, 3,206 wounded (among them 15 enemy soldiers) were treated at the Osijek General Hospital. 540 persons were dead on admission.

Until the end of 1991, the Nova Gradiška Hospital admitted and treated 1,010 wounded persons, Daruvar Hospital 230, Sisak Hospital 1046, Karlovac Hospital 830, Gospić 424 etc.

Shortly, in Croatian hospitals' shelters and cellars on the first front line, more than 10,000 wounded have been treated. There has been no reported cases of refusing help to enemy soldiers. Our present data disclose that some 80 enemy soldiers have been treated in our front line hospitals. During this war, our medical personnel was confronted for the first time with very complex wounds caused by modern weapons. The fact that 91 of 3,206 (2.8%) surgically treated casualties in the Osijek General Hospital died, mainly during

first hours after wounding, constitutes a statistical basis for the comparison on an international level of the quality of Croatian medicine in this tragic war.

Discussion

In the areas of direct fighting between the warring sides it is probably impossible to avoid that a bullet or some other projectile hits a medical institution, vehicle, or person. This risk should be accepted by any medical worker engaged in war medicine. However, the testimonies of innumerable Croatian medical workers (5,6,8,10,12,16,22-27,29) and evidence from the scenes of the events unequivocally establish the fact that medical institutions have been the intentional target of heavy artillery fire from close distance, and air-attacks in which 250 kg heavy bombs were used (6,25). Medical personnel, dressed in white, and wearing all the signs of the profession, and medical vehicles clearly and properly marked were not spared but intentionally targeted, because of its very function and meaning. The number of medical institutions damaged, and the extent of damages clearly disclose that the destruction was intentional and planed. Total material damage is presently estimated to some DEM 1.3 billion; at least 18 medical workers were killed, and many wounded, kidnapped, captured or imprisoned. Nevertheless, Croatian medicine functioned without interuption saving the lives of all those who needed its help, enemy soldiers included. The 2,000 years-old Hippocrate's Oath was fully respected in Croatia during this war; there is no doubt on this subject, even now when only the preliminary data are at hand.

The stories of those who had left their jobs in the beginning of the war, Croatians who feared the danger and Serbs who opted for the other side, pose extremely difficult and delicate questions. At the moment, we will leave them to the future, for hopefully more peaceful times when it will be easier to analyze them more objectively. However, they definitely have to be discussed and the experience drawn must become part of the treasure of the mankind's total medical experience, which has provided the basis for definition of rules of behavior accepted by all civilized nations (18,19).

It is no secret that Croatian Medicine feels proud of its work and achievements in this war; the compliments poured from outside also. This feeling is difficult to quantitate and prove objectively, and for this task the future times will also be better than the present. However, we must remind the reader that Croatian Medical Corps started its work some 10 months ago when the first Croatian military doctor, Dr. I.P., took the first aid set from his car during the Pakrac fights, and ended up serving more than 100,000 men on the field. However, the general opinion presently held by both medics and laymen in Croatia deserves a word of discussion. Inasmuch as we do believe in the excellence of the Croatian Medicine in this war, we will list several possible reasons for it:

(a) The medicine is by its nature relatively independent from the politics and so from the previous regime. This independence spared medicine to an extent greater than historic, legal, economic and other sciences. In other words, we faced the aggression with a fair professional structure; (b) By its nature, medical work is stressful and full of emergency situations, and the medics are educated and used to cope with surprises. The war is the best and the worst occasion we were prepared for although not knowing it (for example, by the summer of 1991, there was not a single war medicine book in the Croatian language; however, when we became aware of that, a brilliant handbook was translated in a week and published in a month); (c) Being spared from the everyday politics, Medicine continuously tried to learn and adopt international criteria of work. This also resulted in a better preparation of Croatian medicine for the aggression and contributed to its success in international relations, from organization and distribution of the international help to spreading of truth on the war against Croatia; (d) Humanitarian and medical help to Croatia came from various sources and was abundant and useful; it was accepted, sorted, distributed and used without major confusion or losses. The world knew the aggressor and the victim, it knew the extent and source of atrocities. And, since it could not help by "other means", it helped through medical and humanitarian aid. We thank our kind and understanding colleagues and friends.

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References

1 Von Clausewitz C. On war. Translated and edited by Howard M. and Paret P. Princeton, New Jersey: Princeton University Press, 1976.

2 Tudman F. Bespuća povijesne zbiljnosti. Zagreb: Nakladni zavod Matice hrvatske, 1989.

3 Klain E. Yugoslavia as a group. Croat Med J 1992;33(War Suppl 1):1-13.

4 Jakovljević M. Psychiatric perspective of the war against Croatia. Croat Med J 1992;33(War Suppl 2):10-7.

5 Croatian Medical Journal 1992;33(War Suppl 1).

6 Marušić M, editor. Medical Testimony of the Vukovar Tragedy. Zagreb: Croatian Medical Journal, 1992.

7 Vučak I, Juretić A. A plea from Croatia. Nature 1991;353:597.

8 Kostović I, Marušić M. Attacks on Croatia's hospitals. Lancet 1991;338:26.

9 Marušić M, Hebrang A, Kostović I. War in Yugoslavia. Br Med J 1991;303:997.

10 Editorial. Croatia: War against Vukovar medical centre. Lancet 1991;331:1447-8.

11 Anonimous. War damages in health services in the Republic of Croatia. Zagreb: Republic of Croatia Ministry of Information. October 1991.

12 Gale RP, Labar B. Croatia: Civilian hospitals as military targets. Lancet 1992;339:48.

13 Suedland L. Die suedslavische Frage and der Weltkrieg. Wien: Manzsche k. u. k. Hof Verlags Universitaets Buchhandlung. 1918.

14 Banac I. The national question in Yugoslavia: origins, history, politics. Ithaca, New York: Cornell University Press. 1984.

15 Hebrang A. Preobrazba mirnodopskog u ratni hrvatski zdravstveni sustav. Liječ Nov 1991;104/106:3-5.

16 Croatian Medical Journal 1992;33(War Suppl 2).

17 International Committee of the Red Cross. Basic rules of the Geneva conventions and their additional protocols. Geneva: ICRC, 1983.

18 International Committee of the Red Cross. Rules for behavior in combat. Geneva: ICRC, 1985.

19 Official News of the Presidium of the People's Parliment of Federal People's Republic of Yugoslavia; Criminal Law of the Socialist Federal Republic of Yugoslavia; Criminal Acts against Humanity and International Law; War Crimes against Wounded and Ill. Article 143, page 193 (in Serbian).

20 Turek S. War in Croatia. Coll Antropol 1991;2:181-6.

21 Izvješće o ratnim štetama do 3. siječnja 1992. Zagreb: Republika Hrvatska, Ministarstvo zdravlja, broj: 534-02-07-91-0003.

22 Glavina K, Tucak A, Janoši K, Karner I, Hanzer J, Pajtler M, et al. Deliberate Military Destruction of the General Hospital in the city of Osijek. Croat Med J 1992;33(War Suppl 1):61-9.

23 Johman A, Markeljević J. Destruction of the Gospić medical center. Croat Med J 1992;33(War Suppl 2):145-8.

24 Vidović K, Vidović T, Topić M, Hajda M, Markeljević J, Kovačić L. Destruction of the Pakrac hospital and evacuation of 280 psychiatric patients after 40 days of blockade. Croat Med J 1992;33(War Suppl 2):134-40.

25 Matoš I, Njavro J, Bosanac V, Lacković Z. The deliberate preconceived destruction of the hospital during the seizure of Vukovar. Croat Med J 1992;33(War Suppl 2):120-8.

26 Barišić Z, Lacković Z. The third military destruction of the Lipik rehabilitation center in this century. Croat Med J;33(War Suppl 2):141-4.

27 Švagelj D, Lacković Z. Deliberate destruction of the Vinkovci medical center during the war against Croatia. Croat Med J 1992;33(War Suppl 2):129-33.

28 Biluš, S. Prijedlog amandmana na Hipokratovu zakletvu. Liječ Nov 1991;104/106:38-9.

29 Tucak A, Glavina K, Bosanac V, Njavro J, Matoš I, Švagelj D, et al. Destruction of medical institutions of Slavonia and Baranya during the war against Croatia (until the end of 1991). Med Vjesn 1991;23(3-4):62-107

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The Deliberate Preconceived Destruction of the Hospital During the Seizure of Vukovar

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Abstract. The Vukovar Medical Center was founded in 1857. Until the war against Croatia, it had 421 hospital beds and 1,200 employees, 93 of them doctors. During the war of Serbia and Yugoslav Federal Army against Croatia, in the time period from August 5 to December 19, 1991, all Hospital premises were practically destroyed. Above all, on October 5, the Hospital was hit by two 250-kg airplane bombs. The ground floor and the atomic shelter were left the only protection for patients and medical professionals. Throughout that time, the Hospital was working: about 2,500 patients were treated and 10 children given birth in this Hospital of Vukovar, a city which has become a metaphor for Croatian solidarity, strength and sacrifice.

Key words: *Croatia; Geneva Conventions; hospitals; Red Cross; Vukovar; war crime*

Where would you yet be struck,
you that rebel again and again?
The whole head is sick,
the whole heart faint.
From the sole of the foot to the head
there is no sound spot:
Wound and welt and gaping gash,
not drained, or bandaged,
or eased with salve.
Your country is waste,
your cities burnt with fire;
Your land before your eyes
strangers devour
a waste, like Sodom overthrown.
(Isaiah, New Testimony)

Introduction

Vukovar (in 1981 estimated to have a population of 34,000) was not only a Croatian city, a cornucopia of undoubtful beauty, prestige, wealth and youthfulness, but a sanctuary of peace and unique culture. The city is situated near the estuary of the river Vuka on the Danube. Its origins are in the New Stone Age, when in the region of modern Vukovar flourished a rich neolithic Vučedol culture. However, Vukovar is no longer just a place of historical significance, nor acknowledged solely by its important harbor on the Danube, but a metaphor of Croatian solidarity, strength and sacrifice. In the war against Croatia, this beautiful and peaceful old city suffered such barbarism, destructiveness and cruelty that even the Sun hides his face before the desolated playground of the Four Horsemen.

Modern Vukovar is situated on the site of the medieval Vukovo. Vukovo received Royal Recognition in 1231. Consequently, the city received privileges and developed activities, such as free weekly trade, which boosted its economy. Vukovar soon developed into an important cultural and economical center and as such became the pivoting point of the Croatian people, their nation, culture and language. In the 16th and 17th century, the city of Vukovar came under the Turkish jurisdiction. Subsequently, Vukovar became the administrative center of the region of Srijem (which spread from Vinkovci to Zemun). In 1918, when the Kingdom of Serbians, Croatians and Slovenians was established, Vukovar was a Croatian town

bordering on Serbia. In 1727, a Franciscan monastery was founded in Vukovar. Soon after that a Catholic and Serbian Orthodox Churches were established, and in 1777 the famous Palace Eltz was built (1). Two symbols are sacred to Vukovar and Croatia: The world-famous *Vučedolska golubica* (Vučedol's Dove), a vase from the New Stone Age, shaped like a pigeon, and the work of the renowned chemist and Nobel prize winner of 1939, Lavoslav Ružička, born in 1887, whose ancestors were from Vukovar. Until the unprecedented barbaric attack on Vukovar, there lived 43.7% Croatians, 37.4% Serbians, 2,7% Ruthenians, 1.6% Hungarians, 1.6 % Slovacs, and a smaller percentage of other nationalities (2). Bare and unsentimental facts put aside, Vukovar was simply a small city of a great and noble spirit. Its culture was adorned with specific, beautiful folk songs, which, together with the traditional *Fish Paprikash* and the supreme quality wine *Traminac,* have become a tradition. The Danube river contributed to the City's beauty of misty mornings when silent, river-loving fishermen watch the rising Sun, and warm afternoons on small islands where beautiful young women bask in the sun. Vukovar gave birth to poets, writers, playwrights, actors, artists and philosophers; it was not merely a region of habitancy but a city that possessed its own unique lifestyle.

The first hospital in Vukovar was established in 1857, thanks to Dr. Victor Spits and with a help from citizens, Earls Eltz and Kuhen. It was located in front of the Eltz castle, but later on it was resituated to the region of the New Vukovar (3).

Before the aggression on Vukovar, Vukovar Medical Center had 421 beds and 1,200 employees, 93 doctors. The Medical Center consisted of the General Hospital, Industrial Medical Center, Dental Medicine Unit, *Vuteks* Industrial Clinic, Central Pharmacy with two outer subcenters, Center for Adolescents, and several local clinics in Borovo. The General Hospital had 10 departments. The Hospital was comprised of five main buildings: Emergency Center; Department of Medicine and Lung Diseases; Pediatrics, ENT, Ophthalmology, Neuropsychiatry Center; Transfusion Center and kitchen; and the new building built in 1977 with the Departments of Surgery, Gynecology, Internal Medicine, Radiology, Laboratory and an Outpatient Clinic. The Hospital complex had several other buildings for technical services, and an Informatics-Research Center.

During the aggression on Croatia, the Hospital and the entire Medical Center in Vukovar were repeatedly targeted and completely destroyed. This barbaric, merciless attacks had such an impact that it was as if the city was left winded - the town gasped for help and was left, metaphorically speaking, drained and tired. In retrospect, one could say that only the rivers remained unscathed; a gesture portraying a sense of continuity and at the same time, like the world before us, the silent eyes in passing.

Facts and Photodocumentation

During the night of August 5-6, 1991, the Administrative building of the Medical Center, situated behind the Police Station, was shelled.

The Hospital was attacked during the first half of September, when two grenades exploded and damaged the surgery and gynecology rooms on the first and second floors. This bombing resulted in the shattering of the majority of windows and breaking of the pipes for central supplies of air, oxygen, oxidule and vacuum. Three people were mildly injured: a doctor, a nurse and a cleaning woman. Soon after that, surgical operations were performed on the floor below, once serving as a gynecology room. Later in September, the Hospital came under continuous artillery attacks from the Yugoslav Federal Army (YFA) barracks situated in the city, the village of Negoslavci, a town suburb called Petrova Gora and multiple rocket launcher missiles from Voivodina on the other side of the Danube. Electricity and elevators stopped working. On August 24, Vukovar came under a fierce general attack. The patients and medical equipment were relocated to the ground floor and atomic shelter. At that moment, there were about 30 hospitalized patients in the hospital. Full-time staff members were removed to the basement. At the time there were 430 patients at the Hospital, 400 of them wounded. The basement was the only safe place available (Fig. 1). Toward the end of August, an aeroplane bombed a part of the Eltz castle, trapping several administrative workers in the ruins. A medical team, consisting of a doctor, a nurse and a driver, rushed in to provide immediate aid. As soon as they had left the car, it was hit, obviously targeted from Voivodina (the car was hit in spite of it being clearly and visibly marked with red-cross signs). The doctor was heavily wounded (S.T., middle-ear injury with a damage to his sense of balance, later transferred to the ENT Clinic in Zagreb), whereas both the driver and nurse were mildly injured.

Throughout September, Vukovar was under intensive mortar and cannon attacks, in which all ground floor windows were destroyed, especially those on the side towards Negoslavci, then temporarily closed with nylon foil and wooden planks. At that time, there was no water or electricity, thus, heavily injured patients had to be evacuated to Vinkovci and Đakovo. During the seizure of Vukovar, such evacuations became impossible. On October 19, the French organization *Medecins sans Frontieres*, managed to evacuate 107 wounded patients through the areas that were under the control of Serbian forces. During this evacuation, one patient died due to burns (V.L., aged 72) and two nurses, members of the above mentioned organization, were injured and left behind.

On October 5, the Hospital came under heavy machine-gun fire from the YFA aeroplanes, and two 250-kg bombs hit the hospital. The first bomb exploded damaging the outer section of the building, most heavily the second floor. The surgical

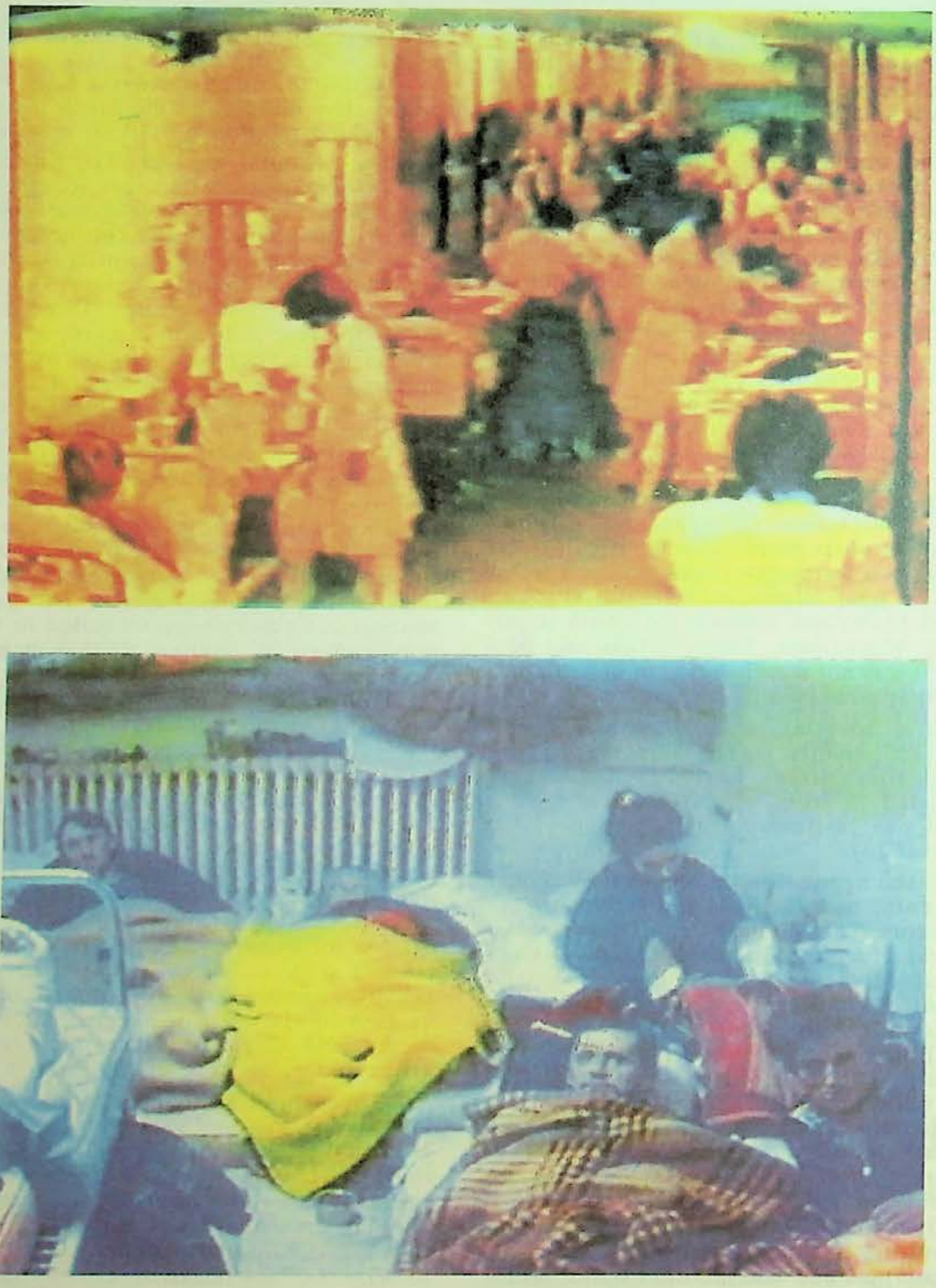

Figure 1. For Vukovar Hospital patients the ground floor and the atomic shelter became the only source of protection. (Pictures were taken from a TV document released by HTV, October 1991)

wing was blown apart and the entire southern side of the building and the nearby buildings destroyed (glass shattered, roof tiles removed, doors ripped out of door frames, etc) (Figs. 2-4). Five ambulances were destroyed (as evidenced by a videotape, property of I. M.). During the attack, a doctor was injured (Dr. V.T., commotio cerebri and fist injury).

Another bomb, also weighing 250 kg, fell on the new section of the Hospital, piercing six floors, totally destroying the concrete facades of the building, and landing near the entrance to the atomic shelter, on the bed where an immobile patient (P.V., aged 45, explosive wound to the right elbow with an open fracture) laid. The bomb did not explode as there was no detonator (Figs. 5 and 6).

From October 10 to 15, 1991, the Hospital came under numerous attacks by mortars, tanks, etc., damaging the entire first floor and the ground

Figure 2. Hospital entrance. (Photo by Dr. I. Matoš, October 7, 1991)

Figure 3. South side of the new Hospital building. (Photo by Dr. I. Matoš, October 7, 1991)

floor. Following this, 70 people were evacuated to the basement. There were nights when two patients had to share one bed, and some of them had to be placed under the beds. For a time they were sleeping on the floor and on chairs.

Whilst Vukovar was surrounded, the YFA did not permit the patients to be evacuated, thus the living and working conditions in the hospital became even more difficult. Eventually, the lightly injured patients were transferred to the *Borovokomerc* shelter which was the best equipped shelter in Vukovar. Consequently, the civilians from that shelter had to be relocated to numerous other places. There was no other choice, as the Medical Center was destroyed. Accompanying the lightly

Figure 4. Patient room in the ground floor of the old Hospital building. (Picture taken from the videotape made by E. Jurčević, October 5, 1991)

wounded patients were eight doctors, among them an orthopedic surgeon (V.E.) and staff members. They were continuously supplied with medical equipment from the Center's warehouse.

Beside the *Borovokomerc* shelter, medical service was also organized in other bigger shelters in Vukovar. Doctors and staff were constantly present in these shelters (Olajnica I and II, *Alpina* in the city center, the *Varteks* shop basement, *Vladimir Nazor* school, the shelter in Strossmayer street). In total, 16 doctors worked in these shelters.

By mid October, the Hospital was struck by more than a dozen missiles; one of these struck the engine room killing a fireman (I.R., shrapnel to the heart). During this period, the Hospital was struck twice by metal-piercing missiles. One hit the atomic shelter where patients were located; at that time, one patient was heavily wounded (J.T., aged 65, hospitalized for amputation). The other missile struck a concrete wall, consequently ripping across the hospital yard forming an enormous hole 3-4 m deep, and finally ending up at the entrance of the atomic shelter where it exploded. A patient was lightly wounded (P.T., aged 34). Another metal-piercing missile fell through a room where the wounded YFA soldiers where located. A grenade ripped through a concrete wall coming to a standstill deep in the ground - not exploding.

According to the Ministry of Health of the Republic of Croatia, total damage to the Hospital by the end of October was estimated to approximately DEM 48.219.229 (4).

In the basement, the rooms were made up to serve as operating theaters and first aid rooms. Three surgical teams were formed, with four surgeons, one urologist and one orthopedist. They operated on about 30 patients, sometimes even 90, daily. During the month of October, 939 injured patients were operated on.

The majority of patients admitted and treated in the Hospital were those assaulted by the YFA. There were between 2,300-2,500 patients, 55% of them civilians, among them 100 children. Twenty YFA soldiers and a Serbian terrorist (some of them evacuated to the YFA medical facilities during the month of August) were also admitted to the hospital. By the end of September, the mortality rate was 1.5%, later on it increased to a striking 10%, mainly due to inadequate conditions. The occurrence of diseases and infections was due to the lack of sanitary equipment needed for proper treatment of injuries, such as craniocerebral wounds, which contributed to the rise in the mortality rate. At the end of October and beginning of November, gas gangrene appeared and affected ten patients; 4 of them died. Apart from these horrific instances, 16 children were given birth to in this Hospital; one premature child, weighing meager 700 g, died on the 3rd day.

During August, the city was continually bombed, especially the old chapels and mortuaries, thus, by September burying the dead in cemeteries became impossible. Burials were communally conducted in large grave and, when movement became impossible, burials were conducted in yards, gardens and even in garages. In November, constant bombardment rendered burying of the dead absolutely impossible, and about 80-120 bodies were simply placed in various buildings, yards, homes for the elderly, etc. The lack of coffins also caused havoc; plastic bags became an alternative, the

Figure 5. On October 5, 1991, a 250-kg airplane bomb penetreted six floors of the Vukovar Hospital. (Pictures taken from a videotape made by Z. Jurčević.)

only means of identification being a plastic card strapped to the toe of the deceased. In the last two weeks, all communication among medical units in Vukovar ceased, and each center functioned on its own forces and means. Accordingly, the mortality rate increased, but until now data from this period has remained unknown.

All medical facilities had large Red Cross signs plastered to the roofs and, when roofs were destroyed, large sheets of 3x3 m size were placed in the nearby yards (Fig. 7). Throughout the attacks on Vukovar and its Medical Center, there was never any artillery housed at the Hospital, or any firing or retaliation towards the Serbian forces. During the aggression against Vukovar, 4 doctors, 6 nurses, 2 staff members and one medical staff assistant were wounded.

Figure 6. After piercing through six floors of the Vukovar Hospital, a 250-kg airplane bomb landed on a hospital bed at the entrance of the atomic shelter. Luckily, the bomb did not explode. (This picture was taken from a videotape made by Ž. Jurčević on October 5, 1991, a half an hour after the airplane had attacked the hospital.)

Figure 7. When roofs of the Vukovar Hospital were destroyed, large sheets with Red Cross signs were placed in the nearby yards. (The picture was taken from a videotape made by Z. Jurčević on October 5, 1991, half an hour after an airplane attack on the Hospital.)

Discussion

Vukovar was historically, culturally, economically and ethnically open to new ideas and progress; however, throughout the development and strengthening the Croatian nation it has always remained a clearly Croatian city. Despite imperative disclosures and the nourishing of civilization and faith, which at a time was at crossroads, the people there have managed to maintain and uphold their nationality and unity. Vukovar is located near the border to Serbia, a site where it was constantly under pressure, from Serbian politicians and generals, to become a part of Great Serbia. Within 90 days, Vukovar was destroyed and the majority of the residents were left homeless, ironically, merely refugees in their own Motherland. Despite this, a stand off was organized where not more than 1,500 people managed to resist the YFA, an elite army, an army incomparable in strength, manpower and technology. In essence, considering the circumstances, the result of this resistance is unbelievable. The courage of a few hundred people kept back the barbaric attacks of an elite army. About 400 tanks were destroyed and about 50 planes struck down by the heroic defenders of Vukovar. They broke the backbone of the YFA: after the battle of Vukovar, the defence of Croatia became much more feasible.

The behavior of the YFA was cruel, unreasonable, inhuman, adamant and immoral. The seizure of Vukovar continued for several months, during which time they managed to ruin, stifle and damage almost the entire Medical Center. One may ask why did they deliberately and constantly targeted the Hospital? As the people of the 20th century, we place ourselves on a high standard, yet the world must be blind and arrogant not to see that targeting of a hospital endlessly, until it is converted back to the dust from which it was created, can be considered only immoral, inhumane and savage. Despite all this, the Hospital continued working. The resources were limited and the basements became the only place available to save life, give birth and heal.

The contingencies that evolve during a war are boundless, yet when it comes to saving lives, a hospital serves as a sanctuary of life. No bias or political stance should be incalculated or concluded in the medical profession - the only view that should be preserved and honored to the highest degree is that every man deserves to live. Yet, when considering the tragic events that are constantly occurring, we can see that the Serbian forces refuse to conform to the world's standards (5,6). The irony of this situation is that while the doctors were treating the ill of both sides, the enemy continued to mindlessly terrorize and attack

the Hospital. The enemy soldiers were not only treated but even provided better care than the civilians and Croatian soldiers.

The atrocities of war are incomprehensible; this war has brought along many stealthy, ruthless and underhanded actions. The Vukovar Hospital was constantly under attacks. Sabotage and conspiracy upon vital information on the hospital maintenance was constant, conducted by certain members of the personnel, later identified by their joining the Serbian paramilitary forces when they captured the Center. This was extremely damaging to the Center and its work. For example, the boiler and distillation rooms and various generators were specifically and intentionally shelled, even within few hours after they were relocated. Nevertheless, this simply strengthened the opposition of the loyal personnel. The love and respect for the profession was unbreakable. After the YFA "liberated" the Hospital, confusion and division began. The majority of the Serbian workers sided with the aggressors whilst Croatians were either captured or evacuated and taken to safer regions of Croatia.

The war has brought with it a thick lingering fog of depression, anguish, hunger and hatred. Considering this diabolic cascade of events, we can truly respect and admire the medical staff in Vukovar: their strength to endure, their strength to love and heal without doubt in themselves and without breaking the Hippocrat's Oath that emphasizes ethical and humanitarian rights. This feeling of self accomplishment, rare but deserved, is unbelievable considering that hundreds of grenades fell on the Hospital and its surroundings every day. Yet, this shelling was simply a shower of sudden shocks, the release of two bombs each weighing 250 kg, came like an earthquake.

The deliberate and open actions of the aggressive YFA were undoubtedly very obvious. If somebody shells a hospital once or twice, there is a large possibility of it being a mistake or merely an occurrence. However, when the same hospital is repeatedly bombed and targeted, whilst a police station located nearby is not hit even once, one can simply conclude that their primary aim was to obliterate the entire hospital. Moreover, the subsequent accusations made against the medical staff in Vukovar were childish and nonsensical: they accused the hospital personnel of using wounded and ill Serbian patients for organ explantations!

Unfortunately, the Hospital could neither be saved nor evacuated, which would seem unethical considering that soldiers were still defending Vukovar and additional 15,000 civilians remained hiding in bomb shelters. The mentality and conscience of the aggressor cannot be understood. But one thing is beyond doubt - if Vukovar could not be taken by the Serbian forces, then it had to be totally destroyed. Our own experience of such barbaric atrocities and several documents presented earlier (7-9) would refer to a biblical prophecy rather than the events occurring in 1991 Europe and in our self-proclaimed modern world.

Conclusion

The final curtain has been drawn, this inconceivable convolution of events finally led to the destruction of Vukovar. A definite foreclosure of this war and all its inhumane actions is that this hospital will stand again. Wounds will be healed, the ill treated and babies will be delivered there. There will be large windows in this house of life, from which many generations will look out onto the river of Danube.

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References

1 Bognar A. Geografija SR Hrvatske. Knjiga 3. Istočna Hrvatska. Zagreb: Školska knjiga, 1975.

2 Republički zavod za statistiku Republike Hrvatske: Popis domaćinstava, stanovnika i poljoprivrednih gospodarstava u 1991. godini; Pučanstvo Republike Hrvatske po nacionalnom sastavu, vjerskoj pripadnosti i materinskom jeziku, Saopćenje br. 21.4, 1991.

3 Schreckeis H. Vukovar, stara prijestolnica Srijema. (Citation according to Souček B: Kao feniks iz pepela. Zagreb: Večernji list Nov. 17, 1991,17-18.)

4 War damages in health services in the Republic of Croatia. Zagreb: Republic of Croatia Ministry of Information, November 1991.

5 International Committee of the Red Cross. Basic rules of the Geneva Conventions and their additional protocols. Geneva: ICRC, 1983.

6 International Committee of the Red Cross. Rules for the behavior in combat. Geneva: ICRC, 1985

7 Kostović I, Marušić M. Attacks on Croatia's hospitals. Lancet 1991;338:26.

8 Editorial. Croatia: War against Vukovar medical centre. Lancet 1991;331:1447-8.

9 Marušić M, editor. Medical Testimony of the Vukovar Tragedy. Zagreb: Croatian Medical Journal, 1991.

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Deliberate Destruction of the Vinkovci Hospital During the War against Croatia

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Abstract. In Vinkovci, the hospital was established in 1857, whereas the present Medical Center on the new premises has been in function since the '70s. The Center had 505 beds, about 1,100 employees and provided medical care for an area with a population of 130,000. Since September 2, 1991, when the Vinkovci Medical Center was first attacked, the Center's premises and equipment have been almost completely destroyed, so that all medical care and other activities have to be carried out in underground rooms and shelters. Doctors practically do not leave them at all. Numerous heavy artillery hits, especially air shells, clearly show that this health care institution has been deliberately targeted by the Yugoslav Federal Army.

Key words: *Croatia; Geneva Conventions; hospitals; Red Cross; Vinkovci; war*

Introduction

Vinkovci is a Croatian, Slavonic town (according to the 1981 census, 32,923 inhabitants) situated on the river Bosut, on the site of an ancient Roman colony, Aurelia Cibalae (2nd and 3rd century A.D.), in which the emperors Valerian the First and Valens were born. In Middle Ages on the site of Aurelia Cibalae, there existed St. Elias' Church and a village of the same name. For several centuries Slavonia was part of the Ottoman empire. After the Turks' retreat from Slavonia, in the 14th century, on the ruins of St. Elia's Church, St. Vincent's Church was constructed and the town was named after it. In the 18th century, the shipping regiment headquarters was in Vinkovci. The settlement gradually spread beyond its military nucleus, especially at the end of the 19th century when the railway lines developed and, with time, Vinkovci became the most important junction in East Croatia. Economic development entailed the cultural flourishing of the town, e.g., Antun Matija Reljković, the author of the famous *Satire* (1762), one of the earliest works written in Croatian, once equally popular as Andrija Kačić Miošić's *Razgovor ugodni naroda slovinskoga*, worked and died in Vinkovci in 1798. Josip Kozarac (1858) and Vladimir Kovačić (1907), men of letters, and professor Julije Domac, one of the founders of the Croatian pharmacy, were born in Vinkovci, and Josip Runjanin, who set *Lijepa naša*, the Croatian anthem, to music, was buried in Vinkovci (1858) (1-5). According to the 1991 Census, in Vinkovci there were 80.0% Croats, 13.0% Serbs, 1.6% Hungarians and a smaller percentage of other nations (6).

The General Hospital in Vinkovci has been in function since 1857, initially with not more than 50 beds. It was the main medical institution in the town until 1970. In 1963, the Polyclinic was built, and in 1972 the main premises constructed, containing the Departments of Pulmonary and Infectious Diseases. Organizationally, the present-day Medical Center in Vinkovci was founded in 1959, with the union of the General Hospital and Health Center. Until the 1991 war against Croatia, the Vinkovci Medical Center had 505 beds and about 1100 employees, among them 98 physicians

Figure 1. Eastern view of the northern part of the main building of the Vinkovci Medical Center. Beside broken windows, a more careful inspection reveals numerous large-caliber hits.

(including doctors of dental medicine). Emergency service, 24-hour clinic and pharmacy, as well as all specialist departments, except oncology and hemodialysis (equipment for these has already been purchased), were completely organized and functioning. As the neighboring (27 km distance) community of Županja has no medical center, the one in Vinkovci provided health service for the population of Vinkovci and for a part of Županja, about 130,000 people in total. According to all said above, Vinkovci is apparently a Croatian town, witness both its history and culture, ethnical composition and economic development. Still, it came under numerous fierce attacks, aiming at annexing Vinkovci to "Great Serbia" or "the rest of Yugoslavia". Likewise other places attacked (7), the Medical Center in Vinkovci was also intentionally demolished. This is a report with authentic photodocumentation on the destruction.

The Facts

The Vinkovci Medical Center first came under artillery attacks on September 2, 1991. From October 14, 1991, it was hit daily by various weapons. Until October 29, the Center's premises were hit with more than 500 light mortar shells. More than 30 100 mm-caliber shells hit the building itself (Figs. 1 and 2), whereas on two occasions it was hit by air shells (entrance gate and central part of the building under construction). Briefly, damage done to the Center is as follows:

First floor: The Pediatrics with its inventory was completely destroyed (Fig. 3).

Second floor: The Departments of Internal Medicine and X-ray are demolished to a large extent, and out of function.

Third floor: The Gynecology ward was heavily damaged by four tank shells (Fig. 3).

Fourth floor: The Departments of Surgery and of Internal Medicine are completely demolished.

Fifth floor: The Department of Ophthalmology is completely destroyed, and at the Department of Otorhinolaryngology the operating theater was burned down (Fig. 4).

Sixth floor: The Library, regularly receiving 27 journals, came under direct attack and was completely destroyed.

The Departments of Pulmonary and of Infectious Diseases, located in a separate building, were completely demolished by direct artillery shells (Fig. 4).

The Administrative Building, the wash-room (3 direct hits) and the boiler-room are destroyed, as are the elevators and all fittings.

Due to practically complete destruction of all departments, the Vinkovci Medical Center is pres-

Figure 2. Western view of the southern part of the main building of the Vinkovci Medical Center. Beside broken windows, holes made by direct shell-hits are visible.

ently functioning in its basement, in the former warehouse and in a small part of the first floor, protected from attacks from Mirkovci, a Serbian stronghold, by other buildings. The basement capacity is about 150 beds, but up to 250 can be placed there when necessary. Four operating theaters have also been organized there. At present, 150 employees, among them 25 physicians, work at the Center. Anesthesiology, surgery, blood transfusion and emergency services, gynecology, pharmacy and pathology are all in function there. Due to permanent exposure of Vinkovci to artillery attacks, most of medical staff members do not leave the hospital at all, with the exception of a minor number of other personnel working in shifts (e.g., cooks). During the period from July 1 till October 28, 1991, 707 wounded persons, 471 of them severely wounded, and 203 dead, were admitted to the Vinkovci Medical Center. More than 50% of the wounded were civilians. Two members of the Yugoslav Federal Army (YFA) were also admitted; one of them (K.I., aged 19) died.

There were no casualties among the Center personnel to date, only a gynecologist (A.T.) of Serbian nationality, working at the Center, was brought in dead. The circumstances of his getting killed are still unknown. According to the Croatian Ministry of Health and Social Welfare, direct material damage done to the Center amounts to DEM 58.800,000 (8).

Discussion

In this war against Croatia, the towns in Slavonia bordering on Serbia have suffered the most severe attacks. Among them, Vukovar, Osijek and Vinkovci have been the most tremendously devastated so far, medical institutions included. One might suppose that the destruction was unintentional and accidental. However, when air hits are taken into consideration, the destruction of the Vinkovci Medical Center appears to have been deliberate. Whereas some weapons, e.g., multiple rocket launcher, are relatively imprecise, and while mortars can be served by inadequately trained or even drunk individuals, e.g., members of the Serbian irregular forces in particular, the precision of air rockets cannot be questioned. It is hard to believe that the so-called Yugoslav Air Force would let poorly trained or drunk pilots fly expensive warplanes. On the contrary, broadcasts of some captured pilots, presented on Croatian Television, showed them to be highly educated individuals with high-rank insignia. International conventions and statements concerning medical institutions are very clear, e.g., the Geneva Conventions state: "Military or civilian health care institutions are under protection..." (article I, 19) (9). "The protection may only cease if an appropriate warning has been given in a reasonable time before..." (article I, 21) (9). In the Rules for the Behavior in Combat, the International Committee

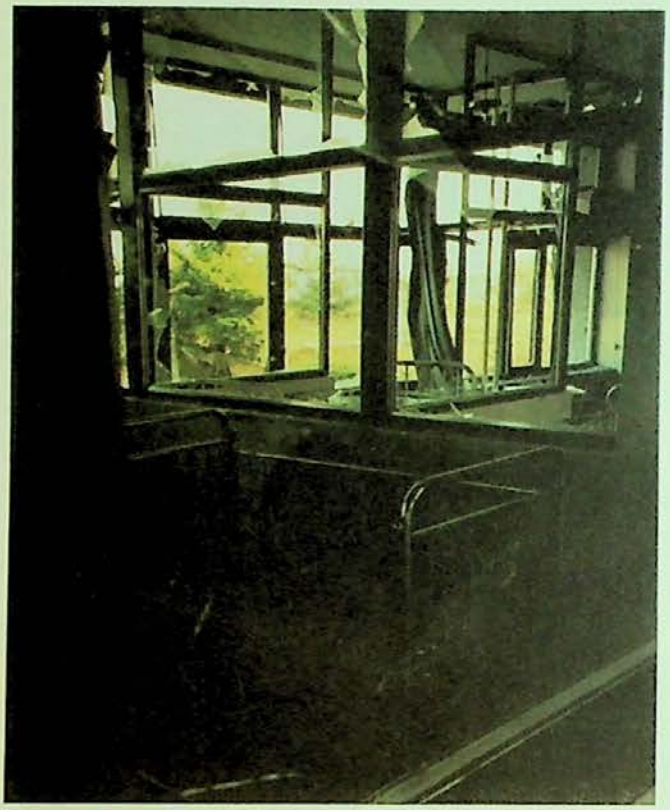

Figure 3. Interior of the Pediatric Department in the main building (top). Corridor in front of the room for newborns at the Department of Gynecology (bottom).

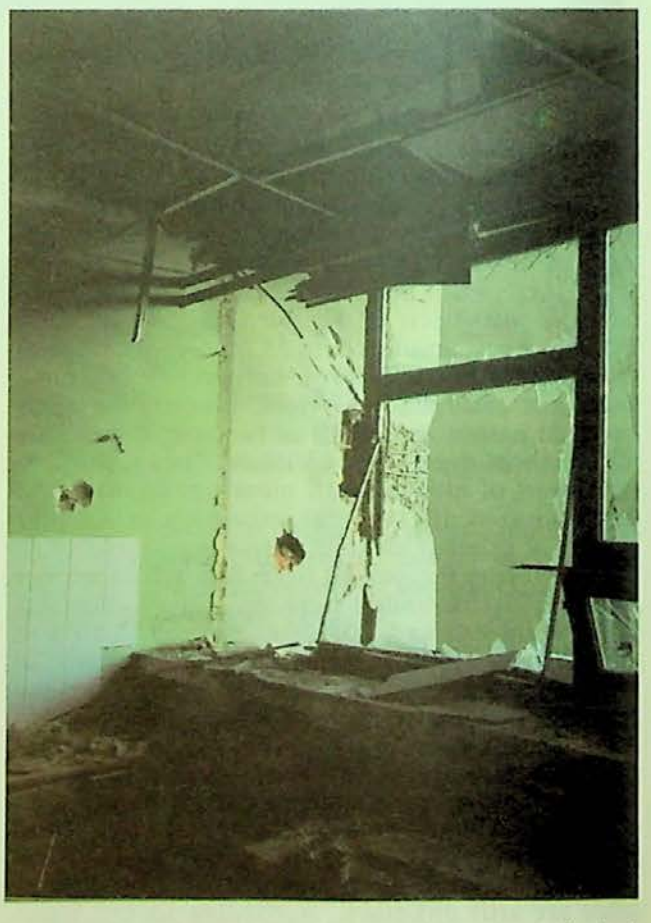

Figure 4. A demolished corridor in the main building (top). Kitchenette at the Department of Infectious Diseases (bottom).

of the Red Cross strictly demands the personnel and objects marked with Red Cross or Red Crescent signs to be respected (10). The Medical Center in Vinkovci was properly marked with Red Cross signs. No attacks on the aggressor were launched from the Center. The Medical Center was not warned of any of the attacks.

Conclusion

The YFA, still internationally considered the regular army of the state of Yugoslavia, multiply and intentionally violated a number of humanitarian regulations of the international law of war, by its systematic, continuous and overtly deliberate destruction of the Vinkovci Medical Center by heavy artillery weapons and air bombs.

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References

1 Slavonija. Opća enciklopedija. Zagreb: Jugoslavenski leksikografski zavod, 1980.

2 Hrvatska, Istočna Hrvatska. Enciklopedija Jugoslavije. Zagreb: Jugoslavenski leksikografski zavod, 1988:221-2.

3 Bognar A, Crkvenčić I, Pepeonik Z, Ridanović J, Roglić J, Sić M, et al. Geografija SR Hrvatske, Knjiga 3. Istočna Hrvatska. Zagreb: Školska knjiga, 1975.

4 Horvat J. Politička povijest Hrvatske. Zagreb: August Cesarec, 1989.

5 Šidak J, Foretić V, Grabovac J, Karaman I, Strčić P, Valentić M. Hrvatski narodni preporod - Ilirski pokret. Zagreb: Stvarnost, Školska Knjiga, 1988.

6 Popis domaćinstava, stanovnika i poljoprivrednih gospodarstava u 1991. godini; Pučanstvo Republike Hrvatske po nacionalnom sastavu, vjerskoj pripadnosti i materinskom jeziku. Saopćenje br. 21. 4, 1991. Zagreb: Republički zavod za statistiku Republike Hrvatske, 1991.

7 Glavina K, Tucak A, Janoši K, Karner I, Hanzer J, Pajtler M, et al. Deliberate military destruction of the General Hospital in the city of Osijek. Croat Med J 1992;33(War Suppl 1):61-9.

8 Republic of Croatia ministry of information. War damage in health services in the Republic of Croatia. Zagreb, October 1991.

9 International Committee of the Red Cross. Basic rules of the Geneva Conventions and their additional protocols. Geneva: ICRC, 1983.

10 International Committee of the Red Cross. Rules for the behavior in combat. Geneva; ICRC, 1985.

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Destruction of the Pakrac Hospital and Evacuation of 280 Psychiatric Patients after a Forty-day Blockade

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Abstract. The community of Pakrac is located in the western part of the Slavonia region. It has a population of 27,288 people. The national structure is complex. The hospital was founded in 1760's. It had a large psychiatric ward from the very beginning. Before the war, the hospital had 680 beds, 320 of which were in the Psychiatric Ward. During the war against Croatia, health institutions in Pakrac, especially the hospital, were heavily attacked and damaged by the Yugoslav Federal Army and Serbian irregular troops. The artillery attacks were constsnt from August 19 to September 29, 1991. Patients and hospital personnel were blocked in the hospital building. The last six days of the blockade were the most difficult for 280 patients and 20 members of medical personnel. The rescue attempt by the International Red Cross failed. Finally, the patients, together with the medical personnel, were secretly rescued after 40 days of blockade. The rescue action was organized by the regional military authorities and the Ministry of Health of the Republic of Croatia.

Key words: *Croatia; Geneva Conventions; hospitals; psychiatric services; Red Cross; war*

Introduction

War conflicts in Croatia began in August 1990 with the blockade of roads and railways and diversions in the region of Knin (1). Conflicts became more violent in the middle of 1991 and shortly escalated into a war. Up to December 1991, about one third of the Croatian territory was occupied by the Yugoslav Federal Army (YFA), and Serbian irregular troops.

Brutal attacks resulted in civilian massacres (2), and destruction of non-military targets: churches, historical monuments, houses, hospitals and other health institutions (3). Many towns and villages were razed to the ground or severely devastated while more than half a million people had to flee their homes (4).

The community of Pakrac (area: 567 km^2) is located in western Slavonia, 120 kilometers east of Zagreb, on the foothills of Psunj mountain (Fig. 1). According to the 1991 Census, it had a population of 27,288, which is 615 persons less than 10 years ago. The community had a complex national structure (Table 1), which was one of the causes of the serious conflict and coming destruction.

A low birth rate (11.4 per 1,000 population), high death rate (14.2 per 1,000 population) and relatively high infant mortality rate (22.2 per 1,000 live births in 1988) were the main characteristics of the population.

The economy of the region was based on agriculture, small scale industry and small private businesses. The social sector was moderately developed. Health services were well developed with a large regional hospital in Pakrac and a spa in Lipik. Gross national income was below the republic's average.

Figure 1. Western Slavonia. Pakrac Municipality.

Table 1. National structure of the population in the community of Pakrac according to the 1991 Census.

Nationality	%
Serbs	46.4
Croats	36.0
Yugoslavs	4.8
Italians	3.1
Bulgarians	2.6
Hungarians	1.0
Other	3.8
Unknown	2.3
Total	100.0

Health Services

Pakrac has a long tradition in health service. Thermal springs and spas were discovered in the region in Roman times (Balnea Jassi, Aquae Balissae).

In the 1760's, the castle of baron Trenk was donated to the hospital for treatment of syphilitic patients. The disease was brought to the region by Trenk's soldiers (the "Trenk's pandurs") who had been infected serving in northern European countries. Thermal water was used in treatment of syphilitic patients. Until the end of the 19th century, the old Pakrac hospital was located in Trenk's castle. It consisted of two wards: the ward for syphilitic patients and the general ward. In 1889 the hospital accumulated a total of 33,012 hospital days (5). In 1896, the new hospital was built as the first "country public hospital" in Croatia. It was under the direct management of the national government. The hospital was very well equipped and managed (5). In 1910, a new ward with 200 beds for psychiatric patients was opened. Since that time, the hospital has become a modern general hospital with a large psychiatric ward.

In 1973 the hospital was reconstructed: the pathology, cytology and a new operating theatre were built, and the Psychiatric Ward with 350 beds was renovated. In 1975, the first Intensive Care Unit in this part of Croatia was organized. In 1978, the Neurologic Ward with 45 beds was built. In 1984 the new main building was opened with the Departments of Surgery, Internal Medicine, Oto-rhino-laryngology, Ophthalmology, Out-patient clinics and technical services. Between 1984 and 1991, several renovations of the old buildings were done.

The outpatient health care also has a long tradition. In 1803 the first vaccination against variola was performed. In 1826, the first public pharmacy was opened, and in 1845 the town of Pakrac had its "city physician", the public health officer (6). In 1880, the first branch of health insurance for the forest workers was established.

In 1990, the Pakrac Medical Center, had a total of 680 beds and 613 employees (75 doctors, 23 in primary health care and 52 in the general hospital, and 280 nurses). The largest hospital ward was Psychiatry with 320 beds. The Ward of Neurology had 45 beds and Wards of Internal Medicine and Surgery had 72 beds each. The wards were very well equipped: 13 machines for renal dialysis, Intensive Care Unit, and modern laboratory equipment. The Center provided primary and preventive health care for all residents of the community. The largest department in the Center was the General Practice Department. There were also the Occupational Medicine, School Medicine, Stomatology and Epidemiology departments.

Figure 2. The facade of the old building of the Psychiatry Ward of the Pakrac Hospital after heavy artillery attack.

Destruction of the Hospital and Health Center

This report on the destruction of the Pakrac health institutions is based on the authors' observations, official and newspaper reports.

The tensions in the district of Pakrac started in 1990, and intensified after March 1991. During March 1991, the YFA troops were stationed in the hospital area for 18 days, but the hospital work was not disturbed and friendly relations were maintained with the hospital staff. However, the relations between citizens of Serbian and other nationalities became more and more tense without any logical explanation. Some members of the medical staff of Serbian nationality left their jobs before the middle of August 1991, without explanation. The Hospital and the Health Center buildings were guarded by the usual security staff. Croatian soldiers were not present in the hospital area. Intensive YFA attacks on the hospital began in August 1991.

At six in the morning on August 19, 1991, an artillery attack was launched on the hospital park and the orphanage. During the morning, heavy gunfire was opened on the hospital and health center buildings. One member of the kitchen staff and one patient were wounded. In the afternoon, the hospital was occupied by Serbian irregular troops. Late in the evening, a Croatian anti-terrorist group took over the town of Pakrac including the hospital building. Serbian irregulars moved from the hospital building to the mountains and took with them a few patients of Serbian nationality, who were treated in the hospital. Dr. V.S., a Croat, had been taken hostage. His fate is still unknown.

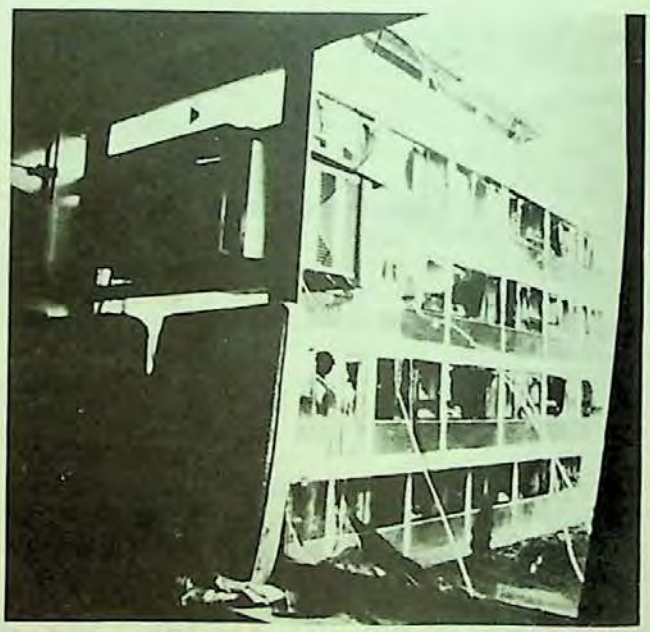

Figure 3. The facade of the new hospital building with the Surgery, Medicine and Gynecology Wards. The picture was taken during sniping-rifle fire.

Heavy artillery attacks on the hospital building continued from August 20 to 24, 1991. The Intensive Care Unit, physicians' offices and the kitchen were damaged (Figs. 1 and 2). The patients and medical staff were evacuated to safer areas of the hospital. Because of the insecurity and reduced personnel, some patients were discharged from the hospital. 450 of the most seriously ill, including 16 on renal dialysis, stayed at the hospital. About half of them were patients from the Psychiatric Ward. The hospital was unprepared for war.

Figure 4. Surgery Ward after attack.

Figure 5. Neonatal Ward after attack.

The wounded (approximately 10 daily) were admitted to the hospital, but work was almost impossible under constant artillery attacks. Medical staff, ambulances and patients were shot at on purpose. Food for the patients, and about 200 members of the personnel and their relatives, who took shelter in the hospital, was transported every day from a nearby village by a medical doctor and an ambulance driver. The town was without drinking water and electricity. The water system was damaged in the first days of the attacks. Some patients were sent to the nearby Lipik hospital (Figs. 4 and 5).

The situation was better in the period from August 25 to September 23, 1991, although artillery fire continued. Food was becoming scarce, and meals were reduced in quantity and quality. The hospital staff remained at the hospital day and night, because it was too dangerous to move

Figure 6. Damaged Neonatal Intensive Care Unit.

around in the town. The majority of patients and staff slept on the hopital floor.

On September 24, 1991, the hospital came under a heavy artillery attack again. The hospital was hit with more than 1,000 mortar shells, tank shells, rockets from multiple rocket launchers, and projectiles from heavy and light firearms. During the attack, patients were evacuated to the safer parts of the hospital. Surgery and Internal Medicine wards were destroyed, while the building in which the Psychiatric Ward was located was not heavily damaged. The kitchen, heating unit, Pathology, and the shops were completely destroyed. It was decided that patients should be evacuated from Pakrac immediately. The evacuation started with patients from Surgery, Pediatrics, Maternity and Internal Medicine wards. During the evacuation one patient was killed, several injured, and 5 staff members were wounded (Figs. 6 and 7).

After this phase of the evacuation had been completed, all roads in the area were blocked and there were no vehicles available for the evacuation of the remaining 280 patients, most of them from the Psychiatric Ward, and 20 staff members (4 doctors and 16 nurses and technicians).

Evacuation of 280 Psychiatric Patients

The next four days were very difficult for 300 persons left in the hospital. Communications with the rest of the world were cut, there was not enough food, medicines and drinking water. There was a well in the yard, but it was under continuous fire. Nurses and patients ran out between attacks to bring some water. It was difficult to keep sanitary units clean. On September 27, during an artillery attack, the municipal government official entered the hospital and informed the staff of the attempt of the International Red Cross to evacuate the rest of the hospital. A convoy of ambulances and hospital busses, under the International Red Cross escort, had left Bjelovar, but it was stopped and attacked with gun fire. One nurse was severely injured and the International Red Cross officials refused to proceed with the evacuation under such conditions. Fire gradually ceased during the next few days, but the blockade of the hospital continued.

The care for patients became very difficult. It was reduced to elementary treatment of bed ridden patients, emergencies, rational distribution of food, water and medicines. Mineral water, found

Figure 7. A car garage used as a patient's room.

in a storage room, was used for drinking. The only communication with the rest of the world was one battery-operated radio, turned on every hour for the latest news.

From the beginning of the attack, the hospital staff kept patients informed about the situation. Some of the patients were well aware of the situation, and shared responsibilities, duties and tasks with the personnel. Most of the patients didn't know what was happening. Organization of life with those patients was difficult. The majority of them suffered from schizophrenia, alcoholic psychoses and geriatric psychiatric problems. Early in the morning on September 29, several Croatian National Guard soldiers successfully ran the blockade and started preparations for the evacuation. During the day, all patients were secretly prepared for the evacuation. Immobile patients were wrapped into dark blankets. Sedatives were given to most of the patients, particularly to those who were agitated and upset. In the beginning of the evacuation process there were about 30 immobile patients. As the evacuation progressed, another 30 patients collapsed and needed help.

The evacuation began at 7:30 p.m. in complete darkness, for security reasons. An oppening, facing the back yard and the park, was made in the basement wall of the old psychiatry building. A small river and about 100 meters of very difficult terrain had to be crossed to the place where busses were waiting. Guardsmen and several medical technicians went first to clear the way and build a plank crossing over the river. When this was done, mobile patients in good physical condition followed. Guardsmen and hospital personnel formed a lane so that patients could go from arm to arm to the busses. All those who were not able to move, were carried by others or in stretchers. After about 3 hours, all patients and staff members were in the busses and were taken to the nearby psychiatric hospitals at Popovača and Sisak.

The psychiatric building was destroyed and burned in later attacks.

Discussion

War conflicts in the region of Pakrac and in the Republic of Croatia as a whole are complex and difficult. In the beginning, this war could be classified as a "low intensity conflict" (LIC) (7,8). LIC refers to conflicts short of conventional war, which intentionally subject the civilian population to a combination of psychological, economic, and military pressures, in order to promote the adoption of the desired social system. Such wars always take place within a single country. Later, when the people of Croatia voted for independency and after its proclamation, this war became a war between two countries. But the war was never declared. The Geneva Conventions and the Protocols (9) were not respected. Medical personnel and medical institutions were targeted intentionally. During attacks on Pakrac health institutions one patient was killed, several patients and six medical staff members were wounded. The director of the Pakrac Medical Center was taken hostage. After four months, he is still a captive. We received the information that his health is very poor.

Examples of similar wars with deaths and injuries of civilians, medical staff and destruction of health institutions are described in literature (10,11). During the seven years of war in Nicaragua, 5,714 war-related deaths were reported. Nearly a third of all deaths were civilians. In Croatia about a half of deaths were civilians.

During the hospital blockade, the case of 280 psychiatric patients was internationalized. The International Red Cross tried to help the evacuation. The evacuation was blocked by Serbian irregular troops. The convoy, which tried to reach Pakrac under the International Red Cross escort on September 27, 1991, was attacked and stopped. One nurse was severely wounded.

The successful evacuation of 300 people from the Pakrac hospital was organized by the Ministry of Health and regional health and military authorities. It is yet another case of humanitarian effort on the part of medical professionals, Croatian soldiers and ordinary citizens in saving of human lives. The guardsman, who deserves direct credit for the rescue action of the psychiatric patients and medical personnel, was killed in another action two weeks later.

Acknowledgments

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References

1 Klein E. Yugoslavia as a group. Croat Med J 1992; 33(War Suppl 1):1-13.

2 Judaš M, Chudy D, Prišćan A, Radonić N, Papić J, Marušić A, et al. Chronology of civilian suffering in the war against Croatia. Croat Med J,1992;33(War Suppl 1):15-23.

3 Glavina K, Tucak A, Janoši K, Karner I, Hanzer J, Pajtler M, et al. Deliberate military destruction of the General Hospital in the city of Osijek. Croat Med J 1992; 33(War Suppl 1): 61-9.

4 Kujundžić M, Kern J, Ivanković D, Budak A, Dragun D, Vuletić S. Person displacement pattern in Croatia. Croat Med J, 1992; 33(War Suppl 1): 55-60.

5 Stojanović G. Iz prošlosti zdravstvenih i socijalnih ustanova u Hrvatskoj i Slavoniji. Beograd: Biblioteka Centralnog higijenskog zavoda, 1940.

6 Švarc V. Prilog povijesti zdravstva u Pakracu. Zdravstvo 1970:12:33-8.

7 Waghelstein J. Post-Vietnam counterinsurgency doctrine. In: Garfield RM. War-related changes in health and health services in Nicaragua. Soc Sci Med 1989, 28:669-76.

8 Sarekesian SC. Low-intensity conflict: concepts, principles, and policy guidelines. In: Broholm C, Clements C, DiPirete L, Epstein P, Fine A, Halloran ME, et al. editors. Health effects of the war in two rural communities in Nicaragua. Am J Publ Health 1989;79:424-9.

9 International Committee of the Red Cross. Basic rules of the Geneva convention and their additional protocols. Geneva: ICRC,1983.

10 Broholm C, Clements C, DiPrete L, Epstein P, Fine A, Halloran ME, et al. Health effects of the war in two rural communities in Nicaragua. Am J Publ Health 1989;79:424-9.

11 Garfield RM. War-related changes in health and health services in Nicaragua. Soc Sci Med 1989;28:669-76.

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The Third Military Destruction of the Lipik Rehabilitation Center in This Century

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Abstract. Before the war against Croatia, the *Dr. Božidar Maslarić* Rehabilitation Center for Neurologic Diseases in Lipik had 375 beds and 240 employees. The center had been damaged during World Wars I and II, but the war damage inflicted during this war surpassed all previous devastation. One medical technician was killed, and two nurses and two ambulance drivers wounded.

Key words: *Croatia; Geneva Conventions; hospitals; Red Cross; war*

Introduction

Lipik is a town in the Pakra river valley. It is best known for its thermal springs, discovered in Roman Times and later mentioned by franciscan Ivan Kapistran (Capestrano 1386 - Ilok 1456, a renowned leader of the Christian army in the defense of Belgrade, in 1690 declared a saint protector of chaplains). In the 18th century, pools and various buildings were constructed in the vicinity of the springs. A spa auditorium, hotel, and a physical therapy building, the so called *Marble Bath*, were built in 1893. In 1957, a hospital ward was founded on the spa premises.

Until the war against Croatia, the *Dr. Božidar Maslarić* Rehabilitation Center had 375 beds and 240 employees, 12 of them physicians (10 physiatrists, 1 neurologist and 1 neuropsychiatrist). The Rehabilitation Center, consisting of five interconnected buildings, a hotel and recreation grounds, were situated in a beautiful, well-tended park.

Facts about the Third Destruction of the Lipik Rehabilitation Center

Attacks on Lipik began on September 19, 1991, when a considerable number of mortar shells exploded in the vicinity of the Center. The windows were shattered, the facade was damaged and the electricity and telephone lines were cut. About 70 mobile patients were evacuated immediately. Bed ridden patients and the remaining personnel were displaced into a corridor on the ground floor, since there was no better shelter. Only a few days before the attacks on the Center began, 50% of the staff (mostly of Serbian nationality) went on vacation, or took sick-leave. A day before the first attack, on September 18, the head of the Rehabilitation Center, Dr. Ivan Šreter, had been taken hostage by Serbian terrorists en route from Zagreb to Lipik. There is still no information about him. Attacks on Lipik continued in the following days.

On September 25, 1991, during intensive attacks on Lipik, the Rehabilitation Center was hit with about 100 grenades. The military situation and the big damage inflicted on the Center premises caused the evacuation of all the remaining patients (mostly with cerebrovascular strokes, paraplegia and similar diseases).

On September 29, the Rehabilitation Center was attacked again and suffered the third and biggest devastation in this century. Grenades damaged the entrance of the Center. A physician's room above the entrance was destroyed (Fig. 1); a

Figure 1. Lipik Rehabilitation Center on December 27, 1991. Damaged entrance to the Hospital. A physician's room above it was also destroyed.

Figure 2. Entrance into the kitchen hit by a grenade.

grenade pierced the kitchen wall (Fig. 2); the physical therapy building entrance was demolished (Fig. 3); the Neurology building was damaged and a physical therapy room destroyed (Fig. 4). The electrical wiring, water and heating systems were also destroyed. The old park in which the complex is situated was also heavily damaged. After the occupation of Lipik by the YFA and Serbian terrorists, some of the several hundred years old oaks were cut down, while the rest of the park was doomed by deliberate ruination of the bark. On the same day, a medical technician was killed by a grenade in front of the Center. During the attack the purchasing manager, I.K., died of heart attack. Two nurses (K.L. and Ž.I.) and two ambulance drivers (M.Z. and V.M.) were wounded, and their vehicles damaged.

Figure 3. Entrance into the Physical Therapy building, the so-called *Marble Bath*.

Figure 4. Damaged building of the Neurology Ward (left), a destroyed physical therapy room (center), damaged entrance into a pool (right).

In the following weeks Lipik was an area of fierce fighting. Consequently, the first photographic material about the destruction of the Rehabilitation Center was obtained in the beginning of December, when the Croatian forces liberated Lipik.

According to the estimates of the Ministry of Health of the Republic of Croatia, the direct damage to the Lipik Rehabilitation Center is DEM 25 million (3).

During the attacks, no members of the Croatian forces were present in the Lipik Rehabilitation Center. The Center was properly marked with Red Cross signs and its sanitary function was well known among the Serbian terrorists who attacked it. The Center staff was not forewarned of the at-

tacks as is demanded by the Geneva Conventions (4). On the contrary, as far as we know, the Center was attacked much earlier than any object of military significance in Lipik.

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References

1 Bognar A, Crkvenčić I, Pepeonik Z, Ridanović J, Roglić J, Šić M, et al. Geografija SR Hrvatske, vol. 3. Istočna Hrvatska. Zagreb: Školska knjiga, 1975.

2 Lipik, Medicinska enciklopedija. Zagreb: JLZ, 1969;4:327-8.

3 The Republic of Croatia, Ministry of Health: Report on the war damage until January 3, 1992. Letter sent to the Ministry of Information on January 10, 1992. (No. 534-02-07-91-0003, in Croatian).

4 International Committee of the Red Cross: Basic rules of the Geneva conventions and their additional protocols. Geneva: ICRC, 1983.

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Destruction of the Gospić Medical Center

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Abstract. Destruction of the Gospić Medical Center during the Yugoslav Federal Army (YFA) and Serbian paramilitary forces aggression on Croatia is described and documented by photographs. With respect to the number of artillery and other weapon hits, airplane bombing of the Center, and the vicinity of the YFA barracks (100 m), there is no doubt that the destruction was intentional. The Center was properly marked with Red Cross signs and the conduct of the YFA cannot be excused by any means.

Key words: *Croatia; Geneva Conventions; hospitals; Red Cross; war*

Introduction

First settlement in this part of Croatia (southwestern province of Lika) was mentioned in 1263. The settlement, Kasezi, disappeared during Turkish assaults. The establishment of an urban settlement falls in 1729, when Lika and Otočac Regiments, organized to fight advancing Turkish conquerors, were stationed in the area. Historic and urban identity of the town, marked mostly by Baroque sacral architecture, developed during the following centuries. The region is best known for the Plitvice Lakes National Park which is under UNESCO protection.

The first medical institution in Gospić was built in 1857. The Department of Surgery was added in 1934. Citizen donations provided the means for the building of the Outpatient Department in 1985. The Medical Center in Gospić served as the central medical institution for the Lika region. It provided both primary and secondary medical care, having stationary and outpatient services for internal medicine, surgery, gynecology and pediatrics, with X-ray and biochemistry diagnostics, pathology, blood transfusion, toxicology and epidemiology services. Regional medical offices in Kosinj, Aleksinac, Karlobag, Lički Osik, Medak and Perušić were under the supervision of the Gospić Medical Center.

At the beginning of 1991, the Center had 4,095 m^2 of useful space, 212 beds and 310 employees, 56 of whom were physicians. Ruthless attacks of the Yugoslav Federal Army (YFA) and Chetniks (Serbian paramilitary forces), have reduced the Center capacity to 60 beds. Only 105 employees remained working in highly inadequate conditions, while the rest of the personnel (mostly of Serbian nationality) left the hospital when the attacks began.

Attacks and Destruction

Since August 28, 1991, the YFA has periodically attacked the town by mortars, heavy artillery, and airplanes. On September 17 and 18, airplanes bombarded the town and hit the Center premises. During these two days the Center facilities were also hit by 6 tank grenades, 30 mortar shells and innumerable light weapon bullets from the YFA garrison situated 100 m from the Center.

The Old Building

The facade, the windows and the entrance were completely ruined by mortar shells and light weapon bullets (Figs. 1 and 2). Tank shells pierced the wall on the first and second floor and heavily damaged the kitchen, pharmacy, X-ray diagnostics and the Department of Internal Medicine (Fig. 3).

Figure 1. Facade of the old building, damaged by bullets and pierced by artillery shells.

Figure 2. Shell-pierced entrance of the hospital

Figure 3. Damage done by a direct artillery hit to the inside of the building. Medical personnel had to wear camouflage uniforms. White coats were often deliberate targets of the enemy.

Figure 4. Tank shell-pierced roof of the old building.

Figure 5. Damaged facade and the roof of the new Outpatient Building.

A direct hit from the neighboring YFA garrison destroyed one of the three new operating theaters. A tank grenade destroyed the roof of the building (Fig. 4).

The New Outpatient Clinics

Two mortar shells hit the south side of the Department for Physical Therapy. Artillery shells damaged the interior of the building, completely destroying the Preschool and School Pediatric Wards and seriously damaging the Department of Pathology, storage rooms and the central heating system (Fig. 5).

Two ambulances caught fire, one was completely destroyed and one damaged. On September 9, 1991, one ambulance driver was wounded (T.D., aged 34). From July 2, to November 20, 424 wounded persons were treated at the Center, 144 civilians and 5 YFA soldiers among them. About 25% of the treated had severe injuries, but only one died after admission. During the attacks, nobody was wounded inside the hospital.

Discussion

Human life is protected by a number of international declarations and rules, especially in war time. The International Committee of the Red Cross clearly demands that the buildings and vehicles with the Red Cross sign be spared during war operations (1,2). The sign is well known in this region and every civilian and YFA medical building or ambulance is marked with it. In the Center, which is only about 100 m away from the YFA garrison, there were no armed Croatian soldiers. These facts exclude any possibility of accidental destruction or error. It should be emphasized that only 4 days before the attack on the Gospić Medical Center, the YFA had attacked and seriously damaged the Osijek General Hospital, the central medical institution of Slavonia and Baranya (3). It is impossible that YFA soldiers and officers were not familiar with the basic, widely publicized and known international conventions and humanitarian rules of conduct in war. Therefore, the YFA conduct must be considered intentional, which makes them guilty of a war crime.

References

1 International Committee of the Red Cross. Basic rules of the Geneva Conventions and their additional protocols. Geneva: ICRC, 1983.

2 International Committee of the Red Cross. Rules for the behavior in combat. Geneva: ICRC, 1985.

3 Glavina K, Tucak A, Janoši K, Karner I, Hanzer J, Pajtler M, et al. Deliberate military destruction of the General Hospital in the city of Osijek. Croat Med J 1992;33(War Suppl 1):61-9.

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Sisak: A Hospital as a War Target

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Abstract. The paper presents the destruction of the Sisak Medical Center by Yugoslav Federal Army and Serbian terrorists. The hospital was attacked on November 3, from the ill-famed Petrinja Army barracks, some 10 km far from it. Hemodialysis Ward was most severely damaged.

Key words: *Croatia; Geneva Conventions; hospitals; Red Cross; war*

Introduction

Sisak has existed for 2000 years. It was first mentioned by Roman writers (e.g. Pliny) as Segestica, an Illyrian fortress on the right bank of the Kupa river. The settlement was devastated and seized by Octavius in 35 B.C. and from that time on it was known as Siscia. As a Roman town, Siscia bloomed with prosperity from the 2nd to the 5th century A.D. It had waterworks, sewage system, thermae and, like other cities of the Roman Empire, a well developed medical and apothecary practice, which is evidenced by a collection of some 600 pieces of medical instruments, kept in the Museum of Archeology in Zagreb. After the medieval darkness, Sisak re-entered the history toward the end of the 16th century, when its fortress stopped the Turks' penetration to Central Europe. Thus, in 1710, the first military *cordon sanitaire* in Europe was established there in order to prevent the spread of contagious diseases from the Ottoman Empire to the Central European countries.

In 1806, the first inpatient clinic with 26 beds was established, which is considered the actual beginning of the organized public health service in Sisak.

At present, the Sisak Medical Center has 1,500 employees, 200 of them physicians. The hospital has 620 beds, i.e. 7.23 beds per 1,000 inhabitants. The hospital offers medical care to the community of Sisak which, according to the 1991 Census, has 84,247 citizens. In addition, the hospital provides Banija, the community of Kutina, and parts of the communities of Novska, Bosanski Novi and Bosanska Dubica, with specialist and inpatient services. In total, some 200,000 people gravitate to the Center.

Facts

In Banija, the Serbian rebellion officially started on June 26, 1991, with the attack on the Glina Police Station. Among health institutions, general practice offices in Sunja and Komarevo were destroyed first, whereas a general practice office near the Sisak hospital was shelled on two occasions. The hospital was attacked on November 3, from the ill-famed Petrinja barracks, some 10 km far from it. After Petrinja was occupied by the Yugoslav Federal Army (YFA) forces and Serbian extremists, this area has continuously been used to attack Sisak. The Petrinja barracks is one of the best equipped in this military region.

Six grenades that hit the hospital damaged the Center for Hemodialysis, Outpatient Ophthalmologic Clinic, roof of the Department of Gynecology, the entrance booth, the hospital fence and the vicinity of the Departments of Internal Medicine and of Infectious Diseases.

Hemodialysis was most heavily damaged, being hit directly (Figs. 1-4); Ophthalmology was completely destroyed (Fig. 5), whereas the grenade which hit Gynecology pierced the roof but

Figure 1. Hemodialysis Center hit by a heavy artillery granade.

Figure 2. Corridor in the Hemodialysis Center.

did not explode. On the Departments of Internal Medicine and of Infectious Diseases, all windows were broken, and the walls and cars parked in front of the building were damaged. None of the patients and staff members was injured, partially owing to previous dislocation to lower floors. Sisak was shelled from both mortars and guns.

Discussion

Unfortunately, in this dirty war everything is possible. Even hospitals become intentional war targets. The conventions that should be respected by professional soldiers were put aside by Yugoslav Federal Army.

Figure 3. Storage room, Hemodialysis Center.

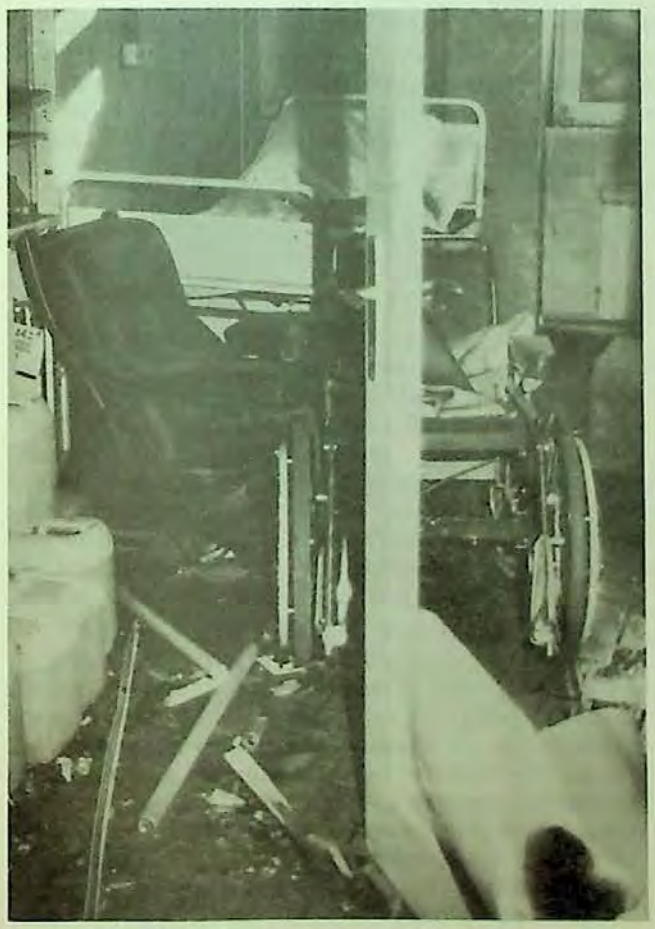

Figure 4. Isolation room, Hemodialysis Center.

There arises a question: What is the moral of the people who order and/or shell the hospital in which some of them or their children were born. How can they shoot at medical personnel who have offered medical care and help to them as well? Thus, if their professional ethics has failed, where is their human conscience? Even if war is considered as a bare and sometimes unaviodable fact of man's history, or a pathological state of low instincts aroused, it is hard to grasp all the bestiality of the war against Croatia. What is it that releases this archaic energy in man, this urge to massacre, to shoot at those helpless and ill, what a "trigger" lets the demon out, suppresses the seeds of God in man and renders him a criminal?

Many civilians, victims of this irrational war, as well as many wounded, soldiers of both armies, were admitted to the Sisak hospital. Till November 26, 1991, 957 wounded, 10 of them belonging to the YFA, were treated there and 150 dead bodies were examined at the dissecting rooms. This is not the final number of casualties admitted at the Sisak hospital since the war is still going on and many persons are recorded as missing.

Conclusion

The YFA and those like-minded shell health institutions, thereby not only disregarding numerous cease-fire treaties but also violating all respective international conventions. As long as the only communication is that over a gun-sight, we can hardly expect peace in Banija. This war is cruel, dishonorable, long and very real. Priests console their church-fold in demolished churches that obviously nothing, including the freedom of the

Figure 5. Damaged Outpatient Ophthalmologic Clinic.

homeland, is born without pain. Our homeland is devastated. Even hospitals have become intentional targets of the aggressor.

Acknowledgement

We thank Mr. A. Duračić for providing the photographs of the damaged Hospital.

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Destruction of the Karlovac Medical Center during War against Croatia

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Abstract. Main features of the Karlovac Medical Center and Hospital on Švarča are presented. The first incident of shooting in the area of Karlovac was recorded on September 18, 1991. During the aggression on Croatia, total numbers of wounded and killed recorded at the Karlovac medical Center, are 830 and 176. Intentional destruction of the Karlovac Medical Center premises from October 7 until December 31, 1991 are briefly described.

Key words: *Croatia; Geneva Conventions; hospitals; Red Cross; war*

Introduction

The Karlovac General Hospital was built in 1846. In 1883, a story was added to the Hospital located on Dubovac. During the past 25 years, a new hospital was built on Švarča, a plateau overlooking the city of Karlovac. The Hospital on Švarča consists of two buildings, a smaller one with neuropsychiatry and pulmology, and a larger one with outpatient and inpatient departments. At the beginning of 1991, the Karlovac Medical Center had 612 beds and 1515 employees.

During World Wars I and II, the Hospital premises were spared of all attacks and devastations. This war has, however, left ineffaceable scars and wounds all over the Hospital premises. On numerous occasions, damage to the Hospital buildings was presented to the whole world *via* TV and newspapers. The extent of destruction was directly witnessed by many journalists, members of European Community Monitoring Missions, members of parliaments, church dignitaries and other distinguished persons visiting Karlovac.

The Karlovac battlefield is the closest one to Zagreb, the capital of Croatia. It is about 50 km long, stretching along the banks of the Kupa and Korana rivers.

Victims of the War

First war casualties arrived in the Karlovac Medical Center on Easter 1991, during the first battles on the Plitvice Lakes. The Karlovac Medical Center teams provided the first medical aid, and some of the wounded were hospitalized at the Center.

In 1991, the total number of wounded treated at the Center was 830: 532 Croatian National Guard (CNG) members, 172 civilians, 75 policemen, 24 Civilian Defense (CD) members, 4 Yugoslav Federal Army (YFA) soldiers, 18 Serbian terrorists and 5 foreigners. In total, 148 dead bodies were admitted to the Center's Department of Pathology, and 28 wounded persons died during hospitalization. Dr. B.B., a physician from Zagreb, was also among them.

The patients, medical staff and equipment were timely evacuated to the Hospital ground floor and basement. None of the hospitalized patients or staff was wounded during attacks on the Medical Center premises. However, one worker was killed by a shell while going home from the Center. The number of the Center staff members was affected by the war: during 1991, 449 employees left the Karlovac Medical Center.

Figure 1. Hospital on Švarča. The front of the building damaged by a shell.

Figure 2. A doctor's office.

Chronology of Destruction of the Karlovac Medical Center

In Karlovac, the first instance of shooting was recorded on September 18. Deliberate war devastation of the hospital occurred as follows:

October 7, 1991: The first shell hit the parking lot in front of the main entrance of the Hospital on Švarča, broke the windows and damaged two cars parked there.

October 16, 1991: The Hospital on Švarča was first hit directly: three mortar shells hit the front of the building, the roof of the Department of Obstetrics and the Library.

October 23, 1991: The Department of Pediatrics was hit by a shell. Window frames and the

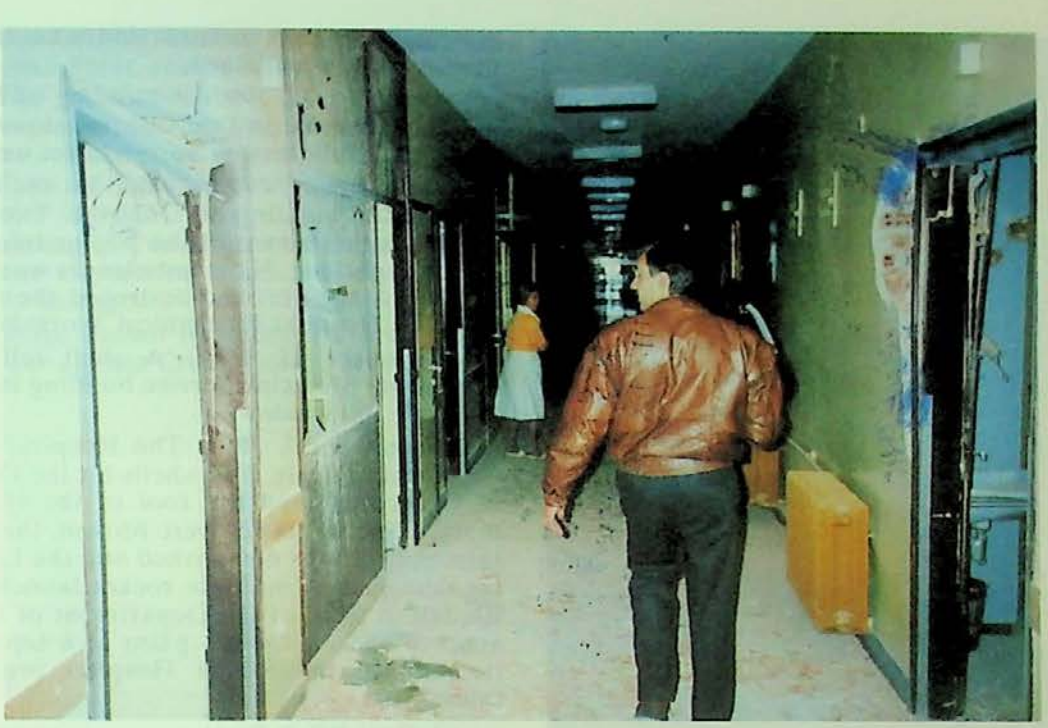

Figure 3. A corridor at the Department of Surgery.

Figure 4. Department of Pulmology.

staircase were damaged, and many window glasses broken.

November 4, 1991: Six shells hit the Hospital on Švarča: the fourth, fifth, sixth and seventh floors, and the Department of Neuropsychiatry. The attack left extensive damage to the windows, walls, doors, staircase and instruments for sterilization.

November 7, 1991: Two shells fell into the park behind the former Department of Pediatrics of the Hospital on Dubovac.

November 8, 1991: Window glasses were broken by a shell fallen near the fence of the Hospital on Švarča.

November 23, 1991: A shell hit the Department of Pulmology. Window frames, window

Figure 5. Front of the Department of Gynecology.

glasses, many glass surfaces, doors, ceilings and radiators were demolished.

December 12, 1991: A building of Emergency Medicine Service in the Karlovac downtown, was hit by shell splinters. Window glasses were broken.

December 21, 1991: A shell hit the roof of the old hospital building on Dubovac. Two shells exploded in the crowns of the poplar-trees near the Hospital parking. Nine ambulances were damaged thereby. A shell hit and destroyed the roof of the Dubovac Hospital Mechanical Workshop.

December 25, 1991: A shell fell near the Emergency Medicine Service building in Karlovac, breaking the windows.

December 27, 1991: The Hospital on Švarča was attacked again. Two shells hit the Department of Gynecology and the roof of the Hospital Library. Window glasses were broken, the air-conditioning plant was demolished and the Library ceiling damaged. A multiple rocket launcher projectile fell in front of the Department of Gynecolgy, another one hit the gas plant at a separate location within the Švarča Hospital premises and caused fire.

A shell fell in front of the Dubovac Hospital. All window glasses on a three-story building looking on the street were broken. The roof of the Dubovac Hospital wash-room was hit by a shell. The roof was demolished, and three washing machines, electric fittings and a dryer were damaged. All window glasses on the building were broken.

December 29, 1991: A shell fell next to the boiler-room of the Švarča Hospital and damaged a part of the heating plant.

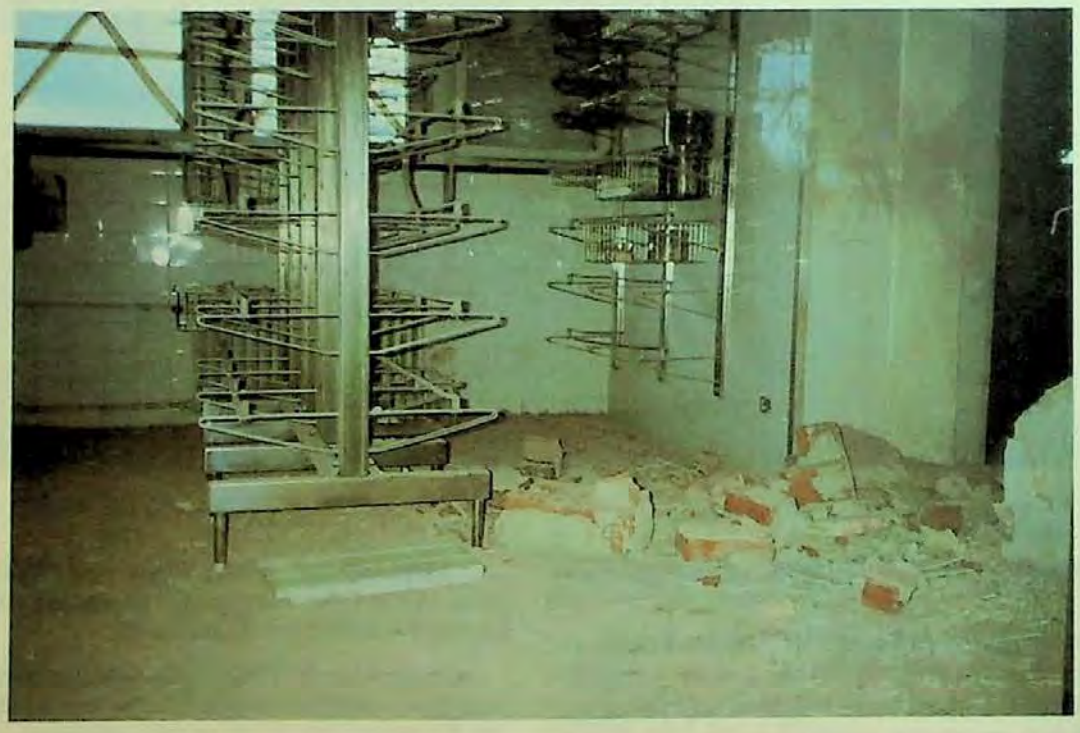

Figure 6. Part of the sterilization room.

December 30, 1991: During a mortar attack on the *Jugoturbina* Plant, the building with a general practice office was demolished.

The suburb of Švarča, Šišljavići and Rečica were daily attacked during several weeks. In these attacks, offices of general medicine and dental medicine were damaged.

The building in Turanj, in which dental medicine and general practice offices are located, was also severely damaged.

All damage caused by deliberate destruction during the war against Croatia have been reported and partially estimated. Some of the damage listed are shown on Figures 1-6. Partial repair measures were taken in all cases where required and possible; full and thorough reconstruction is expected.

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War against Croatia: Medical Care in Zadar

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Abstract. From August 1, 1990, to December 31, 1991, 982 persons were wounded in the attacks of the combined forces of Serbian terrorists and Yugoslav Federal Army (YFA) on Zadar and the surrounding area. The highest number of affected persons (about 90%) were registered in the last four months of 1991. One hundred and eighty-one persons were killed, mostly civilians (about 60%). Most were barbarously killed and massacred (villages Škabrnje, Nadin, Bruška, Zemunik Donji and Jasenice) or killed in air and heavy artillery attacks on civilian targets. Medical institutions in Zadar were also military targets. The forensic medical expertise of five victims illustrates the manner of YFA killing in this war.

Key words: *casualties; Croatia; forensic expertise; hospitals; medical care; war*

Introduction

Zadar is a world-famous old city with numerous monuments from Roman and medieval times. It also has a long and famous medical history starting from the 6th century (559) when the first almshouse *Saint Basil* was founded. During the next 10 centuries, more than 35 almshouses were built. Other important dates in Zadar medical history were the foundation of two Army Hospitals in 1515 and 1611. The second hospital had been working for two centuries. In the beginning of the 19th century, one Army Hospital was transformed into Civil Hospital, and it became the School of Medicine during the Napoleon rule, from 1806 until 1811. The new Cantonian Hospital was built in 1887 at the present location. A school for Midwives was founded in 1821; in 1847, the first ether anesthesia in this part of Europe was used, four months after the first one in Boston. In 1868, the first Medical Association in Croatia was founded. Ten years later, the first Red Cross was organized (1). Nowdays, Zadar Medical Center consists of the Outpatient Clinics and the General Hospital. The Center is providing medical care to 140,000 inhabitants of Zadar and the surrounding area, from the island of Pag to the town of Biograd. This paper deals with the characteristics of regional medical care, destruction of the General Hospital, the incidence of the wounded and killed and the forensic expertise on several deaths.

Patients and Methods

Patients

All the wounded and dead registered by the Medical Corps Headquarters of North Dalmatia from August 1, 1990, until December 31, 1991, were included in this report. The casualties included civilians, Croatian National Guard soldiers, Croatian policemen, as well as YFA and Serbian paramilitary troops soldiers.

Methods

War medical care was organized by the Medical Corps Headquarters of North Dalmatia. Activities such as first aid education, transport of casualties, taking care of wounded persons and the forensic expertise of killed persons were carried out by the Zadar Medical Center, Medical Corps Headquarters of North Dalmatia, Red Cross, Zadar Branch office of the Croatian Medical Association and Community Civilian Protection Organization. The General Hospital has 860 beds and 1,850 employees (287 physicians), and also

Table 1. The incidence of the wounded in Zadar area

Year	1990	1991			
Month	X-XII	I-IV	X-VIII	X-XII	Total
Civilian	10	10	34	215	269
Croatian National Guard	0	0	9	565	574
Police	2	2	17	82	102
Terrorist	1	0	3	32	36
Total	13	12	63	894	982

Table 2. The incidence of the dead in the Zadar area

Year	1990	1991			
Month	X-XII	I-IV	X-VIII	X-XII	Total
Civilian	0	1	4	97	102
Croatian National Guard	0	0	7	48	55
Police	1	0	2	4	7
Terrorist	0	1	4	12	17
Total	1	2	17	161	181

provides medical assistance in numerous outpatient medical offices.

Results

Medical Organization

The organization of medical care for war causalities is shown in Fig. 1. The primary medical facilities consist of four different teams which act independently at or near the battlefront. Surgical teams and medical ambulances are equipped for a higher level of assistance (e.g. simple operations, primary wound care, shock therapy, etc). The final care is given in the hospital. All primary medical facilities transport the casualties to secondary institutions except the emergency teams, which are directly connected to the hospital.

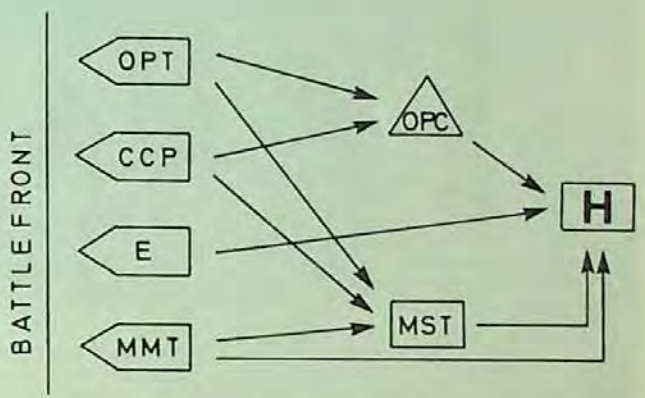

Figure 1. Medical organization in Zadar area during the war. OPT - outpatient team, CCP - community civilian protection, E - emergency, MMT - mobile medical team, OPC - outpatient clinic, MST - mobile surgical team, H - hospital.

Hospital as Military Target

Four intense air and heavy artillery attacks on Zadar were launched by the Yugoslav Federal Army (YFA). In three of them, the Hospital and Outpatient Clinics were hit by more than 100 rounds of artillery fire. One shell hit the new building of the Pediatric Ward (Fig. 2). The ground floor (Fig. 3), central corridor, catering service and three rooms on the first floor (Fig. 4) were damaged. A direct hit left a crater on the facade of the Infectology Ward building (Fig. 5). Several patient rooms were also damaged (Fig. 6). Parts of the Gynecology, Pulmology, Central Hospital Kitchen, Laboratory for Neurophysiology (restored two years ago) were also damaged. Seven Outpatient Medical Offices in Zadar area were completely or partially ruined. During the first attack, all important hospital facilities (Operation Theatres, Intensive Care Unit, Radiology Ward and Laboratory Unit) were displaced into the anti-atom bomb shelter located in the basement of the new Pediatric Ward building. Two hundred triple-deck hospital beds were improvized (Fig. 7).

The Victims

Tables 1 and 2 and Figures 8 and 9 summarize the frequency of the wounded and dead persons registered by the Medical Corps Headquarters of North Dalmatia during the 16 months of the war in the Zadar area. More than 90% of the casualties were recorded in the last four months of 1991. Croatian National Guard soldiers constituted 60%, and civilians 30% of all the causalities. One hundred and eighty-one dead were documented. Most of them were civilians. Thirty eight percent of the total civilian casualties were killed, compared to less than 10% dead among Croatian forces casualties (chi square = 72.45, $P < 0.00001$) (Fig. 9).

Several forensic cases are presented to illustrate the brutality of the aggressor.

DECEDENT: K.I., male, aged 39.

Autopsy Code: 58/91;

Occupation: worker.

Comment: The victim was kidnapped on July 21, 1991 and murdered a day later by a member of illegal Serbian police from Knin. The autopsy was performed on July 24, 1991.

External examination: Large skin hematomas and excoriations of the face, forehead, neck, trunk, both arms, left leg and scrotum are found (Fig. 10).

Internal Examination: Large suffusions of skin and muscles, scrotum and testes in the above-described areas are found. A diffuse meningeal bleeding is found. The sternum is broken, and there are multiple fractures of the ribs, from 2nd to 10th rib in the medioclavicular line, on both sides of the chest. Examination of the back reveals serial fractures of 7-10th left ribs and 7th and 10th right rib. The intercostal vessels are ruptured. The

Figure 2. Artillery shell landed on the north facade of the Pediatric Ward.

signs of bleeding are also found in pericardium. Both pleural cavities are filled with blood. Lung conquassation is found. Two longitudinal ruptures of liver, measuring 11 cm and 12 cm are found. In peritoneal cavity, 400 ml of blood is found. Parts of the small and large intestine, and mesenterium are contused and suffused with blood.

Pathoanathomical Diagnoses:

Bruises of the head, neck, trunk, arms, left shank, scrotum, testes and penis
Haematomata cutis, subcutis and musculorum capitis, colli, thoracis, abdominis, dorsi, extremitatum superiorum, cruris sinistri, scroti, testis utriusque et penis

Skin excoriations of the forehead, elbows, left forearm and shank, right fist and back
Excoriationes cutis frontis, cubiti utriusque, antebrachii et cruris sinistri, manus dextrae et dorsi corporis

Diffuse subarachnoidal bleeding
Haemorrhagia subarachnoidalis diffusa

Fracture of the sternum and the right (II-X) and left (II-XI) ribs
Fractura sterni et costae II-X dextrae et costae II-XI sinistrae

Contusion of the lung
Contusio pulmonum

Rupture of intercostal vessels of both sides of the chest
Ruptura vasorum intercostalium thoracis lateris utriusque

Hemorrhage into the left (500 ml) and right (300 ml) pleural cavity
Haematothorax sinister 500 ml et dexter 300 ml

Contusions of the small and large intestine, mesenterium and mesocolon
Contusio intestini tenuis et crassi, mesenterii et mesacolonis

Ruptures of the liver
Rupturae hepatis

Bleeding in the peritoneal cavity 400 ml
Haematoperitoneum 400 ml

Edema of the lung and brain
Oedema pulmonum et cerebri

Cause of Death:

Traumatic and hemorrhagic shock
Shock traumaticum and hemorrhagicum

Opinion: The external examination revealed that all the injuries were inflicted by blunt mechanical force. Hematomas, skin, subcutaneous tissue and muscle abrasions, contusions of the abdominal organs and genitalia, as well as rib fractures were the consequence of beating with a blunt object or foot. Broken sternum and serial rib fractures on both sides with consecutive ruptures of the intercostal blood vessels, hemorrhage into the thorax and lung contusion, as well as the rupture of the liver with hemorrhage into the abdominal cavity, may have been caused by intensive mechanical force, such as jumping on the victim's chest.

DECEDENT: E.V., male, aged 40.

Autopsy Code: 36/91;

Occupation: truck-driver.

Comment: The victim was killed from an ambush by illegal Serbian policemen from Knin on

Figure 3. Ruined ground floor of the Pediatric Ward.

Figure 4. Damaged outer wall of the Pediatric Ward room on the first floor.

May 23, 1991, while driving his truck. The autopsy was performed a day later.

External Examination: Stellate entrance gunshot wound measuring 7:4 cm is found in the left occipital region (Fig. 12), caused by a dum-dum bullet. The exit gunshot wound measuring 2 cm is found in the right temporal region (Fig. 13). Squashed brain tissue is protruding from the wound opening. The radiography of the skull revealed numerous metallic parts of a dum-dum bullet jacket, measuring 1 to 7 mm in diameter (Fig. 14).

Internal Examination: Numerous fractures at the skull base and vault and upper jaw are found. Two bone defects are found, one on the right larger wing of the sphenoidal bone measuring 2 cm in diameter, and the other in the left part of the occipital bone measuring 4 cm in diameter. The disruption of meningeal dura in the same regions are also found. Basal parts of both brain hemispheres are squashed. Basal ganglia, mesencephalon, pons, cerebellum and medulla oblongata are squashed. Several particles of a bullet jacket are found in the squashed brain tissue.

Pathoanathomical Diagnoses:

Gunshot wound of the head
Vulnus sclopetarium capitis

Multiple fractures of the cranial vault and base and upper jaw
Fracturae multiplices calvariae et basis cranii et maxillae

Conquasation of the cerebrum, cerebellum, pons and medulla oblongata
Conquassatio cerebri, pontis, cerebelli et medullae oblongatae

Metal foreign bodies in the brain and skin of the neck
Corpora alienia metallica cerebri et subcutis colli

Cause of death:

Conquassation of cerebrum, cerebellum, pons and medulla oblongata
Conquassatio cerebri, pontis, cerebelli et medullae oblongatae

Opinion: The gunshot wound of the head was probably caused by a fragmenting (dum-dum) bullet. The entrance gunshot wound was found in the left occipital region encircled by several small wounds penetrating the subcutaneous tissue with numerous fragmented pieces of a bullet. The head injury was inflicted by multiple fragments of a bullet. Numerous fragments of the bullet were found in the skull and brain.

DECEDENT: V.V., male, aged 30.

Autopsy Code: 110/91

Occupation: ambulance driver.

Figure 5. A crater on the facade of the Infectology Ward building.

Figure 6. The ruined beds in a room of the Infectology Ward.

Comment: The victim was killed by direct artillery shot while driving an ambulance on October 6, 1991. The autopsy was performed on October 7, 1991.

External and Internal Examination: A large defect of the skin and muscles is found on the head. The defect starts from the upper lip, continues through the nose and forehead and finishes at the top of the head. The calvaria and brain tissue are missing. Multiple fractures of the bones of the skull vault and base are found. A longitudinal laceration of the skin over the left cheek is found. The left ear is missing. This defect continues

Figure 7. Improvised triple-deck hospital beds.

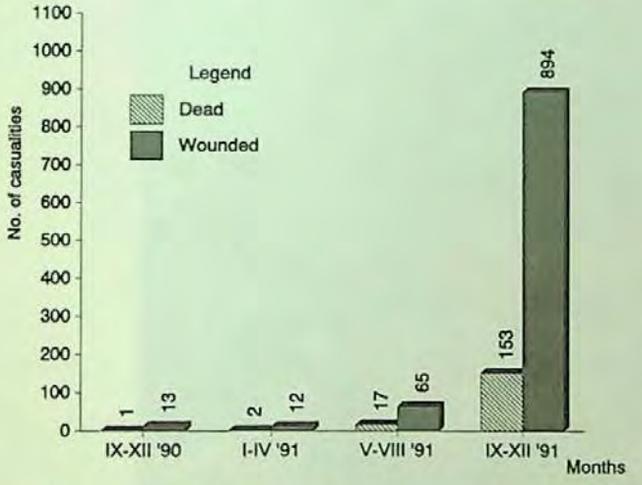

Figure 8. Incidence of the wounded and dead in the Zadar area according to the Medical Corps Headquarters of the North Dalmatia.

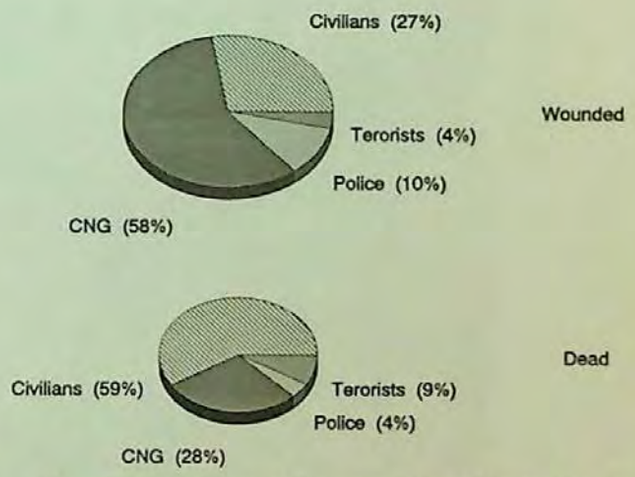

Figure 9. Distribution of the wounded and the dead in the Zadar area according to the Medical Corps Headquarters of the North Dalmatia. (CNG - Croatian National Guard; Police - Croatian Police, Terrorist - Yugoslav Federal Army and Serbian paramilitary troops.)

through left part of the neck, chest and upper arm (Fig. 15). Multiple fractures of the left ribs, left clavicle and left scapulae are also found. Left hemithorax is completely open, with the disruption of left lung, pericard and aorta, and signs of bleeding into the thoracic cavity. Both lungs are squashed. The third cervical vertebra is broken and the conquassation of spinal cord is documented. Numerous skin defects of both ferearms, left forearm, left fist, left knee and the right shank, as well as the excoriations of both thighs are found.

Pathoanathomical Diagnoses:

Explosive wounds of the head, neck, chest and limbs
Vulnera explosiva capitis, colli, thoracis et extremitatum omnium

Destruction of the brain
Destructio cerebri

Multiple open fractures of the skull, cervical vertebra, left ribs, left clavicle and left scapulae

Figure 10. Decedent K.I., male, aged 39. Skin hematomas and excoriations of the trunk, left arm, left leg and scrotum.

Figure 11. Decedent K.I., male, aged 39. Numerous bruises of the trunk with the signs of putrefaction process.

Fracture multiplices complicatae ossium capitis omnium, columnae vertebralis cervicalis, costarum sinistrarum, claviculae et scapulae sinistrae

Lacerocontusions of the head, neck, chest and limbs

Vulnera lacerocontusa capitis, colli, thoracis et extremitatum omnium

Contusion of the lung
Contusio pulmonum

Lacerations of the lung, pericard, heart, thoracal aorta

Figure 12. Decedent E.V., male, aged 40. Stellate entrance gunshot wound of the right temporal region.

Figure 13. Decedent E.V. Exit gunshot wound of the left occipital region.

Vulnera lacerata pulmonum, pericardii, cordis et aortae thoracalis

Hemorrhage into the left thoracic cavity
Haematothorax sinister

Cause of Death:

Injuries of the head, neck and chest

Laesiones graves capitis, colli et thoracis

Opinion: Multiple severe injuries with the destruction of one part of the head, neck and thorax were inflicted by a tank grenade.

DECEDENT: D.N., male, aged 28.

Autopsy Code: 88/91;

Figure 14. Decedent E.V. Radiography of the skull reveals numerous metal parts of a dum-dum bullet jacket.

Occupation: Croatian National Guard member.

Comment: The decedent was killed on a battlefront on September 28, 1991. The autopsy was performed two days later on September 30, 1991.

External and Internal Examination: Stellate entrance gunshot wound, measuring 4:3 cm is found in the left temporal region (Fig. 16). A large laceration of the left forehead, left parietal and temple region with a defect of the skull vault, measuring 16:4 cm, are also found. The cerebrum and pons are squashed and squeezed out from the skull. Multiple fractures of the rest of skull vault and base are also found. On the inner side of the right parietal bone, small pieces of lead-core and jacket of a dum-dum bullet are found.

Several wounds on the front of the trunk caused by particles of the bullet jacket are found. Similar wounds are also found on the right shoulder, right shank, right foot and left forearm. Fracture of the left forearm is also found. Two entrance wounds are found on the left side of the abdominal wall. The exit wounds are found on the right side, with a part of peritoneum protruding from the wound opening. Numerous skin excoriations of the face, chest and abdomen are also found. A laceration of the small intestine is found.

Pathoanathomical Diagnoses:

Gunshot wounds of the head, chest, abdomen, left forearm and right shank and foot
Vulnera sclopetaria capitis, thoracis, abdominis, brachii sinistri, cruris et pedis dextri

Multiple open fractures of the calvaria and skull base
Fracturae multiplices complicatae calvariae et basis cranii

Conquassation of the cerebrum and pons
Conquassatio cerebri et pontis

Open fracture of the left humerus
Fractura complicata humeri sinistri

Laceration of the small intestine
Rupturae intestini tenuis

Cause of Death:

Conquassation of the cerebrum and pons
Conquassatio cerebri et pontis

Opinion: The gunshot wound of the head was caused by a fragmenting bullet shot from long range. The injuries on other locations were probably caused by fragments of a bullet exploded near the decedent.

DECEDENT: M.R., male, aged 30.

Autopsy Code: 136/91;

Occupation: Croatian National Guard member.

Comment: The victim was killed on a battlefront by a direct hit from a tank gun on October 7, 1991. The autopsy was performed in October 10, 1991.

External and Internal Examination: The putrefaction process is advanced, particularly on the skin and internal organs. The skin is covered with numerous maggots (Fig. 17).

The front part of head, neck, chest and right leg are missing and disrupted (Fig. 17). Multiple fractures of the arms and legs are found. The liver and parts of the small and large bowel are squashed.

Pathoanathomical Diagnoses:

Explosive wounds of the body
Vulnera explosiva corporis totius

Total destruction of the head, neck, chest and right leg
Destructio totalis capitis, colli, thoracis et extremitati inferioris dextrae

Open fractures of both humeri
Fracturae complicatae humeri utriusque

Laceration and contusion of the arms and legs
Vulnera lacerocontusa extremitatum omnium

Contusions and disruptions of the liver, small and large intestine
Contusiones et rupturae hepatis, intestini tenuis et crassi

Putrefaction of the body
Stadium putrefaction

Cause of death:

Explosive destruction of the head, neck and chest
Destructio explosiva totalis capitis, colli et thoracis

Opinion: The destruction of the head, neck, chest and the right leg were inflicted by direct hit of a tank grenade.

Figure 15. Decedent V.V., male, aged 30. Complete destruction of the left part of the head, neck, chest and arm.

Figure 16. Decedent D.N., male, aged 28. Stellate entrance gunshot wound in the left temple (arrow). Squashed brain squeezed out through the defect of the skull.

Discussion

The organization of the local medical care in Zadar was adequate to the situation, especially in view of the fact that the medical institutions were military targets. Beside Zadar, this is also true for many other cities of Croatia such as Osijek, Sisak, Karlovac, Gospić and especially Vukovar and Vinkovci (2,3). This supports the concept that the hospitals had to be moved to safer locations during the war.

The highest incidence of wounded and killed persons (about 90%) were registered in the last

Figure 17. Decedent M.R., male, aged 30. Numerous maggots cover the body. The front part of the head, neck chest and right leg are missing. There is an extensive putrefaction process of the body.

four months of 1991, during the most intensive attacks by the YFA and Serbian terrorists on Zadar. More than half were Croatian army soldiers and about 30% civilians. On the other hand, among the killed, more than a half were civilians and about one third military persons. A high number of dead civilians is the consequence of extreme brutality of the aggressor. Civilians were executed in several massacres in villages near Zadar (51 victims in Škabrnje and Nadin, 11 in Bruška, 4 in Zemunik Donji, 1 in Zaton Obrovački and 5 in Jasenice). Civilians in Zadar were mostly killed in the beginning of an alarm, on their way to a shelter. This underlines the importance of strict respect of the rules during an alarm.

The five forensic cases illustrate the types and modes of killing in this war. Beside the "typical" war wounds, such as gunshots and artillery fired shots, other brutal killings were recorded. One of the victims was killed by a dumdum bullet which squashed the brain. Skull radiographs illustrated numerous bullet fragments inside the skull. Another victim (decedent K.I.) was tortured and killed by a mechanic force. The fifth case also illustrates the aggressor's carelessness and senseless brutality towards the dead. Many of them were left in the fields so that a putrefaction process of the body was well advanced before they were found. This made the identification of the victims very difficult.

Conclusions

During a 16-month-period of aggression on Zadar, 982 persons were wounded and 181 were killed. Most of them were Croatian National Guard soldiers and civilians. A large number of killed civilians indicates the brutality of the aggressors, namely the Yugoslav Federal Army and Serbian paramilitary troops. Many of the civilians were executed in numerous massacres or killed during attacks on civilian areas of the city of Zadar. Medical institutions were also a primary military targets.

References

1 Jelić R. From hospital St Basil to liberation of Zadar (559-1944). In: Dujella J, et al, editors. Hundredth Anniversary of Cantonian Hospital in Zadar. Zadar: Medical Center Zadar, Čakovec: Zrinski, 1987:11-30.

2 Glavina K, Tucak A, Janoši K, Karner I, Hanzer J, Pajtler M, et al. Deliberate military destruction of the General Hospital in the city of Osijek. Croat Med J 1992;33(War Suppl 1):61-9.

3 Gale RP, Labar B. Croatia: Civilian hospitals as military targets. Lancet 1992;339:48.

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Disregard of the Red Cross Sign

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Abstract. The objective of the study was to find out if the Geneva Conventions were respected in the Slavonia region in regard to the Red Cross sign on the medical vehicles transporting wounded Croatian soldiers.The research conducted in three war months, from September to November 1991, resulted in facts given herein. In that period 31 medical vehicles were slightly or severely damaged or completely destroyed. The preponderance of damage were caused by grenade explosions.

Key words: *ambulances; Croatia; Geneva Conventions; Red Cross; war*

Introduction

In accordance with the regulations of the Geneva Convention of August 12, 1949, all medical vehicles used by the Croatian army forces are properly marked with Red Cross signs. As determined by the Geneva Convention, special protective measures are to be guaranteed by conflicting parties to all properly marked medical vehicles used in the transport of wounded. Such vehicles should by no means be attacked. Having in mind this regulation, no significant damage on medical vehicles should be expected in the war in Croatia. However, systematic records obtained by detailed inspection of medical vehicles damaged in military activities show that the enemy does not respect this segment of the Geneva Conventions. The list of the damaged medical vehicles in the Slavonia region in these three war months clearly confirms this statement.

Ambulances Damaged in September

1. In the village of Donji Bogićevci, Nova Gradiška community, a medical vehicle of the Golf type was completely destroyed in a grenade explosion.

2. In the village of Nuštar a grenade explosion destroyed a medical Pintzgauer.

3. During the retreat of the Croatian soldiers from the village of Sarvaš, a medical vehicle, Mercedes 250 D, was deliberately damaged by automatic rifle fire.

4. At the end of September, a Renault 1600 IMV, wagon type, which had been sent to aid in Vukovar, was completely destroyed.

5. During fights in the villages of Ostrovo and Gaboš, near Vinkovci, a clearly marked medical vehicle, a TAM 110, was hit by infantry weapons. The body of the car was pierced in several places.

Ambulances Damaged in October

1. While rescuing the wounded from the village of Laslovo, on the way to Ernestinovo, a medical vehicle ran into a barricade and was significantly damaged.

2. In the village of Tenja, a medical Renault ran over a mine and was completely destroyed.

3. In the village of Tenja, a medical vehicle, Ford transit, was hit by a mortar shell.

4. Due to a mortar shell explosion in the vicinity, a medical vehicle had to turn off the road and subsequently crashed.

Figure 1. September 17, 1991: The ambulance riddled with bullets and set on fire on its way to the village of Tenja.

5. A citroen IMW C25 was also destroyed by a mortar shell explosion.

6. In the village of Cernička Šagovina, the community of Nova Gradiška, a medical Land Rover was damaged by grenade shrapnel.

7. A Citroen, wagon type, was damaged by rifle bullets in the village of Mašić, the community of Nova Gradiška, while driving the wounded to the medical center.

8. An ambulance, Dodge type, was damaged by grenade shrapnel in the village of Pivare, the community of Nova Gradiška.

9. A Citroen, wagon type, was destroyed by a grenade in the community of Nova Gradiška.

10. Two more vehicles, Citroen wagon type, were destroyed in this area in the same way.

11. A Renault, wagon type, was damaged by bullets from automatic weapons.

12. Mortar shell shrapnels damaged four ambulances, Dodge type, near Nova Gradiška.

13. A medical Pintzgauer was hit by rifle bullets while driving a wounded soldier from the positios in the village of Poljane near Nova Gradiška.

14. Toward the end of October a medical vehicle of Renault make, which was sent to aid in a convoy for Vukovar, was damaged.

15. During the unsuccessful attempt of rescuing the wounded from the barracks in Vukovar a special medical bus was damaged and subsequently left on the road full of medicines and medical materials.

Ambulances Damaged in November

1. At the beginning of the month, an adapted car, Ford 1600, was destroyed by a grenade in the village of Laslovo.

2. In the same village a medical vehicle, Lada Niva, was damaged under the same circumstances.

3. In the middle of November three medical vehicles were damaged during the air attack on the facilities of Posavina enterprise in Đakovo.

A CX 2000 burned up while another CX 2000 and a Citroen C25, wagon type, were severely damaged.

4. In rescuing the wounded from Vukovar and Sremska Mitrovica three medical vehicles from the convoy were damaged, namely: a Renault 4 was destroyed in an explosion in Bosanska Rača and had to be left there, another Renault 4 was slightly damaged, while a Citroen CX 2200 was damaged severely.

5. During two mortar attacks on our positions in the village of Orljavac, in the community of Slavonska Požega, a TAM 110 Special was severely damaged due to explosion of mortar shells in the vicinity.

Conclusion

The inspection of the medical cars damaged during fights in Slavonija region, clearly proved that the aggressor, the Yugoslav Federal Army Serbian terrorists, ignores the Geneva Conven-

tions which strictly demand that the Red Cross sign and the transport of wounded be respected.

In only three months a great number of medical vehicles, all of them properly marked with the Red Cross sign, were damaged or destroyed. It is obvious that in the war in Croatia the Red Cross sign is an intentional target for our enemies.

Acknowledgement

I wish to express my gratitude to all personnel of Medical Corps Headquarters in Slavonija and Baranya for providing relevant reports and facts necessary for this study.

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Croatian Medical Corps First Echelon: A Front Line Doctor

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Abstract. A front-line battlefield experience of a general practitioner working in the Vinkovci area is described. In as much as the enemy was extremely brutal to captured wounded Croatian fighters, the main strategy was to evacuate the wounded away from the front line as soon as possible. The control of massive bleeding and analgesia was the basis of the first aid under that condition. The major problem was the supply of ambulances, since the enemy intentionally fired at cars with the Red Cross sign.

Key words: *Croatia; first aid; military medicine; wounds and injuries*

Vinkovci

Vinkovci is a beautiful Croatian town in East Slavonia. Before the war there were about 90,000 inhabitants in Vinkovci region, and Vinkovci itself had a population of 45,000. Highly developed agriculture is the main source of income in the region. The land is flat and rich, bringing forth plentiful crops of wheat and corn, and feeding numerous livestock. People are hard-working and peaceful. Eighty-eight percent of the population are Croats, Serbs make about 8%, while the Hungarians are the third most numerous nation in the region. Vinkovci had a Medical Center with 400 beds. Before the war started, I worked as a general practitioner in the Emergency Unit of the Vinkovci Medical Center for nine months. In July 1991, I officialy joined the Croatian National Guard as a field doctor.

The War

The war started with the slaughter of 12 Croatian policemen in Borovo Selo (populated mostly by Serbs). In the middle of July, Vinkovci were first attacked by heavy artillery. Until January 1992, Vinkovci and the surrounding area were under continuous fire. During that period, the Yugoslav Federal Army (YFA) and Serbian terrorists seized one by one many of the surrounding villages, all populated by Croats. Each conquest resulted in many dead and wounded and innumerable attrocities. Then, on October 2, 1991, the road to Vukovar (an improvized pathway through the cornfields) was cut off, and the pressure on Vinkovci somewhat lessened, since the enemy concentrated on seizing Vukovar. Besides, our forces grew stronger, from one Croatian soldier to some 100 YFA and Chetniks ratio, to 1:10 ratio. The aggressor obviously considered this inconvenient for open frontal battles, and used the tactics of constant shelling of the town from a safe distance. We expected a great offensive after the fall of Vukovar, but the enemy turned to Osijek, and Tordinci was the only village in our vicinity that was captured by the YFA.

Organization of the First Echelon

We had little or nothing in the beginning. Every platoon had a medical orderly, and a battalion a physician. We educated soldiers in the first aid and basic battlefield hygiene. All our soldiers and endangered civilians (those living close to Serbian villages) were vaccinated with anti-tetanus vaccine. Each Croatian soldier had bandages for the first dressing and tablets for chlorination of the water. Some soldiers had triangular bandages as well. The orderly had larger quantities of ban-

daging material (including Esmarch bandages), antibiotics, analgetics and antipiretics. Since battlefields were in the cornfields, our vehicles were inadequate, until we obtained Dodge ambulances with four-wheel drive. We lost many ambulances since the enemy intentionally aimed at cars with the Red Cross sign.

I worked in an improvized office, moved all along the front. Most often my ambulance car served as an office or, in better cases, we would use a deserted house. I worked with two drivers, two medical aids and one technician. All of them were brave Croatian soldiers and warm and friendly human beings. We would position ourselves in the area of most fierce fighting or where fierce fights were expected and cruise along the front checking the health of our men. Our duty was also to check all reports on the enemy's use of chemical warfare agents.

The Wounded

In the beggining, when the battlefront was still very long, we would usually come to find the dead or lightly wounded; the seriously wounded would usually be taken to the hospital by someone else - a passing civilian or a fellow soldier. Soon, the front shortened and we often found ourselves in the middle of battles. In such situations we had to take care of all kinds of wounds. Most of the injuries (90%) were explosive ones: the enemy rarely dared to come close to our positions but, well equipped and armed, used heavy artillery from a distance.

I kept records on all medical data on our patients. Figure 1 shows the incidence of wounds in the three major groups of casualties: Croatian National Guard members, civilians and policemen. The number of wounded civilians reached the plateau after the front had stabilized and the attacks on the villages and towns ceased to be unexpected. In addition, most of the civilians left the town, and the remaining learned to protect themselves.

Figure 2 shows the number and ratio of lightly and seriously wounded of the three groups of patients (guardsmen, policemen and civilians). Somewhat lower proportion of the lightly wounded civilians should be ascribed to two possible causes: (a) lightly wounded civilians could report to other doctor's offices and might have skipped our attention, and (b) the explosions of artillery shells are much more dangerous when in contact with hard surface (asfalt, concrete) than with soft surface (soil). Most civilians were wounded in inhabited places, and therefore were more susceptible to severe injuries than the soldiers located in the fields.

Evacuation from the Front Line

The evacuation was always performed under fire. We were loosing the field, and the wounded and dead were usually very far ahead. However, we never left our wounded and dead to the enemy. Often the fellow soldiers would pull out the wounded by crawling ahead of our lines, but we did the same on many occasions. Our duty was to take the wounded to the hospital. The hospital was close, but the fire was heavy. We always tried to control the bleeding and administer some analgetics. Very little could be done in a car, because wagon trails we had to use were horrible and the cars shaked violently. In the beginning we used the stretchers and the Ambu-box, but soon we learned that much of it was not of great help in our condition. Later we carried bandaging material (Esmarch, first dressing bandages, triangular bandages), compresses and analgetics (morphine for i.m. application).

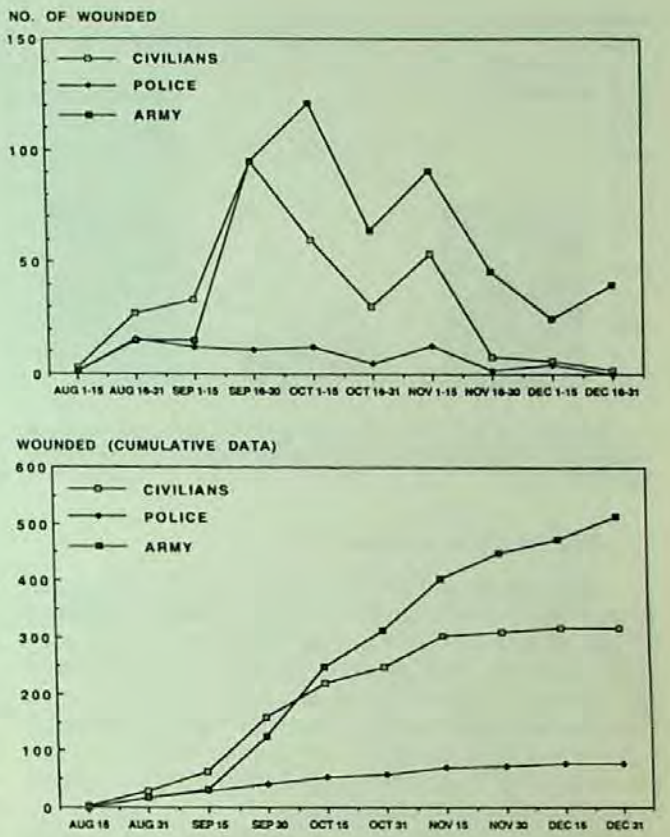

Figure 1. Incidence of wounded among Croatian National Guard members, policemen and civilians in the area of Vinkovci.

We treated the lightly wounded ourselves, often delaying transport to the hospital until the fire ceased, and all the severely wounded were always evacuated (a rough triage).

Our work was also very hard psychologically: we had to drive along the front under fire, without any possibility to use our skill and intelligence to protect ourselves. That was the reason some members of the medical personnel returned to plain guardsmen. I learned not to drive along the roads perpendicular to the front line but by those parallel to it. In the town, most of the wounded we found were in the streets perpendicular to the enemy's position.

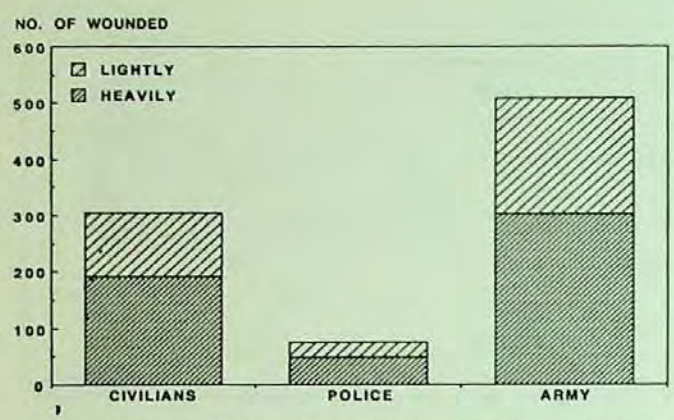

Figure 2. Ratio of heavily and lightly wounded among Croatian National Guard and police forces and civilians in the area of Vinkovci.

Further Evacuation

We organized first convoys of the wounded from Vinkovci to Zagreb (to a medical institution of the fourth echelon). The Medical Center provided vehicles and drivers. For the evacuation of the seriously wounded the decision was made by a hospital anesthesiologist. All the lightly wounded were evacuated in order to reduce the strain on the Vinkovci Hospital which functioned as a third echelon medical institution.

Since the enemy was very close to the hospital (the Chetnik territory in Mirkovci begun some 300 m from the Center and the Chetniks were some 700 m away during the day and 500 m during the night), we organized a retreat field hospital in the village of Mikanovci (also a war hospital of third echelon).

The entrance of the Center was constantly under fire from light and heavy artillery arms. We lost many ambulances but, fortunately, few men since everybody was very cautious.

First Aid

The enemy's conduct towards our men was outrageous, particularly if they were wounded; thus, our first thought was always to take the wounded away, even if it meant an incomplete first aid.

In distinction to the enemy, we never left our wounded to be captured. Whoever was available helped evacuate the wounded from the battlefield. Civilians, doctors, fellow soldiers would help. They would put the wounded in their private cars, on their bicycles, even carry them in their arms. There I learned how great my people is and that we would certainly win this war.

Supplies

There was little of what we needed in Vinkovci when the war began. The supplies came from two sources: we captured them from the enemy and received many donations from abroad. After a month, all the necessary material was regularly obtained by a request to the superior command.

The greatest problem was the supply of cars, because, as already stated, they were intentionally destroyed by the enemy. Five of them were completely destroyed. In emergency, we drove broken down ambulances and civilian cars.

Acknowledgement

Dražen Bliml, Branislav Lukačević, Milan Bičanić, Ivica Dujmić and Slave Kovačević were my close collaborators and friends throughout this war. Our dear Vlado Karlić died on duty. I thank them not only for their help and faithfulness, but even more for their humanity and love for our patients. I also thank Drs. Matko Marušić and Lehel Somogyi for encouragement and help with preparation of this report.

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Battlefield Experience of a Mobile Surgical Team: Anesthesiological Approach

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Abstract. Practical experience of a Mobile Surgical Team (MST) working on battlefields near Đakovo, Ilok, Novska and Samobor is described. Among a great number of the wounded treated, 39 cases of seriously wounded subjects are presented. Some important conclusions on a wartime hospital providing fluid resuscitation and analgesia, relevant to the MST in war situations are documented.

Key words: *analgesia; anesthesiology; fluid resuscitation; mobile surgical team; war hospital; war wounds*

Introduction

The Military Medical Corps of the Republic of Croatia (Croatian Medical Corps, CMC) was established in April 1991, when the Yugoslav Federal Army (YFA) and Serbia openly attacked Croatia which was completely unprepared for the war and without its own army. The CMC services had to be organized in a very short time. Medical personnel was mobilized from civilian hospitals. Medical equipment was taken from hospitals and the Croatian Territorial Defense, which was disarmed one year before the attack on Croatia. Fortunately, most of Mobile Army Surgery Hospitals (MASH) were left. It was very important because YFA and Serbian paramilitary forces soon started a brutal war against Croatia (1-7).

Organization of War Medical Services

A military medical doctrine has been developed by the Croatian Medical Corps Headquarters. Mobile surgical teams (MST) have been formed and sent to the battlefield areas of Croatia. There is an essential difference between the CMC and the YFA doctrines. In the CMC doctrine, MST is very close to the battlefield and frequently on it. YFA first surgical team is located in a division hospital deep in the background. Our results in saving lives of the wounded fully justify our medical doctrine. The position of civil hospitals in Croatia is very important for MST work. They are our fourth echelon (8) and transport of the wounded by car should take less than one hour. Unfortunately, CMC did not have helicopters for transportation of the wounded. High percentage of saved lives (9) is a very important moral factor in our struggle for freedom.

The Work in an MST

An MST has a surgeon, anesthesiologist, theater nurse, anesthetist and a medical technician. Our MST spent about two months on different battlefields. We were in Đakovo, Ilok, Novska and Samobor (Fig. 1). In Đakovo and Samobor we founded war hospitals in medical centers (Figs. 2, and 3). In Ilok, we worked in a small wartime hospital founded in a castle by a previous MST. In Novska, we formed a medical aid station. The reason for this was the existence

Figure 1. Map of Croatia. The places where our MST established war hospitals or first aid stations are indicated.

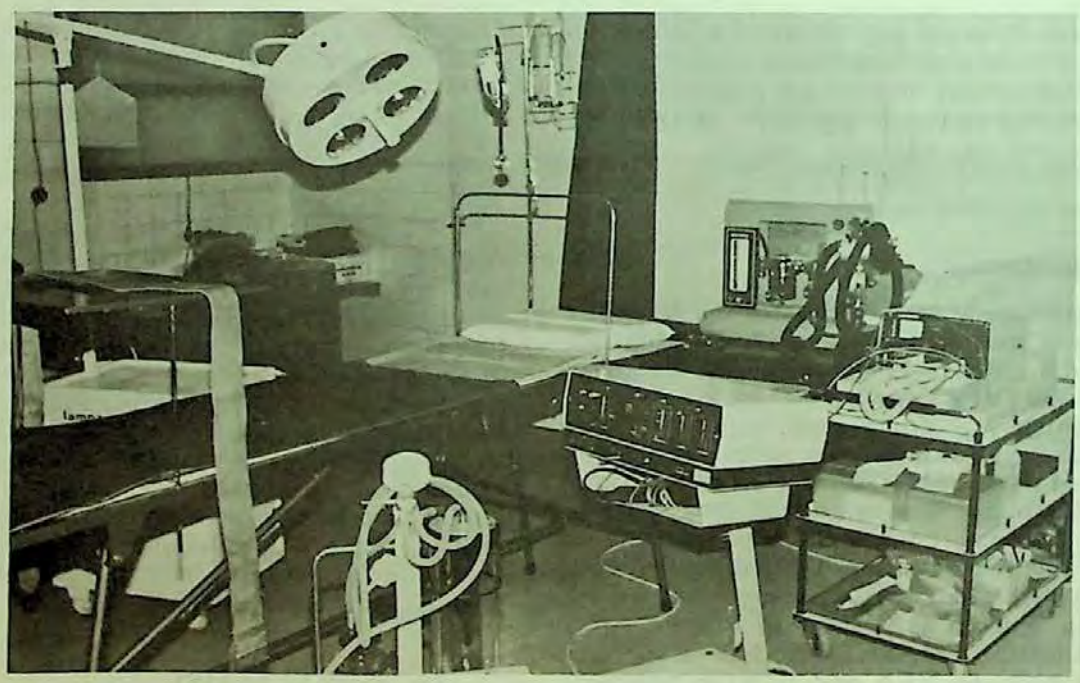

Figure 2. Operating theatre in one of the war hospitals.

of a larger war hospital near Novska, and a free highway to Zagreb (100 km). It is important to emphasize that we were all at liberty to decide how and where to organize our work on the battlefield. As a result, all wounded from the Novska area, treated in our medical aid station are still live.

War Hospitals

A war hospital was first organized in Đakovo. For this purpose, we used the local medical center. In that way we could use the laboratory, X-ray ward, electric generators, and also have adequate space. The repair of two YFA MASH units to full

Figure 3. Surgical beds in the hospital (top and bottom).

working capability took 36 hours. However, if it had been necessary, our wartime hospital could have started working after 12 hours. After the Đakovo experience, we established a war hospital in Samobor, only five hours after the order had been given by CMC Headquarters. Samobor is about 20 km from Zagreb. In our main hospital (The Sisters of Mercy University Hospital, Zagreb) we had already prepared the equipment, surgical sets, drugs and all other medical materials for the first 24 hours. A set of YFA MASH equipment was already in the Samobor Medical Center. We combined the two and formed a war hospital. Its complete installing and basic introduction of the local medical center personnel to the workings of a wartime hospital took about four hours. In Samobor we organized two MSTs. YFA barracks were located in the town. The fighting started one hour after the completion of the hospital.

Medical center personnel have an important role in this war. The organization of any wartime hospital would be almost impossible without them. Their task is to form a number of mobile medical teams, comprising a GP, a nurse and a driver with ambulances or other cars which could be used as ambulances. It must be emphasized that the aggressor deliberately and frequently shot at them although they were properly marked with Red Cross signs.

Medical Material and Drug Supply

Medical material and drugs came from three sources. We used the local medical center supplies, but they were insufficient. Sufficient quantities arrived from CMC Headquarters and our main hospital in Zagreb. When a drug was not at hand, we would receive an adequate substitute.

Anesthetic Equipment

Anesthetic equipment of wartime hospitals contained an anesthetic device *Sutjeska* (Belgrade, Serbia); cardiac monitor-defibrillator; laryngoscope with all size blades (Mackintosh type, 3 sets); endotracheal, nasotracheal and tracheostomy cuffed tubes, all sizes; several Ambu-resuscitators; spinal needles and peridural sets.

Anesthetic devices *Sutjeska* (Fig. 4) previously belonged to the YFA; all its parts were manufactured by Draeger (Draegerwerk, Luebeck, Germany) except for the vaporizers, which were a Penlon OMV Fifty halothane vaporizer and Cyprane Keighley Works ether draw-over vaporizer. The anesthetic device has a connection to one N_2O and two oxygen cylinders. It is very useful, relatively easy to transport and suitable for all kinds of inhalation anesthesia. Four essential reasons against use of the nitrous oxide in disaster anesthesia are listed in the literature (10): (1) supplying it in adequate amounts during disaster situations poses a logistic burden; (2) the remote possibility of human error occurring in connecting lines during assembly must be avoided. Thus, the gas supply system should be as simple as possible; (3) the exclusion of N_2O from a technique allows the use of an oxygen concentrator for providing a low flow of O_2 without the danger of reducing FiO_2; and (4) nitrous oxide characteristically diffuses into pathologic air-containing spaces, which often may be found in the traumatized patient (e.g., pneumothorax). In our situation, several of these reasons did not apply. Firstly, the situation on our battlefields is such that all hospitals, civil and wartime, can be supplied with all materials. The only exception to this is Vukovar. During the work on this article, Vukovar has already been surrounded for nearly three months, with 12,000 civilians, 2,000 of them children under 14, and about 400 wounded in the basement of a destroyed hospital. YFA and Serbian terrorists have made impossible any kind of humanitarian help including medical. For that reason, no medical rule or exceptions from rules could be applied to Vukovar. Secondly, the anesthesiology personnel had enough experience to avoid mistakes in connecting anesthetic systems. Thirdly, in agreement with the local authorities, sufficient amounts of oxygen were insured for the cases of supply disconnection. Only the fourth (medical) reason was justified in our situation (10).

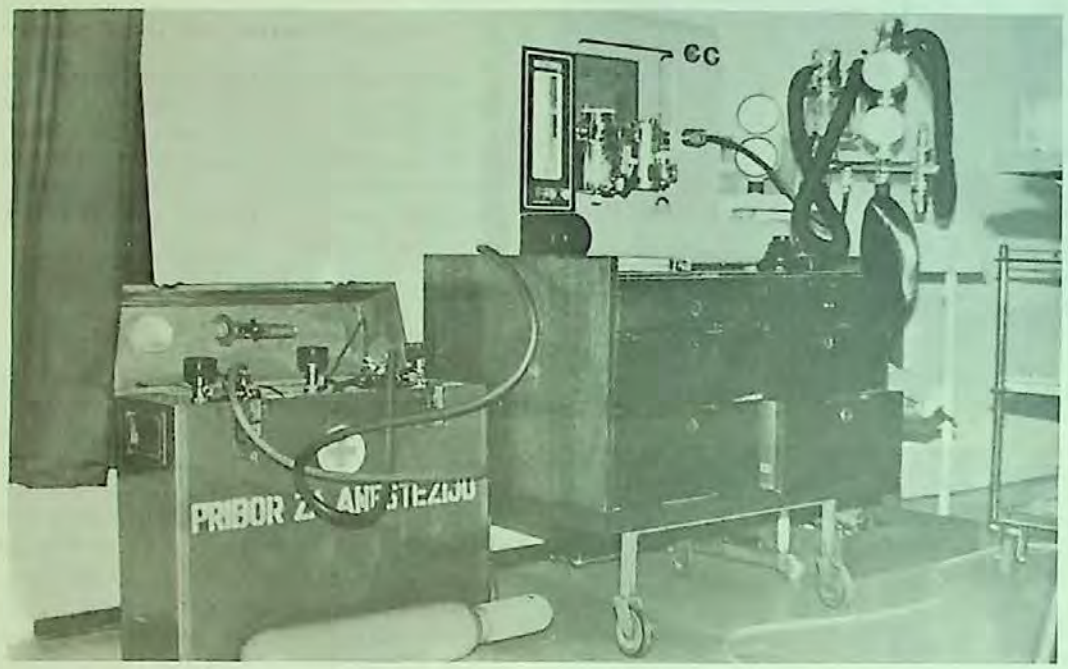

Figure 4. Anesthetic device *Sutjeska*.

Work of a MST

The work of MST units in Novska and Samobor, where we were most busy, is described. For the following reasons, in Novska we decided that our duty would be first aid only: (1) a war hospital with more MSTs was located near Novska and the highway to Zagreb was free; (2) we admitted many wounded at the same time, and if we had started with operations many wounded would have had to wait for too long a period of time.

From the surgical point of view, the first aid included hemostasis of visible bleeding from large vessels, immobilization of injured or fractured extremities, wound dressing, drainage of pneumo- and hematopneumothorax and insertion of nasogastric tubes or urinary catheters. From the anesthesiologic point of view, the patient was resuscitated with fluids, and analgesia and ET-intubation were performed. Shortly, the aims of our procedure were to stop the progression of a shock, to recover the patient and prepare him for the transport to the fourth echelon.

Personnel from the local medical center had prepared the wartime hospital in Novska for a possible attack or siege before we arrived. A part of the medical material and drugs were transferred to the nearby shelters. Other parts of the material and equipment could be quickly transported to these places and the work could start immediately. In Samobor, we had a different situation. The battle was taking place during the night around the YFA barracks. All roads to Zagreb were closed. It was hard to predict the number of possible casualties, because the YFA engaged its air-force (bombs intended for Samobor fell 6 km away, wounding two and killing one civilian). For this reason, we decided to transport the wounded to hospitals in neighboring Slovenia. The hospital in Brežice is 20 km from Samobor and has a general surgery ward. The hospital in Novo Mesto is 60 km from Samobor and has general and special surgery (vascular, traumatology, ENT, etc) wards. We thank the personnel of these hospitals for their help. In case of the cut-off of the roads to Slovenia, we were prepared to start operations in Samobor (Fig. 1).

In Novska, the wounded arrived in large groups (on one occasion, 29 wounded within 1.5 hours). In Samobor, the wounded arrived one by one. The manner of admission determined the manner of work. If they arrived in groups, the diagnosis was established and the operation performed (e.g., drainage of pneumothorax) on the basis of clinical examination only. If the wounded arrived one by one, we had enough time for laboratory and X-ray examination before the operation.

The Wounded

Thirty nine severely wounded treated in Novska and Samobor are described here (37 Croatian guardsmen and two civilians). After the treatment, they were all transported to the fourth echelon.

Mechanisms of Injury

More than 90% of wounds were caused by fragments of explosive devices. Our MST admitted only four patients with gunshot wounds. The group described here had three patients with gunshot wounds. Two were wounded by falling material from a house and a tree.

The age of the wounded was as follows: 34 in the 20-30 age group, two in 31-40, two in 41-50 and one in 51-60 age group.

Wound Types

Inasmuch as most of the wounds were caused by fragments from explosive devices (grenades, mortar shells), they were multiple, often with two and more organs or body systems affected. There were 20 patients with one and 19 patients with multiple organ or body systems wounds. Seven patients had head and neck injuries without brain injury, 9 had upper extremities injuries, 9 thoracic, 5 upper abdominal, 5 pelvic and lower abdominal, 13 lower extremities and 3 external genitalia injuries.

Average Time of Arrival to MST

Most of the wounded were evacuated in the first 1.5 hours after injury (range, 15 min to 4 hours).

Consciousness

Consciousness of the wounded upon the arrival to MST ranged from full consciousness to somnolence.

The Dead

Seven person were already dead upon their arrival from the battlefield, six guardsmen and one civilian. The external examination revealed that three were killed by decapitation (explosion of tank grenade in a trench), two by inner injury due to air blast after the explosion of tank grenade in a trench, one by a shrapnel passing through the trachea and probably the aortic arch (description by his colleagues), and one was found under a collapsed house (eight-month-pregnant women, killed when YFA aircraft bombed civilian targets near Samobor).

Anesthesiological Approach to the Patient

Our goal was to prepare wounded for the transport to the fourth echelon as soon as possible. To avoid mistakes in drug administration (double dose or wrong drug), one nurse was responsible for only one drug. Her duty was to prepare and administer it. Analgetics were administrated by the anesthesiologist or anesthetist. Each patient received tetanus anatoxin (0.5 ml im.), human tetanus immunoglobulin (500 units im.), penicillin (2.4×10^6 units im.) and gentamicin 120 mg im. (11). The third antimicrobial agent against anaerobic bacteria (metronidazole 500 mg iv.) (11) was not administered by us, but by medics in the fourth echelon, one hour latter. We believe that the one hour difference was not crucial.

Oxygenation

Due to the shortage of oxygenators, in cases when we received several heavily wounded at same time, only the most seriously injured patients received oxygenation via a face mask, with oxygen flow 6-9 L/min. The oxygenation was continued in ambulances during the transport.

Intravenous Route

Intravenous cannula was inserted immediately into a peripheral vein. The procedure is quite short in comparison with insertion of the central venous catheter. Complications that occur with placing the central venous catheters in a hurry are thus avoided (pneumothorax, hematothorax, accidental puncture of the subclavian or carotid artery). The cannulas were inserted first in the dorsum of the hand, but sites of wounds often determined the safest place (basilic or cephalic vein, leg veins). The wounded were young, and cannulas could be easily inserted in peripheral veins, even in one case when the systolic blood pressure was 7.3 kPa.

To be able to infuse large amounts of plasma expanders in a very short time and administer the drugs in parallel, patient had two or three 14-gauge cannulas. When this size could not be inserted, smaller (16- or 18-gauge) cannulas were used, but at least one 14-gauge cannula was inserted after the recovery of the patient. Four types of cannulas were used: Mediport (Argyle, Tullamore, Ireland); Venflon (Viggo, Helsingborg, Sweden); Biovalve (Vygon, Belgium) and Vasofix Braunuele (B. Braun, Melsungen, Germany). Three kinds of central venous catheters were prepared for use: Subclavia-set (Vygon, Germany); Subclavia-Jugular set (Sorenson, Salt Lake City, Utah, USA) and Cavafix (B. Braun, Melsungen, Germany).

Fluid Resuscitation

Fluid resuscitation was started immediately after the insertion of the cannulas. We were unable to give transfusion and therefore used plasma expanders (colloids and crystalloids). Patients described in this article were classified as classes II-IV of the shock (12). There is still no consensus regarding the use either colloid or crystalloid fluids for resuscitation (13). Two important books on this problem in war and disasters have different approaches (12,14). One prefers crystalloids (12) and the other the combination of colloids and crystalloids (14,15). Our experience showed that combination of colloids and crystalloids was much better for our patients, for two essential reasons, medical and paramedical.

(1) Medical Reasons. All the wounded had very severe injuries and developed a shock due to hemorrhage and pain (classes II-IV) (12). All needed the treatment in the fourth echelon (distance 25-100 km). As colloids augment circulating volume and blood pressure much faster than the same volume of crystalloids (13), we first infused colloids. Furthermore, colloids remain in circulation much longer and restore the hemodynamic stability better, which is necessary for the transport of the wounded to the fourth echelon (13).

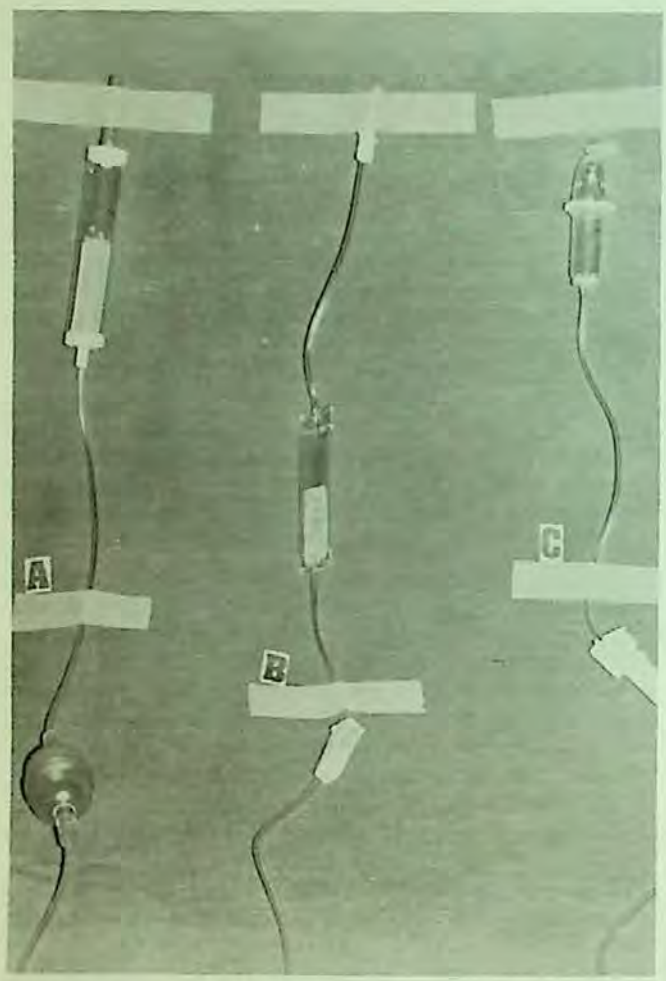

Figure 5. Venisystems blood bottle pump set with a hair pin (Abbott, Donegal, Ireland) (top); Transfusion set with soft plastic drip chamber (Zavod za transfuziju krvi, Zagreb, Croatia) (middle); Transfusion set with hard plastic drip chamber (B. Braun, Melsungen, Germany) (bottom).

(2) Paramedical Reasons. With respect to the amount to be given, the colloids are easier to transport. We were always prepared for quick evacuation, or the possibility of a complete siege. In such situations it is necessary to be effective with least material.

Choice and Use of Infusions

We had four kinds of colloids and three of crystalloids. The colloids were 6% hydroxyethyl starch (HES), 3.5% gelatine (Haemaccel, Servo Mihalj, Zrenjanin, Serbia, according to the Behring license, Germany) and dextrans (Soludex 40 and 70, Pliva, Zagreb, Croatia). Crystalloids were lactated Ringer's solution, 5% glucose in lactated Ringer's solution and 0.9% NaCl.

On admission, most of the wounded had systolic blood pressure of 9.3-12 kPa. Two had lower systolic blood pressure; one of them with an explosive wound of the neck (a small grenade fragment passed though his neck and damaged the carotid artery, trachea and esophagus) and the systolic blood pressure of 7.3 kPa, and the other with a systolic blood pressure of 8.6 kPa due to the intraabdominal hemorrhage after a gunshot wound of the abdomen with subsequent rupture of the mesenteric vessels and the left kidney. Four of them had systolic blood pressure around 13.3 kPa. All had tachycardia of 100-135 bpm, except the two described, who had relative bradycardia of 60-70 bpm. Immediately after inserting the cannulas, fluid resuscitation was started. Colloids we infused first. During the stay in medical center, each of the above described patients received 1,000 ml of colloid and the additional amount of 1,000-2,000 ml of lactated Ringer's solution. The amount of infusion depended on clinical signs. Three patients received 1,500 ml of colloids (one with hemorrhage from the carotid artery, one with abdominal hemorrhage and one with traumatic amputation of the leg and the conquassation of the elbow by a tank grenade). Depending on the level of blood pressure, additional amounts of crystalloids were administered during transport, depending on the blood pressure. The patients spent up to 45 minutes in the medical center, but most of them were transported after 30 minutes. Just before the transportation, all of them had systolic blood pressure of 16-20 kPa and hearth rate of 90-110 bpm. Four had tachycardia (one carotid hemorrhage, one traumatic amputation of leg, one pneumothorax and one hematopneumothorax) of 110-130 bpm.

HES (6%) and Haemaccel were almost exclusively used for fluid resuscitation in situations when several wounded arrived at the same time. Our supply of dextrans was limited due to its inadequate packing: dextrans were packed in glass bottles, heavy for transportation and unpractical for fast infusion. HES and Haemaccel arrived in plastic bottles and when large amounts of infusion were required in a short time (many wounded at the same time or a wounded with low blood pressure) plastic bottles could be pressed with hands. We had limited amounts of 6% HES but sufficient amounts of Haemaccel. Inasmuch as HES augments circulating volume more effectively than the same amount of Haemaccel (13) the wounded with a systolic blood pressure up to 12 kPa upon the arrival were infused with 6% HES. If the systolic blood pressure was over 12 kPa, Haemaccel was used. No significant difference in blood pressure increase between HES and Haemaccel could be observed immediately after infusion, but the information from the fourth echelon showed that the wounded who received HES had more stable blood pressure.

In the emergency situation, when fast infusions were very important, infusion (transfusion) sets played a crucial role. Three kinds of such sets were available (Fig. 5). Venisystems (Fig. 5) proved to be best, but we had only few and kept them only for the most heavily wounded. The set with soft plastic drip chamber showed excellent characteristics (Fig. 5), although this model is almost out of use. If the upper part of the system is closed by a hand, and the drop chamber squeezed at the same time (carefully watching to avoid air

in the lower part of the system), infusion can be significantly accelerated. The set with a hard plastic drop chamber (Fig. 5) was not so useful for fast infusions.

Two wounded had to be resuscitated after treatment in our unit; the first one immediately after the admission to the fourth echelon (pneumothorax, problems with drainage of the thorax), and the second in the ambulance during transportation (bleeding in oral cavity from the carotid artery). Mouth tamponade with gauze, hand pressure on carotid artery and additional amounts of plasma expanders saved his life.

Analgesia

Morphine iv. and im. (Morphin Merck 20, Merck, Darmstadt, Germany); morphine sc. (Morphini hydrochloridum, Alkaloid, Skoplje, Macedonia); pethidine (Dolantin, Hoechst, Frankfurt/Main, Germany); pentazocine (Fortral, Krka, Novo Mesto, Slovenia, according to the Winthrop licence, N.Y., USA) ketoprophen (Ketonal, Krka, Novo Mesto, Slovenia) and midazolam (Analgin, Pliva, Zagreb, Croatia) were in our stock.

Morphine

Morphine again proved the best analgetic (16,17). We had two kinds of morphine; one for iv. or im., and the other for sc. use. Our experience was that the first dose of morphine should be given iv. only. Due to the poor peripheral circulation in shock, the absorption of sc. and even im. administered morphine is very slow (18). In addition, the pain, one of the essential factors in shock progression, should be suppressed as soon as possible. A dose of morphine up to 10 mg/70 kg (16,17,19), given to the first three severely wounded caused insufficient analgesia so that the dose was repeated. Next patients we given 20 mg iv. We did not observe any negative signs of its use, maybe because we received no patients with brain injuries or previous respiratory disease. In two cases, the dose had to be repeated after 30 min (just before transport), but was administered im. We explain this by patient's young age, body weight, and by the observation that patients with severe pain may tolerate larger doses of morphine (three to four therapeutic doses) (18). There were no signs of overdosage in any patient during transport, but the accompanying doctor always had naloxone at hand, as an opiate antagonist. If the systolic blood pressure was higher than 12 kPa, morphine was administered immediately, but if it was under 12 kPa, 500 ml of colloid was quickly infused before morphine. Probably due to the parallel infusion of plasma expanders, there were no signs of blood pressure decrease related to morphine (19).

Pethidine

Due to limited amounts of morphine for iv. application, pethidine was also used. Subjective judgement of the anesthesiologist, based upon clinical signs, was crucial for the choice of morphine or pethidine. We administered morphine to the wounded who signalized strongest pain, and all others received pethidine. The dose of pethidine was also higher than recommended (50 mg/70 kg) (16); we administered 100 mg iv. as a first dose to all patients. In most cases this was sufficient. In three cases, however, we had to repeat the im. dose before the transport, which induced a satisfactory analgesia for the transport. In one very severely wounded patient (gunshot wound of the urinary bladder, rectum and sacrum), the dose of 100 mg iv., had to be repeated after 20 min (at that moment iv. morphine was not available). The main effect was sleepiness; pain diminished but did not cease. During the transport, the accompanying doctor administered another injection of midazolam (2.5 g iv.). After that, the wounded fell asleep, but there were no significant signs of respiratory depression.

Ketoprophen

All light injuries (most of them caused by small shrapnel, without great vessels or bone injury) were treated with ketoprophen (200 mg im.). Most of the lightly wounded waited about two hours to be treated. All this time, the analgesia was excellent.

Pentazocine and metamizol

Pentazocine and metamizol were not used because we were satisfied with the above described analgetics.

Sodium Bicarbonate

All wounded received sodium bicarbonate (8.4% $NaHCO_3$) to correct metabolic acidosis. As we had no facilities to measure acid-base balance, the dose was empirically determined. The dose of sodium bicarbonate depended on seriousness of the injury, the time to the admission, and the body weight. We administered 100-250 mmol iv. in parallel with the plasma expander infusion, and we do not know whether we gave enough. The experience from our main hospital was that 100-400 mmol 8.4% $NaHCO_3$ was necessary to correct metabolic acidosis in such patients.

Sedation

It was not necessary to give sedatives. Sedation produced by morphine or pethidine was satisfactory.

Symphatomimetic Amines

Dopamine and noradrenalin were available, but dopamine was used only once during an unsuccessful cardiopulmonary resuscitation. Plasma expanders were sufficient to maintain the blood pressure.

Endotracheal Intubation

Endotracheal intubation was performed in one patient with bleeding from carotid artery. The patient was somnolent upon admission. After receiving 1,500 ml of plasma expander which raised his blood pressure to 16/8.6 kPa, massive bleeding from the mouth started. He received 350 mg iv. of thiopentone, 100 mg iv. of succinilholin and was intubated. He also received pancuronium bromide (6 mg iv.) for relaxation during the transport, and was ventilated with Ambu-resuscitator.

Cardiopulmonary Resuscitation

It was performed in only one patient. Upon admission he showed no signs of life, and those who brought him in said that he stopped breathing three minutes before. Resuscitation was unsuccessful.

Allergy

Allergic reactions to any drug used were not recorded.

Medical Material and Drug Supply

We did not have many problems with drugs or any other medical supply because Croatia received a great support from abroad. Medical help also came from many international humanitarian organizations and some foreign governments.

Conclusion

The care of the wounded on the battlefield or close to it should be well organized. If there is no possibility to organize a wartime hospital in an existing medical institution, one must think about the following:

1. Place MST on a relatively safe place (medical center if possible);

2. Ensure ambulances or other suitable cars for transportation of the wounded;

3. A GP with a nurse or medical technician (or at least a nurse or a medical technician) should be in each car;

4. Duties of each member of MST and medical center personnel should be strictly determined to avoid misunderstanding and chaos;

5. Sufficient amounts of drugs and medical material for first 24 hours of work and its further supply should be ensured;

6. Drugs and medical material should be suitably packed (e.g. infusions in plastic bottles);

7. A part of drugs and medical material should be put in a safe place (shelter or the next place of evacuation).

We recommend the following anesthesiological approach to the treatment of severely wounded on battlefield:

1. Resuscitation and surgical treatment should be started simultaneously;

2. Intravenous route should be ensured immediately with large cannulas (14-gauge if possible, at least 18-gauge). At least two cannulas should be inserted;

3. Central venous catheters should be placed only when it is not possible to find peripheral veins;

4. Fluid resuscitation should be done with a combination of colloids and crystalloids. Start with colloids (1,000 ml) and continue with crystalloids (1,000 ml and more). Blood pressure and heart rate should be the guiding factor. Keep infusions on room temperature;

5. Opiate analgetics should be used for analgesia (if there are no strict contraindications). Morphine is still the first choice. For good analgesia more (20mg) than recommended 10 mg should be given.

Pethidine in dose of 100 mg is good too. The route of the first injection should be iv. Next dose can be given im. or sc.

Always have some opiate antagonist (naloxone) in medical center and ambulances ready;

6. Sodium bicarbonate (8.4%) can be given empirically. The dose depends on heaviness of injury, time from the injury to admission and body weight. Patients usually need more (100-250 mmol) than standard dose of 1 mmol/kg;

7. There is no necessity for sedatives if opiates were administered. Watch for a synergism;

8. Laryngoscope with all size blades and ET tubes (all sizes) with a cuff should be within reach, together with several Ambu-resuscitators;

9. During the stay in the medical center, the patients should receive tetanus prophylaxis and prescribed antibiotics.

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References

1 Judaš M, Chudy D, Prišćan A, Radonić N, Papić J, Marušić A, et al. Chronology of civilian suffering in the war against Croatia. Croat Med J 1992;33(War Suppl 1):15-23.

2 Kovačević S. Moral of the war against Croatia: A forensic picture. Croat Med J 1992;33(War Suppl 1):25-7.

3 Marcikić M, Kraus Z, Marušić A. Civilian massacre in Dalj. Croat Med J 1992;33(War Suppl 1):29-33.

4 Dobi-Babić R, Katalinić P, Gudelj L, Jonjić S. Civilian massacre in Lovinac. Croat Med J 1992;33(War Suppl 1):35-41.

5 Kovačević S, Judaš M, Marušić A. Civilian massacres in Banija: Kraljevčani and Pecki. Croat Med J 1992;33(War Suppl 1):43-7.

6 Marcikić M, Kraus Z, Dmitrović B, Mošunjac M, Marušić A. Civilian Massacre near Podravska Slatina. Croat Med J 1992;33(War Suppl 1):49-54.

7 Glavina K, Tucak A, Janoši K, Karner I, Hanzer J, Pajtler M, et al. Deliberate military destruction of General Hospital in the city of Osijek. Croat Med J 1992;33(War Suppl 1):61-9.

8 General Considerations of Forward Surgery. In Bowen TE, Bellamy RF, editors. Emergency War Surgery. Second United States revision of The Emergency War Surgery NATO Handbook, United States Department of Defense. Washington D.C.: United States Government Printing Office, 1988:1-13.

9 Izvještaj o ranjenicima u razdoblju 01. 01. 1991 to 16. 12. 1991. Zagreb: Centar za informiranje Kliničke bolnice Sestre Milosrdnice, 1991.

10 Grande CM, Baskett PJF, Donchin J, Wiener M, Bernhard WN. Trauma anesthesia for disasters. In Kvetan V, editor. Critical Care Clinics-Disaster Management. Philadelphia: W. B. Saunders Company, April 1991;7(No. 2):339-61.

11 Vodopija I, Francetić I, Tonković I, Kalenić S, Luetić V. Zaštita od infekcije nakon ranjavanja. Liječ Vjesn 1991;113:288-9.

12 Shock and resuscitation. In Bowen TE, Bellamy RF, editors. Emergency War Surgery. Second United States revision of The Emergency War Surgery NATO Handbook, United States Department of Defense. Washington D.C.: United States Government Printing Office, 1988:133-48.

13 Falk JL, Rackov EC, Weil MH. Colloid and crystalloid fluid resuscitation. In Shoemaker WC, Grenvik A, Holbrook PR, Leigh Thompson W, editors. Textbook of Critical Care. 2nd edition Philadelphia: W.B. Saunders Company, 1989,1055-73.

14 Shoemaker WC, Kvetan V, Fyodorov V, Kram HB. Clinical algorhytm for initial fluid resuscitation in disasters. In Kvetan V, editor. Critical Care Clinics-Disaster Management. Philadelphia: W. B. Saunders Company, 1991;7(No. 2):363-78.

15 Shoemaker WC, Schluchter M, Hopkins JA, Appel PL, Schwartz S, Chang PC. Comparison of the relative effectiveness of colloids and crystalloids in emergency resuscitation. Am J Surg 1981;142:73-84.

16 Barbera JA, Cadoux CG. Search, rescue and evacuation. In Kvetan V, editor. Critical Care Clinics-Disaster Management. Philadelphia: W. B. Saunders Company, 1991;(No. 2):321-37.

17 Janjić I, Vrhovac B, Maletić A, Žanić-Matanić D, Kulović S, Luetić V. Suzbijanje boli u ranjenih osoba. Liječ Vjesn 1991;113:287.

18 Wise RP. Pain and the analgesic drug. In Churchill-Davidson HC, editor. A Practice of Anaesthesia. 4th edition London: Lloyd-Luke (Medical Books) LTD, 1979, 1032-95.

19 Jaffe JH, Martin WR. Opioid analgesics and antagonist. In Goodman Gilman A, Goodman LS, Rall TW, Murad F, editors. Goodman and Gilman's The Pharmacological Basis of Therapeutics. 7th edition New York: Macmillan Publishing Co, 1985, 491-531

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War Hospital in Velika Gorica: The First Seventy Days

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Abstract. The organization, methods of work and results, including several case reports, of the first seventy days of work of the war hospital in Velika Gorica are presented. 1,558 initial examinations were performed, 1,396 (88%) on soldiers and 162 (12%) on civilians. There were 2,800 follow up examinations. 248 sick and wounded were hospitalized (166 wounded and 82 sick with medical diseases). The majority of the wounds were of explosive type and mostly of the extremities. Apart from these injuries, other reasons for hospitalization were diseases of the digestive system (peptic ulcer and enterocolitis) and the respiratory system (bronchitis, bronchopneumonia). After primary medical care at the war hospital, 30 Croatian and 6 Yugoslav Federal Army soldiers were sent for further treatment to specialized wards of our home institution (The Sisters of Mercy Hospital in Zagreb) or other health institutions in Zagreb (fourth echelon).

Key words: *Croatia, war hospital, war wounds*

Introduction

Velika Gorica war hospital is situated 20 km south of Zagreb and about 8 to 30 km from the battlefront. It was founded by the order of the Croatian Medical Corps Headquarters (CMC). The Sisters of Mercy Hospital in Zagreb and the *Vjekoslav Stančić* Health Center in Velika Gorica jointly organized the hospital. The purpose of the war hospital was to provide care for wounded and sick soldiers and civilians from Velika Gorica and the surrounding war-torn area. Work in the war hospital was carried out by medical personnel sent from the Zagreb institutions, including surgeons, anesthesiologists, gynecologists, urologists, ophthalmologists, internists, radiologists, transfusiologists, interns, nurses, technicians and all other necessary medical and technical personnel. The hematologic and biochemical laboratory, X-ray, pharmacy, general practitioner's and the hygiene and epidemiological services were run by the existing personnel and used the equipment of the Velika Gorica Medical Center. The functional units of the war hospital were planned according to the recommendations of the CMC and are similar to those used by NATO medical teams (1). They included Admission Offices (Figs. 1 and 2), Operating Theater (Fig. 3) and Intensive Care Unit. Initial surgical examination and diagnostic procedures, such as X-rays (using fixed and mobile X-ray apparatus; Fig. 4), and hematological and biochemical laboratory tests were performed in the Admission Office. Cardiopulmonary resuscitation and minor surgery units and a plaster room were connected to these offices. Operating Theater and Intensive Care Unit were equipped with standard equipment. The Intensive Care Unit had the facilities to record all vital functions and perform mechanical ventilation of the patient during the post-operative stabilization. Patients in need of protracted mechanical ventilation and close attention to vital functions (electrolytes and acid-base status assessment) were sent to the Intensive Care Unit of the home institution. The in-patient wards had standard equipment and a staff consist-

Figure 1. Admission Office.

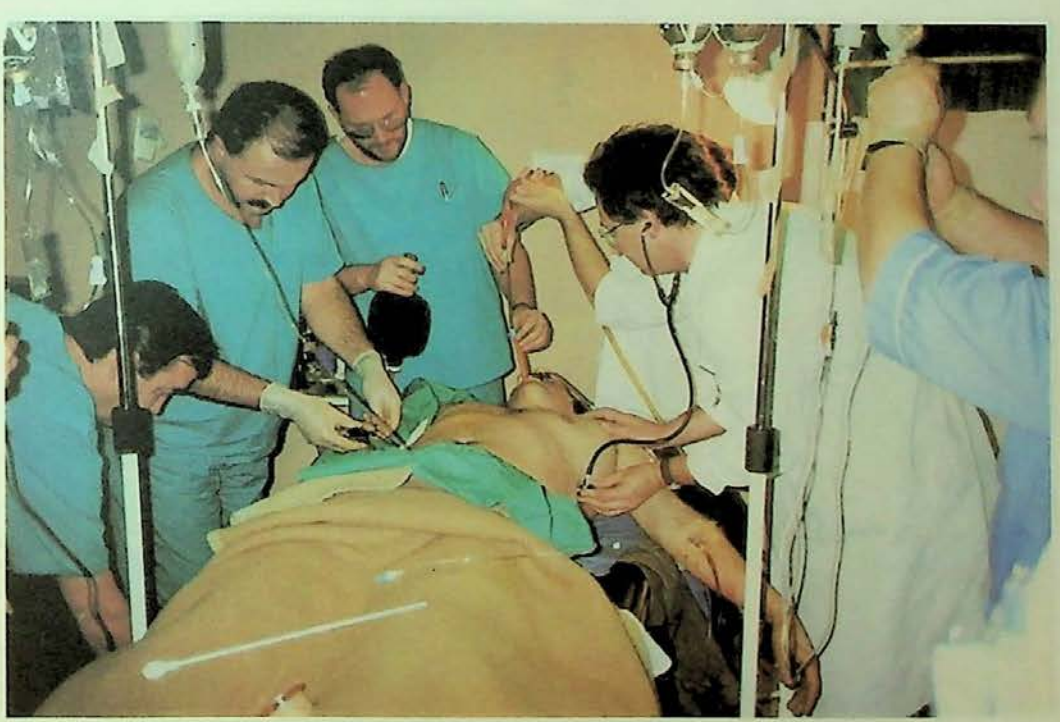

Figure 2. Treatment of severely wounded at the Admission Office.

ing of internists who continued with necessary treatment in collaboration with surgeons, anesthesiologists and physiotherapists.

Treatment of Patients

Basic Principles

The work in the Velika Gorica War Hospital was based on the war medicine doctrine of the CMC which is similar to that of NATO (1). On initial examination, all wounded and injured received anti-tetanus prophylaxis (0.5 ml tetanus toxoid and 250 to 500 I.U. human hyperimmune globulin, both im.). Initial treatment consisted of a debridement; setting up a drainage system and skin traction in the case of amputation. All major wounds were immobilized. Secondary stitches were put 7 to 10 days after the initial treatment or

Figure 3. Surgical Theater.

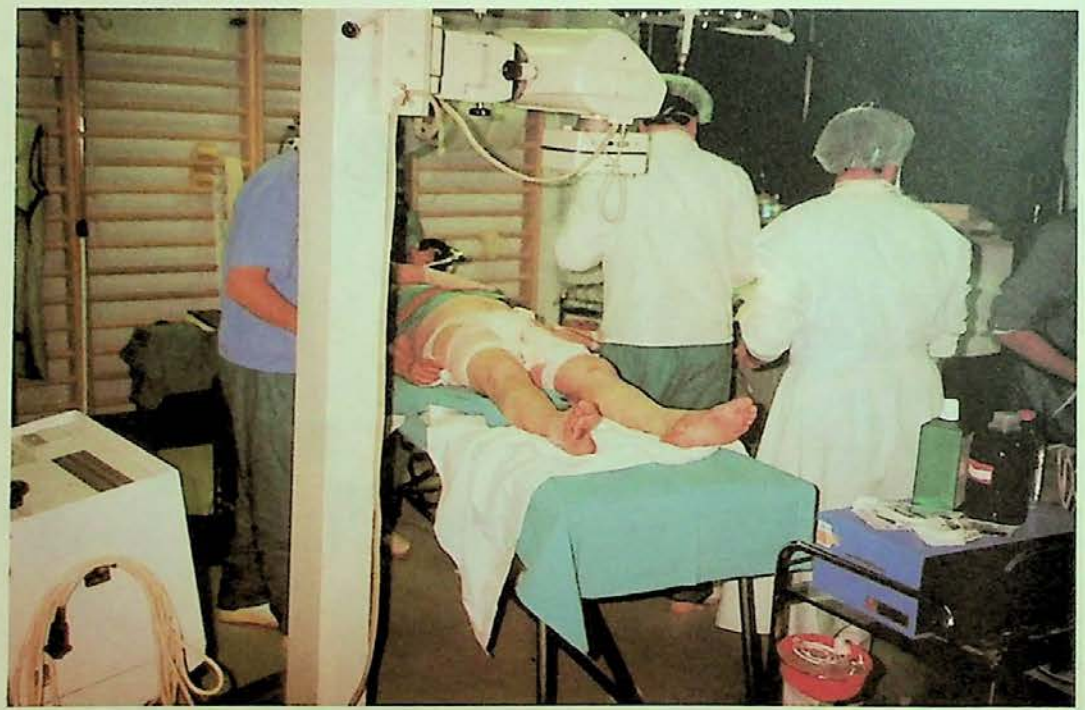

Figure 4. Mobile X-ray apparatus in the Surgical Theater.

14 days in the case of amputations. All wounded patients received procaine penicillin 2 x 2.4 x 10^6 units im. per day for 10 to 12 days (More serious wounds were treated with 18-24 x 10^6 units of G-penicillin iv. once a day), gentamicin in doses of 5 mg/kg body weight per day, metronidazole in doses of 1.5-2.0 g per day (per os or iv.) and ranetidine in doses of 100-200 mg per day for the prevention of stress ulcers (2,3). Other diseases were treated as in peace time.

Admissions

From October to December 1991, 1,558 initial examinations of wounded and sick patients were performed. 248 (16%) were hospitalized (Ta-

Table 1: Patients (soldiers and civilians) registered and examined at the Admission Office of the Velika Gorica war hospital

	Soldiers	Civilians	
		Males	Females
First examinations			
Wounded	572*	80	16
Sick	573**	38	28
Follow-up examinations	2460	210	130

*Including 5 YFA soldiers.
**Including 1 YFA soldier.

Table 2. Reasons for hospitalization on the wards of Velika Gorica war hospital

	Soldiers	Civilians	Total
Wounds	157*	9	166
Internal diseases:			
gastrointestinal	54	0	54
caradiovascular	3	1	4
respiratory	18	1	19
locomotor	3	0	3
Other	2	0	2
Total	237	11	248

*Including 4 YFA soldiers; two admitted for acute appendicitis, one for perforated duodenal ulcer and one for incarcerated ventral hernia.

Table 3. Analysis of the mechanisms and localization of wounds and injuries

	Abd.	Thor.	Extr.	Head/neck	Total No. of wounded	
					Sold.	Civil.
Shrapnel	9	21	93	3	109	11
Gunshot wounds	1	2	6	0	9	1
Air blast	13	0	20	1	8	0
Other	3	3	15	25	46	1
Total number of wounds:						
Soldiers	16	30	126	28		
Civilians	2	6	8	3		

Table 4. Total amounts of infusion solutions used for resuscitation, operations and in the first postoperative day during 70 days of the work of Velika Gorica war hospital

Crystalloid solutions (ml)	
Ringer salt	17,500
Ringer lactate salt	90,000
Saline	25,000
5% glucose	20,000
Tutofusin HL 10	30,000
Colloid solutions (ml)	
Gelatine 3.5% (Haemaccel)	15,000
6% HES	35,000
Dextran 40	10,000
5% human albumin	7,000

ble 1). 1,146 (88%) were soldiers and 162 civilians (12%). The soldiers' age ranged from 18-54 years and that of civilians from 7 to 84 years. There was a total of 2,800 follow-up examinations which, together with the initial examinations, made a total of 3,358 admissions. 157 of 572 wounded soldiers (27%) and 9 of 96 wounded civilians (9.3%) were hospitalized. Of 573 non-wounded soldiers, 80 (16%) were hospitalized. The large number of non-wounded civilians treated as out-patients and those sent to other institutions in Zagreb shortly after the hospital opened was the result of a high number of displaced persons in the area. A large number of Croatian soldiers with medical problems who were treated both as in- and out-patients were members of the reserve forces, who did not have proper medical check-up prior to mobilization. Six members of the Yugoslav Federal Army were treated and sent for further treatment to specialized wards in Zagreb. Twenty-seven Croatian soldiers were resuscitated on admission and sent on to specialist institutions in Zagreb because of the nature of their wounds, (craniocerebral trauma, multiple fractures, open fractures and some traumatic amputations). All craniocerebral injuries with clinical signs of increased intracranial pressure were treated by antiedematous therapy - 1 g/kg bw mannitol (3), furosemide 20 to 40 mg i.v., intubation and hyperventilation at 16-18/min (3) and barbiturate-induced coma (thiopental 15-25 mg/kg) (4). Anticonvulsives were not needed. All the wounded with craniocerebral injuries were sent, under doctor's attention, to the neurosurgical department of our home institution. Five deaths were recorded at the Admission Offices: three were Croatian soldiers (two demonstrated certain signs of death and one died after an unsuccessful resuscitation) and two civilians (an 84-year old woman admitted with signs of cardiac arrest died after unsuccessful resuscitation; and a 69 year-old woman was admitted with hemorrhagic shock of the IV class (5) and died after an unsuccessful resuscitation and operative intervention). All Croatian soldiers were brought to us from the front either by ambulances or by specially adapted vehicles, accompanied by medical teams. Patients arrived with injuries already immobilized (sometimes in an improvised manner, Fig. 5). The first echelon medical teams would administer a relatively good analgesia, but plasma-expander infusion had been given in few cases only. Due to the weather conditions of Autumn, the wounds, shock, and the cold infusions, most of the wounded suffered from the cold. On admission, blood was taken to assess hemoglobin, erythrocyte and leukocyte levels, determine the blood group and crossmatch in case a transfusion should prove necessary. Simultaneously, intravenous drips were inserted (14-18 gauge venal catheters) and crystalloid solutions (Ringer lactate) given by infusion. Tetanus prophylaxis and analgesic treatment were performed. Initial or further analgesic treatment was conducted by application of morphine hydrochloride (0.02 mg sc.), tramadol-hy-

Figure 5. Remnants of self-immobilization on the battlefield.

Table 5. Total amounts of blood and blood derivatives used for resuscitation, operations and in the first postoperative day during 70 days of the work of Velika Gorica war hospital

Blood groups	A+	B+	O+	AB+	A-	B-	0-	AB-	Total
Erythrocyte concentrate									
No. of doses	35	26	62	18	11	0	2	0	154
ml	11,970	8,950	19,170	6,310	3,820	0	420	0	50,650
Full blood									
No. of doses	0	0	4,160	0	1,950	0	0	0	6,110
ml	0	0	4,160	0	1,950	0	0	0	6,110
Fresh frozen plasma									
No. of doses	15	21	38	16	12	2	1	0	105
ml	3,440	3,930	7,650	2,930	2,370	410	190	0	20,920
Concentrated thrombocytes									10 doses
Human fibrinogen									12 g

drochloride (50-100 mg im.), pentazocine (50 mg im.), pethidine (50-100 mg im.), ketoprophen (100-200 mg im.), and immobilization. Wounds were then examined by X-ray. Minor wounds were treated immediately, using local anesthetic (1% or 2% lidocaine) and antibiotics. These patients were then sent to the ward or released.

The Wards

Of 248 patients admitted, 157 (63%) were wounded soldiers, 9 wounded civilians (3.6%), 80 (32.2%) sick soldiers and 2 (0.8%) sick civilians (Table 2). The largest number of medical cases were treated for digestive disorders (54 or 67%). Twenty-eight had acute gastroenteritis and 26 peptic ulcer (demonstrated by endoscopy in 12). Two civilians were admitted for heart failure and exacerbation of chronic obstructive disease of the lungs. Five Croatian soldiers, aged 30-40 years, showed clinical signs of acute psychosis and were sent on to the psychiatric ward of the home institution (not included in Table 2). About 10% of all medical patients showed symptoms of depression and anxiety.

The hospitalized soldiers aged 18-42, and civilians 24-69 years. In the Intensive Care Unit, 14 (5.6%) soldiers and one civilian were treated. Treatment in this Unit lasted 3 days on average, and 4 days in the post-intensive unit. The average stay on the ward was 6 days (between 1 and 58 days); 43% of patients were treated at the ward for 2-3 days, 39% for 4-10 days, 13.2% for more than 11 days and 4.3% for one day only.

In 109 (57%) of 153 wounded soldiers, wounds were caused by shrapnels (Table 3) and were most commonly located on the extremities

(89%). Some patients had multiple wounds, up to 13. Fractures combined with wounds caused by shrapnel were found in 18 cases (16.5%). Gunshot wounds were found in 29 (14%) soldiers and were accompanied by bone fractures in 13 cases (44.8%). During primary surgical treatment, foreign bodies were removed from 36 explosive wounds. In two patients, two or more foreign bodies were removed from a single wound. Eight patients were hospitalized for blast injuries of the inner ear (hissing noise and temporary deafness). In 46 (24%) Croatian soldiers injuries were caused by an overturning vehicle or a fall, including fractures in 11 cases. 28 soldiers were treated for head injuries (three caused by explosion, 20 by traffic accidents and 5 by falls). The majority of wounded did not require intensive resuscitation but all were given a 1000 ml Ringer lactate infusion (Table 4). Seven Croatian soldiers were admitted in serious hemorrhagic shock (class III and IV) (5). Their resuscitation began with the insertion of drips and simultaneous rapid infusion of crystalloid (Ringer lactate 1500-2000 ml) and colloid solutions (6% hydroxyethylstarch, 3.5% gelatine, Haemaccel); the ratio of crystalloid and colloid was 3:1 (6). The infusion continued until a satisfactory hemodynamics was recorded (systolic pressure greater than 14 kPa and pulse less than 100). At the same time, erythrocyte concentrate (hematocrit 70%) and fresh frozen plasma in ratio of 4:1 were transfused (Table 5). After every six doses of erythrocyte concentrate, 10 ml 10% calcium gluconate solution (7) was administered. In 5 patients a massive blood transfusion in doses of 6,100-11,280 ml erythrocyte concentrate was performed. Patients with respiratory problems were intubated and ventilated with an oxygen flow of 6-10 L of 100% oxygen per minute. Acidosis was initially corrected with sodium bicarbonate in doses of 1-1.5 mEq/kg bw, and according to clinical findings and the level of urine acidity at later time points (8); apparatus for assessing acid-base balance was not available. All seriously wounded patients were immediately given 30 mg/kg of methylprednisolone iv. and then 500 mg every 6 hours for the following 2 days (9).

Urgent surgery was performed on five wounded Croatian soldiers. Anesthesia was given by *Sutjeska* apparatus (previously used by the YFA) with 100% oxygen ventilation, fentanyl analgesia (0.003-0.005 mg/kg), and muscle relaxant pancuronium bromide (0.06-0.07 mg/kg bw). The correction of acidosis, liquid infusion and transfusion of blood and blood derivatives were continued. Hemostasis was aided by an infusion of human fibrinogen in a dose of 2-4 g with $6x10^5$-$1x10^6$ units of aprotinin. Seven operations were performed using the same anesthetic apparatus. Neurolept anesthesia was carried out with an oxidul/oxygen ratio of 1:1, a muscle relaxant and decurarisation at the end of the operation. In three operations local spinal anesthetic (a solution of 5% corticain in a dose of 0.15 mg/kg bw) was used. Initial treatment of wounds in 50 patients was carried out using additional iv. or im. analgesia (pethidine 50-100 mg or alfentanil 30-40 mg/kg) or, in the case of short-term intravenous anesthetics, 0.3- 0.5 mg/kg etomidate or the same amount of propofol. In 12 patients, a surgery was carried out using ketamine (0.2-0.4 mg/kg bw) as an anesthetic with atropine (0.5 mg) and midazolam (5-7.5 mg) as premedication.

All surgical treatments involved wounds of the chest and extremities and did not last longer than 20 to 30 minutes so that there was no need for a further dose of ketamine. In only two patients post-operative distress was observed and treated with midazolam (5 mg im.). All patients anesthetized with ketamine showed a slight rise in blood pressure and increase in pulse 3 to 5 min after the application. In one patient with acute respiratory infection, cyanosis which occured during the anesthesia was effectively treated by increasing the oxygen flow through the mask.

Following surgery, all patients except four transported to the home institution, were transfered to the Intensive Care Unit. They received parenteral hyperalimentation during their stay in the Intensive Care Unit. All those with multiple injuries of the bones and muscles, especially lower extremities, and those with abdominal injuries, were given low doses of heparin sc. (7,500-15,000 divided into three daily doses) to prevent thromboembolism. There were no negative effects of heparin, in the form of thrombocytopenia, thrombosis or hemorrhage. Physical therapy began on the second day after the operation, and continued at the ward under the care of a physiotherapist.

At the ward, standard antibiotic treatment and physical therapy were performed. Wounds were dressed every day using a solution of 2% hydrogen and a solution of gentamicin and povidone iodine for cleaning the skin around the wound. After 8 to 10 days, depending on the rate of granulation, secondary stitches were applied. All more serious wounds were treated with Comprigel compresses (Hartmann, Germany), which caused a lessening in secretion and edema around the wound. Two patients showed signs of mild allergic reaction to procaine penicillin im.

All patients with peptic ulcers were successfully treated with 10% solution of fructose and Ringer lactate solution with antacid and ranetidin (200 mg) parenterally and then perorally. Patients with enterocolitis were put on a special diet and received infusion of the crystalloid solution; they showed signs of clinical recovery already on the second day. Most of the patients with enterocolitis and peptic ulcers were members of the reserve forces of the Croatian National Guard. The high occurrence of digestive problems in this group of patients appears to be caused by the field life. Unfavourable weather conditions in Autumn (damp, fog and cold) could have been responsible for the high number of respiratory diseases. Most of the patients with cardiological problems had hypertonia accompanied by tachycardia with no signs of myocardial decompensation. They were successfully treated with betablockers.

Case Reports

Abdominal injury

Patient **G.Z.** (aged 44) was admitted 40 minutes after being wounded, with explosive wounds of the central left side of the hemiabdomen, showing signs of hemorrhagic and traumatic shock. He was resuscitated, X-rayed, prepared for operation and surgically treated. The entrance wound measured 1 x 1.5 cm with rugged edges. On explorative median laparotomy, intraabdominal bleeding was found, with multiple lesions of the small intestine, mezosigmal portion of the large intestine and and retroperitoneal space. In the distal part of the inferior caval vein, lesions 1.5 cm in diameter were found. A resection of the small intestine was performed with latero-lateral anastomosis, mesocolon was stitched and the damaged vein repaired. The foreign body located retroperitoneally at the level of the upper third of the rectum could not be removed. Post-operative procedure was normal and no signs of vein obstruction on the pelvic level were found on the X-ray phlebography.

Neck injury

Patient **M.S.** (aged 24) was wounded by shell fragments in the left side of the neck and brought with a compress bandage on his neck to the hospital within 40 minutes. On admission he was asphyxiated, unsettled, pale, sweating, pupils were dilated and he had no sphincter control (RR 20/14 kPa, cp 110/min, respiration 26/min). Since a lesion of the neck artery was suspected, the compress on the neck was carefully cut using finger pressure and the patient was intubated (with difficulty) and ventilated. At the same time he was given infusions of crystalloid solution. On physical examination a penetrating wound of the left submandibular region was discovered, directed toward the central and upper part of the neck, which did not bleed nor showed signs of a lesion of the carotid artery. Following these procedures the patient's condition immediately improved, respiration normalized, pupils retracted, blood pressure and pulse stabilized and neurological symptoms vanished. For transportation, the patient was sedated (thiopental 7 mg/kg) and assisted respiration (Ambu-mask) was performed. In the company of an anesthesiologist, he was brought to the ENT Department of the home institution, where a tracheostomy was performed and a foreign body removed from the root of the tongue. The patient recovered successfully. We believe the dramatic clinical presentation on admission was due to strangulation and asphyxia caused by strong pressure of the bandage.

Physical Torture

Patient **S.M.** (civilian, aged 69) was wounded and physically abused by Serbian paramilitary formations in the neighboring war-torn area.

He was admitted 4 days after being wounded, with an inflamed gunshot wound of the left lower leg. The wound was wide open and the tibia was visible at its base, with abundant surrounding necrotic tissue. X-ray of the bone showed open fracture of the left fibula. In the left parietoccipital region, a 7 cm long laceration was found, as well as contusions and excoriations in retroauricular and nuchal region. On admission the patient was in poor condition with signs of sepsis, high fever (38.7° C), dehydrated, normal heart and lung findings (RR 22/11 kPa, cp 98 min), accelerated sedimentation rate (102 mm/h), severe anemia (Hb 56 g/L, HTC value 0.27), leukocytosis (10.4 x 10^9/L) with a shift to the left in differential WBC, indicating severe posthemorrhagic anemia and inflammation of the wound. These findings were accompanied by a moderate elevation of blood sugar, creatinine and urea, and acetonuria. The lower leg necrectomy and drainage were performed, and G-penicillin (32 x 10^6 units iv.), gentamicin (240 mg; a reduced dose because of azotemia) and metronidazole (1,500 mg) were administered daily. The patient's general condition improved along with the wounds. On the fourth day, according to the antibiogram (*Enterobacter sp., Enterococcus*) of a wound smear, a combination of amoxicilin and clavulonic acid was administered parenterally. The patient's temperature decreased; hyperglycemia was corrected by crystalline insulin and, together with other supportive measures, the wounds healed satisfactorily. On the 64th day of the treatment, the patient was discharged in excellent general health and with normal glycemia and blood creatinine findings.

Inguinal Gunshot Wound

Patient **B.G.** (aged 27) was wounded by a sniping-rifle bullet in the left inguinal region. He was brought to the war hospital ten minutes later, without previous first aid. On admission, the patient was in severe hemorrhagic shock (type IV) (5), pale, sweating and unconscious, pupils were moderately dilated with labored, irregular breathing. He was immediately given 1,000 ml of Ringer lactate solution, 500 ml of 3.5% gelatine solution (Haemaccel), 2 g methylprednisolone iv. and 100 mEq sodium bicarbonate. The patient was then intubated and ventilated with 100% oxygen. On arrival, his blood pressure was immeasurable, and there was no periphery pulse. The wound to the left inguen was dressed with a tampon and compressed manually. Urinary catheter was introduced and 200 ml of clear urine was obtained. A further infusion of 1,000 ml of Ringer lactate solution and 500 ml of 3.5% gelatine (Haemaccel) solution was given and surgery commenced. Peripheral pulse of 120/min and RR 13.5/7 kPa were registered. Anesthesia was performed with oxidul/oxygen 1:1 ratio, analgesic fentanyl 0.003 mg/kg and the relaxant pancuronium bromide 0.08 mg/kg bw. A transfusion of 4,000 ml erythrocyte concentrate, 1,700 ml fresh frozen plasma with aprotinine (Antagosan), 1 x 10^6 units, and 2 g human fibrinogen were given. When blood pressure of 16/11 kPa was achieved, dopamine was infused (2 pg/kg/min) by the Reguflo apparatus and 1,200 ml of urine was obtained.

The correction of acidosis continued using bicarbonate in a dosage of 44 mEq per liter of transfused blood and with 10 ml of 10% calcium chloride solution. G-penicillin, gentamicin and metronidazole were given in doses already mentioned, along with tetanus toxoid and human hyperimmune globulin. Later in surgery, an infusion of low molecular dextran (Soludex 40, Pliva, Zagreb, Croatia) was given.

Exploration of the wound revealed lesions of the femoral artery. A vascular surgeon arrived from the home institution and, as the operation continued, the femoral artery was reconstructed using the great saphenous vein. Circulation was established in the left leg with normal pulse in the peripheral arteries. The fracture of the left thigh bone was treated with a coxofemoral longeta. Multiple fractures in the right and left hands (2nd, 3rd, and 4th fingers of the left hand and the 2nd finger of the right hand) were also immobilized. During resuscitation and the operation, which lasted 3 hours and 15 min, a total of 7,500 crystalloid liquid and gelatine solution were infused, and 4,000 ml erythrocyte concentrate with 1,700 ml fresh frozen plasma were transfused. Diuresis was 1,700 ml. Thirty minutes after the operation, the patient breathed spontaneously through an endotracheal tube and opened his eyes when called. With good blood pressure and pulse in his peripheral arteries, he was sent to the intensive care unit of the surgical ward of the home institution and 23 days after being wounded he was sent for convalescence to a specialized institution.

Explosive Injuries of the Leg with Deep Venous Thrombosis of the Calf

Patient **K.M.** (aged 33 years) was admitted at the war hospital 5 hours after being wounded by shell shrapnel in the left side of his back, the left gluteal region and the left calf. At admission he was in good general condition, with slightly lower body temperature (36.0° C), RR 16/10 kPa, cp 90, and normal physical findings for heart and lungs. Findings showed hemoconcentration (HTC 0.48, Hb 164 g/L, E 5.2 x 10^{12}/L) and leukocytosis (19.2 x 10^{9}/L). On admission a drip of 1000 ml Ringer lactate solution was administered, the wound was primary treated with standard tetanus prophylaxis and antibiotic therapy (procaine penicillin 2 x 2.4 x 10^{6} units im.; gentamicin 5 mg/kg bw im. and metronidazole, 1.5 g per os daily). On the fifth day of treatment deep vein thrombosis of the left calf was diagnosed. The clinical condition normalized in 3 days with heparin calcium in a dosage of 16,000 units sc. divided in four daily doses. A doppler sonograph of the calf veins performed 14 days later showed normal flow in the deep veins. The patient was treated with Heparin (in the above mentioned doses for 10 days) and for the following three days with 3 x 3,000 units daily with simultaneous introduction of warfarin in doses of 4 mg per day.

Deep vein thrombosis in this patient was probably caused by extended travelling time, decrease of the body temperature, accompanied by hemoconcentration and the location of the wound (left gluteal region and left calf) which made bed rest necessary for the initial period of the treatment. Learning from our experience with this patient, who was one of the first in the field hospital, we treated all other wounded with severe traumas to the muscular-skeletal system and with broad immobilization, especially of the legs, with low dose of heparin (10-15,000 units sc., divided into three to four daily doses) with no control APTT. Probably for this reason, deep vein thrombosis in wounded soldiers was not recorded any more.

Discussion

The results presented justified the formation of a war hospital in Velika Gorica which constituted the third echelon in medical care of the wounded and sick. The data show that a large number of wounded received complete treatment at this hospital so that it could be placed in the fourth echelon as well. Its activities in caring for the wounded and excellent cooperation with the doctors both on the battlefield and in Zagreb home institutions, reduced the flow of wounded into civilian hospitals in Zagreb and thus relieved them of further burdens in their work. Due to its proximity to the war zone and quick and adequate treatment, the lives of several soldiers were saved who, judging by the severe nature of their wounds and the state of severe traumatic and hemorrhagic shock, would have probably died on the way to hospital in Zagreb, 25 km away.

References

1 General considerations of forward surgery. In: Bowen TE, Bellamy RF, editors. Emergency war surgery. Second United States revision of The emergency war surgery NATO handbook. United States Department of Defense. Washington, DC.: United States Government Printing Office, 1988:1-13.

2 Vodopija I, Francetić I, Tonković, I, Kalenić S, Luetić V. Zaštita od infekcije nakon ranjavanja. Liječ Vjesn 1991;113:288-9.

3 Bruce DA. Management of severe head injury. In: Cottrell JE, Turndorf H, editors. Anesthesia and neurosurgery. 2nd ed. St. Louis, Toronto: Mosby Co. 1986:150-72.

4 Boarini DJ, Kassell NF. Cerebral aneurysm management. In: Cottrell JE, Turndorf H, editors. Anesthesia and neurosurgery. 2nd ed. St. Louis, Toronto: Mosby Co 1986:407-43.

5 Shock and resuscitation. In: Bowen TE, Bellamy RF, editors. Emergency war surgery. Second United States revision of The emergency war surgery NATO handbook. United States Department of Defense. Washington D.C.: United States Government Printing Office, 1988:133-48.

6 Shoemaker WC, Kvetan V, Fyodorov V, Kram HB. Clinical algorhytm for initial fluid resuscitation in disasters. In: Kvetan V, editor. Critical care clinics - disaster management. Philadelphia: Saunders, 1991;7:363-78.

7 Rodman GH Jr. Bleeding and clotting disorders. In: Shoemaker WC, Grenvik A, Holbrok PR, Leigh Thompson W, editors. Textbook of critical care. 2nd edition. Philadelphia: Saunders, 1989:722-32.

8 Collins AJ, Burzstein S. Renal failure in disasters. In Kvetan V, editor. Critical care clinics - disaster management. Philadelphia: Saunders, 1991;7:421-35.

9 Jacob HS. Damaging role of activated complement in myocardial infarction and shock lung: therapeutic implications. In Shoemaker WC, Grenvik A, Holbrok PR, Leigh Thompson W, editors. Textbook of critical care. 2nd edition. Philadelphia: Saunders, 1989:716-22.

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Organization and Functioning of the Sisters of Mercy University Hospital in the War against Croatia

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Abstract. During the war against Croatia, the Sisters of Mercy University Hospital developed several functions: activities as a fourth echelon medical institution, organization of two field hospitals, in Velika Gorica and Samobor, organization of three mobile surgical teams, engaged directly on the battlefields (Ilok, Dakovo, Novska, Hrvatska Kostajnica). Between March and December 1991, 3,792 wounded persons were treated both in the Sisters of Mercy University Hospital and its two field hospitals. 1,218 of them were hospitalized, while the others were treated as outpatients. The majority of the wounded that were hospitalized had combined and complex injuries which demanded multidisciplinary surgical approach. Despite of this there was a relatively low mortality rate and a low rate of surgical complications.

Key Words: *Croatia; surgery; war; wounds and injuries*

Introduction

The Sisters of Mercy University Hospital in Zagreb is one of the largest medical institutions in Croatia covering all levels of tertiary medical functions.

According to its functions in war conditions, the Sisters of Mercy University Hospital belongs to the fourth echelon medical institutions, i.e. its activities consist in taking definitive care of the wounded who cannot be treated in smaller medical units or in war endangered areas.

In order to meet the above requirements the Crisis Committee was established in the hospital on July 13, 1991. The director of the hospital became by his function also the chairman of the Crisis Committee, while the operating of the Committee was further organized through several important services: surgery, anesthesiology and reanimation, war psychology and psychiatry, rehabilitation and physiotherapy, medical material and drug supply service and hospital administration service.

The need for more efficient and faster communication between the Crisis Committee and the departments as well as between the hospital and other institution has led to the foundation of the Information Center which operates 24 hours a day; this center is supplied with a direct telephone line connecting the center and the Medical Corps Headquarters of the Republic of Croatia. The Information Center is equipped by computers as well.

Organization of the Hospital

The organization of the hospital functions was made adjustable to all possible war developments including total destruction of the hospital (Table 1).

Zero stage denotes increased preparedness of surgical (general surgery, neurosurgery, otorhinolaryngology, gynecology, urology, anesthesiology, transfusion), internal medicine and diagnostic staff. Increased preparedness includes: 1. Sufficient number of free hospital beds available for immediate care of the wounded; 2. Readiness of all surgical, internal medicine and diagnostic staff on duty to remain available the next day; 3. Ra-

Table 1. Organization of the Sisters of Mercy University Hospital in war conditions.

Stage 0 - increased preparedness
Stage A - admittance of up to 50 wounded
Stage B - admittance of 51-100 wounded
Stage C - admittance of over 100 wounded
Stage D - evacuation of the hospital

Table 2. The wounded treated in both the Sisters of Mercy University Hospital and field hospitals in Velika Gorica and Samobor from March to December 1991.

Wounded	Number
Croatian soldiers	3,344
Civilians	397
Yugoslav Federal Army	28
Other aggressor forces	23
Total	3,792

Table 3. The wounded patients hospitalized in the Sisters of Mercy University Hospital and its war hospital in Velika Gorica, from March to December 1991

	Number
Sisters of Mercy University Hospital	
Department of Surgery	634
Department of Neurosurgery	54
ENT Department,	84
Department of Psychiatry	108
Velika Gorica	338
Total	1,218

Table 4. Major surgical operations performed in the Sisters of Mercy University Hospital, from March to December 1991

Type of operation	Number
Abdominal surgeries	22
Thoracoabdominal surgeries	6
Thoracotomies	7
Thoracotomia minima	28
Fractures of extremities:	
-application of external fixators	41
-corrections of external fixators	19
Craniotomies	22
Blood vessels reconstruction surgery	15
Primary amputations	4
Secondary amputations	2
Total	166

Table 5. Types of injuries treated in the Department of Surgery and Neurosurgery Intensive Care Unit, Sisters of Mercy University Hospital, from March to December 1991

Injury	Number
Head injury only	16
Injuries in combination with paraplegia	4
Thoracic injuries with drainage	28
Combined injuries of extremities, abdomen and thorax	57
Total	105

Table 6. Death rate of 1026 wounded hospitalized in the Sisters of Mercy University Hospital and its war hospital in Velika Gorica from March to December 1991

	Wounded	Dead	Dead on admission
Sisters of Mercy University Hospital:			
Dept. of Surgery	634	5	1
Dept. of Neurosurgery	54	6	0
Velika Gorica	338	1	10
Total	1026	12	11

tionalization and storage of sufficient amounts of necessary drugs; 4. Sufficient quantity of medical material, laundry and instruments.

In case that a larger number of wounded should be admitted, the hospital functioning is organized in the following stages:

Stage A. Physicians from the Department of Internal Medicine assist in triage in the hospital entrance hall and in the surgery unit.

Stage B. This stage includes all activities covered by stage A; the second surgery unit is organized on the ground floor of urology and gynecology buildings, and more medical and paramedical staff is engaged.

Stage C. This stage includes all activities covered by stage B; the third surgery unit is opened on the Department of Internal Medicine ground floor.

Stage D. A plan for admittance of a larger number of wounded was made in dislocated medical units in the outskirts of Zagreb. (The experience from other Croatian towns indicated that the enemy attacks do not spare hospitals (1,2), so that two locations for the evacuation of the hospital were determined.)

The on duty service of personnel is organized according to even and odd dates scheme for all three stages. Other medical and paramedical personnel is also engaged when necessary.

On October 1, 1991, it was agreed at the Medical Corps Crisis Committee of the Republic of Croatia that our hospital should take care of 150 wounded. The number of wounded in the hospital, however, gradually reached 350.

The helicopter field permitting night landings was constructed for faster reception of the wounded.

The War Hospitals

In agreement with the Medical Corps Headquarters of the Republic of Croatia two war hospitals were founded on the Public Health Center premises in Velika Gorica and Samobor. The location in Velika Gorica was convenient due to the vicinity of the battlefield. The purpose of these hospitals was to take care of the vitally endangered wounded as well as to take definitive care of the wounded whose injuries did not require more than general surgical treatment (4). After the first

The spirit of the wounded and their love for their country cannot be described. (Jozo Tomić, ref. 3)

treatment the rest of the wounded were transferred to the main Sisters of Mercy hospital. The field hospital in Velika Gorica started operating on August 31, 1991, and was organized similarly to the main hospital, i.e. its functions were based on surgical (general surgery, neurosurgery, otorhinolaryngology, gynecology, urology, anesthesiology and transfusion), internal medicine and diagnostic activities. It was the first such hospital in Croatia and it is still in function. There are 108 medical and other staff members engaged there, 22 of them with university education. It has a capacity of 200 hospital beds. It was functioning completely independently during several communication cut-offs, taking care of the wounded and the sick in the whole area.

The war hospital in Samobor was organized in October 1991 during the battle for Yugoslav Federal Army barracks in Samobor. It consisted of a surgery and anesthesiology team and in only four hours the first wounded were admitted. The hospital was in function 8 days and was deactivated afterwards, with a possibility to be brought into function in 1 to 2 hours time (operating theatre and ward are fully equipped and prepared for function).

Beside these activities the hospital organized three mobile surgical teams which were engaged directly on the battlefields in Hrvatska Kostajnica, Dakovo, Ilok and Novska, while one permanent neurosurgery team is still working in shifts in Slavonski Brod. The team from Hrvatska Kostajnica was captured and imprisoned for about a month in the prisoners-of-war camp in Manjača.

Medical Treatment of the Wounded

First wounded persons were admitted to our hospital on Easter day 1991, following war activities on the Plitvice Lakes.

Between March and December, 1991, 3,792 wounded persons were treated both in the main hospital and in two war hospitals, 1,218 were hospitalized, 2,418 were treated as outpatients (Tables 2 and 3). 10% of the wounded were civilians.

The majority of wounded were hospitalized in surgery units. Psychiatry disorders included 9% of the admitted persons.

Among all operations in Sisters of Mercy University Hospital 166 major surgical operations were performed. In all cases these were complex and combined injuries of more than one organ or system (Table 4). As a result of specific injuries these surgical operations were performed by multidisciplinary teams consisting of general surgeons, urologists, otorhinolaryngologists, neurosurgeons, ophthalmologists and others. One hundred and five severe injuries were the cause of prolonged treatment of 87 wounded in the Department of Surgery and Neurosurgery Intensive Care Unit (Table 5). The majority of them had also combined injuries of several organs.

In Velika Gorica war hospital 140 major wound treatments and surgeries were performed along with 325 minor surgical operations. In Samobor war hospital 40 wounded were taken care of, while 11 wounded were transferred to the main hospital.

Our injured patients had low rate of secondary infection during hospitalization. Two wounded with gaseous gangrene were admitted to our hospital.

The data on mortality during the same period of time are presented in Table 6. A relatively low death rate is evident despite of numerous complex and complicated injuries.

The Department of Internal Medicine Hemodialysis Unit was receiving patients with chronic renal insufficiency from the Osijek, Vukovar, Pakrac, Sisak, Vinkovci, Dakovo, Petrinja and Virovitica hospitals destroyed by the war.

During the war period normal hospital activities have been continued and the level of civil patient care was not neglected in any way.

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References

1 Glavina K, Tucak A, Janoši K, Karner I, Hanzer J, Pajtler M, et al. Deliberate military destruction of the general hospital in the city of Osijek. Croat Med J 1992;33 (War Suppl 1):61-9

2 Marušić M, editor. Medical testimony of the Vukovar tragedy. Zagreb: Croatian Medical Journal, 1992.

3 Tomić J. Gynecology resident in the war. In: Marušić M, editor. Medical testimony of the Vukovar tragedy. Zagreb: Croatian Medical Journal, 1992:30-3.

4 General Considerations of Forward Surgery. In Bowen TE, Bellamy RF, editors. Emergency war surgery. Second United States revision of the Emergency war surgery NATO handbook. United States Department of Defence. Washington D.C.: United States Government Printing Office, 1988:1-13.

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War Wounds and Injuries of the Spine

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Abstract. Fifty-six patients with spinal injuries due to the war were treated at the University Hospital of Traumatology. Two thirds had neurologic deficits of various degrees. Operative treatment and decompression proved to be methods of choice in the treatment of war wounds and injuries to the spinal column and cord. In cases of spinal trauma with complete neurologic deficit, only wound debridement was done, whereas metallic implants (e.g., plates or fixators) were strictly avoided. Twenty-five patients were surgically treated, of which one died, and 6 showed signs of neurologic improvement during the early postoperation period.

Key words: *military medicine; spinal injuries; spinal cord injuries; wounds, gunshot*

Introduction

Due to the war in Croatia, the risk of spinal wounds and injuries, followed by a high rate of disability, has increased. As in no other type of injury, the time interval from infliction of the injury to its management appears to be important for the course and final outcome of the treatment. Spinal trauma should be managed within the first six hours after infliction of the injury (1). In the war against Croatia, this is often difficult to achieve, inasmuch as the enemy shows no respect for the Red Cross sign.

Subjects

Of our 56 patients, 49 were males and 7 females, 42 were members of the Croatian National Guard and 14 were civilians.

Results and Discussion

Mechanisms and localizations of the injuries are shown in Tables 1 and 2. Neurologic deficits of various degrees were present in 67.9% of patients, of which 26 (46.4%) had complete neurologic deficit (Table 3). 46.4% of patients had a spinal injury associated with injuries of other body regions (Table 4). Surgery was performed in 25 patients (Table 5), of which one (4%) died, and six showed signs of neurologic improvement in the early postoperative period (Table 6).

Since World War II, the standard principles of emergency war surgery have changed, mostly owing to new information and experience gained during the Korean, Vietnam and Lebanese war and other conflicts (3,4). The treatment of war wounds and injuries of the spinal column and cord began with a conservative approach; later on, a laminectomy was recommended for all patients, whereas the modern approach requires only wound debridement in patients with complete neurologic deficit, and myelography is strictly forbidden (4).

The fact that in the early postoperative period, a significant regression of neurologic deficit was noted in 6 patients (Table 6, 15.7% of those having the neurologic deficit), prompted us to conduct an extensive diagnostic procedure, including CT-myelography (Fig. 1) and perform emergency surgery in other such cases (3). The operative approach (anterior or posterior) depends on the localization of injury. For the wounds caused by fragments of explosive devices, fixation by

Table 1. Mechanism of injury

Wound type	No. of patients (%)
Missile wounds	23 (41.0)
Wounds caused by fragments from explosive devices	24 (42.8)
Other	9 (16.1)
Total	56 (100)

Table 2. Localization of injury

Localization	No. of patients (%)
Cervical spine	17 (30.4)
Thoracic spine	21 (37.5)
Thoracolumbar spine	5 (8.9)
Lumbar spine	13 (23.2)
Total	56 (100)

Table 3. Neurologic deficit

Degree	No. of patients
Tetraplegia	5
Tetraparesis 1	
Brachial paresis and paraplegia	1
Paraplegia	21
Paraparesis	5
Monoplegia	1
Monoparesis	3
Hemiparesis	1
Total	38
Total %	67.85

Table 4. Associated injuries

Body region	No. of patients
Head	5
Head and abdomen	1
Thorax	7
Abdomen	7
Thorax and abdomen	1
Extremities	5
Total	26

Table 5. Operative treatment

Spine	Procedure	No. of patients
Cervical		
	Corporectomy	3
	Anterior spondylodesis	3
	Laminectomy	4
Thoracic and lumbar		
	Laminectomy	11
	Laminectomy with dura grafting	4
Total		25

Table 6. Postoperative regression of neurologic deficit

Level of spine injury	No. of patients	Neurologic defect according to Frankel (2)	
		Preoperative	Postoperative
Cervical	1	A	D
	1	C	E
Thoracic	2	C	E
Lumbar	2	C	D
Total	6		

Figure 1. CT-myelography demonstrating the presence of metallic foreign material in the spinal canal.

means of metallic implants is not recommended. With respect to the ongoing war, corrective surgery, in cases of instability persisting even after rehabilitation therapy, must be postponed.

Some 43% of all injuries of spinal column and cord were associated with extensive tissue disruption caused by fragments of explosive devices. A spinal injury was usually just one of many complex injuries, most often associated with thoracic or abdominal injuries (Table 4), which made the management of the spinal cord injury the second priority. The first priority was to save the patient's life.

As ambulances and medical personnel were the enemy's favorite target, evacuation and transportation of the wounded was often difficult or even impossible. Consequently, a lot of precious time was lost, which inevitably reduced the chances of successful treatment.

References

1 Errico TJ, Bauer RD, Waugh TW, editors. Spinal trauma. Philadelphia: Lippincott, 1991.

2 Frankel HL, Hancock DO, Hyslop G, et al. The value of postural reduction in initial management of closed injuries of the spine with paraplegia and tetraplegia. Paraplegia 1969;7:179-92.

3 Simpson RK, Jr, Vengar BH, Narayan RK. Penetrating spinal injuries. In Pitts LH, Wagner FC Jr, editors. Craniocerebral trauma. New York: Thieme, 1990:78-102.

4 Hitna ratna kirurgija. Priručnik prireden za potrebe Glavnog sanitetskog stožera RH. Zagreb: Glavni sanitetski stožer RH, 1991.

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War in Croatia: Medical Care in Biograd Orthopedic Hospital

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Abstract. From August 1991 to October 1991, 113 wounded persons, civilians and soldiers, were registered at the Biograd Orthopedic Hospital. One third of them (36 patients) were hospitalized. Multiple injuries were frequent: beside gunshot (31 patients), explosive (7 patients) and rugged (8 patients) wounds, many of the wounded experienced traumatic amputations (2 patients), fractures (9 patients) and joint displacements (34 patients). Twenty eight of the patients had multiple bruises. Two victims died because of hemorrhagic shock and multiple gunshot wounds. Two representative cases of multiple bone fractures are described. The organization of the hospital work in this war is also presented.

Key Words: *Croatia, Biograd, medical care, hospital, orthopedic surgery, war*

Introduction

The Biograd Orthopedic Hospital is a specialized institution for the treatment of orthopedic and traumatic diseases. This institution provides medical care for patients from South Croatia (Dalmatia and Lika) and western parts of Bosnia. In specialized wards, Biograd Orthopedic hospital comprises 220 beds and 200 employees, of which 20 are physicians. Two operating theatres, Postoperative Care Unit, Radiology Ward, Physical Medicine Ward and Laboratory are the main units of the hospital.

The work of the hospital during the war against Croatia can be divided into two periods. The first period, from August 1990 to August 1991, passed without significant fights in the region and only incidentally wounded persons were admitted at the hospital.

The second period started at the beginning of September 1991, with more intensive attacks on the cities of Zadar and Šibenik and the surrounding area. In this period, the Orthopedic Hospital became a military hospital. The main reason for this was the vicinity of the battlefield and the continuous danger of air and heavy artillery attacks on the hospital.

Patients

From August 1991 till October 1991, 113 wounded persons were registered. Sixty four of them were Croatian National Guard soldiers, 28 Croatian policemen and 21 civilians. Most of them were males (110 patients).

Results

Orthopedic Hospital during War

From the beginning of September, all important hospital facilities (Operating Theatre, Radiology Ward and Laboratory) were displaced to the basement of the newly renovated Physical Medicine Ward. The Patient Ward, with 60, beds was located in the basement corridor. The Operating Theatre was also improvised at the end part of the basement corridor.

Wounded Persons

Table 1 summarizes the type and mode of wounding in 113 persons. Thirty-six were treated in the hospital and two of them died. The causes of death were extensive explosive wounds with hemorrhagic shock in the first victim, and multiple gunshot wounds in the second.

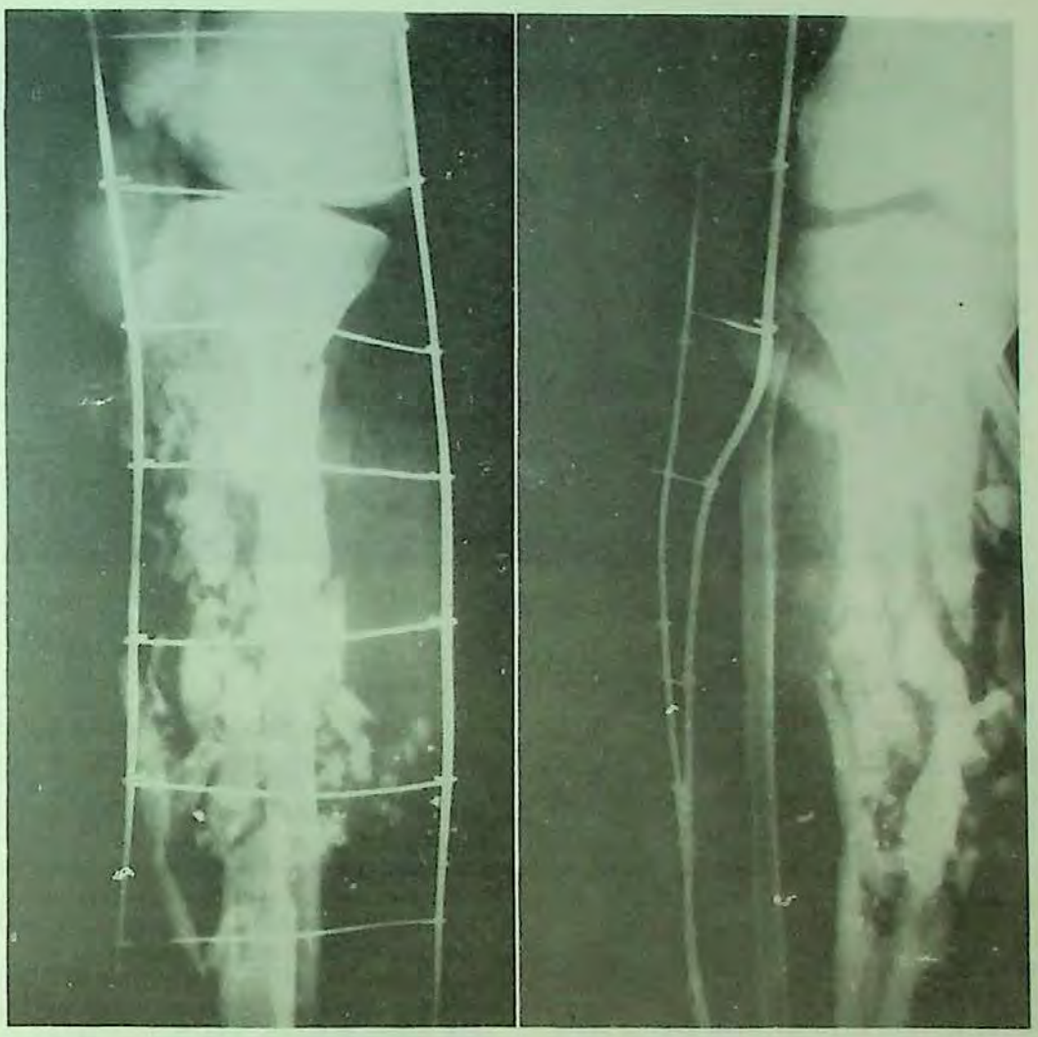

Figure 1. Destruction and multiple fractures of the right foreleg.

Case Reports

Patient C.S., male, aged 25. Occupation: Croatian National Guard soldier.

The patient was admitted to the hospital three hours after being wounded by a machine-gun bullet into the right shank. During transport, a Cramer's splint was used for the immobilization. The bleeding was transitionally stopped using an Esmarch bandage on the right thigh.

Upon admission, clinical signs of hemorrhagic shock were proved by the signs of moderate hypotension (RR 12/7 kPa), barely palpable arterial pulse with the frequency of 110 beats/min, and laboratory findings of anemia (hemoglobin 85 g/L). A whole blood transfusion was initiated immediately.

Examination of the legs revealed a significantly larger diameter of the right shank. The entrance gunshot wound was found in the distal third of the right shank, while the exit gunshot wound was found just beneath the shinbone tuberosity. The neurocirculation of the left leg was not compromised. Radiography (Fig. 1) revealed a destruction of the upper half of the right shinbone with multifragmented fractures of diaphysis near the knee joint.

Following the wound primary care and hemostasis, the right leg was immobilized with a high plaster splint. After 24 hours, the signs of swelling and large vesicles appeared on the right leg. The examination revealed peripheral circulation insufficiency and the disturbance of sensitivity of the right foot, so a large skin and fascia cut was done. After seven days the signs of neurocirculatory disturbances disappeared. Anemia was corrected with transfusion of 6 units erythrocyte concentrate. We are planning to put an external fixator in the near future, when secondary callus appears. We believe that the proximal part of the broken bone is too short to permit stable fixation.

Patient O.M., male, aged 33, Occupation: farmer.

The victim was wounded by an antitank mine while driving a tractor. At admission the patient was pale, with signs of bleeding. The left thigh was in a bizarre position, due to the open fracture of

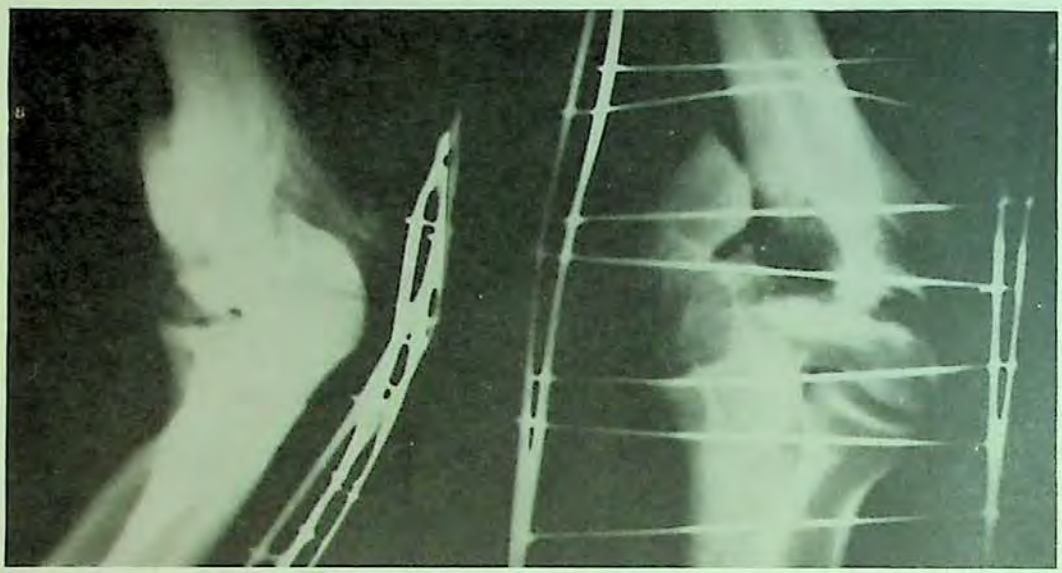

Figure 2. A comminutive fracture of the left elbow.

Table 1. Type of wounds in the patients treated in the Biograd Orthopedic Hospital from August to October 1991

Type of wounds	No of patients	%
Gunshot	31	27
Explosive	9	8
Rugged	8	7
Multiple contusions	28	25
Bone fracture	9	8
Joint displacement	16	14
Other multiple wounds	5	4
Knee lesion	3	3
Traumatic amputation	2	2
Extensive burns	2	2

the distal third of the thigh. The right foot showed no signs of circulation and sensation. Jagged wounds in the popliteal space and outer side of the thigh were also found. There was also a comminutive fracture of the left elbow (Fig. 2).

In general anesthesia revision of the wounds was done with the amputation of the right shank. The patient received 9 units of erythrocyte concentrate. The left elbow fracture was treated conservatively. Osteosynthesis will be done after the soft tissue wounds have healed.

Discussion

During the Gulf War a third of the wounded persons were treated by orthopedic surgeons (1). According to the emergency and mode of the treatment, patients were divided into immediate, urgent, postponed, minimal and expectative group of patients. The majority of orthopedic patients belonged to the urgent and postponed groups. The urgent group comprised of patients with amputations, open fractures, fractures of long bones and large burns (15-40% of body surface). In the postponed group there were patients with all types of soft tissue wounds and noncomplicated fractures of the distal parts of arms and legs (1). Our report of two cases illustrates both problems of urgent and postponed orthopedic treatment of wounded persons.

References

1 Hoffer MM. The Orthopaedic surgeon in armed conflict. J Bone Joint Surg 1991;73:799-801.

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Head and Neck Injuries Treated in Zadar Medical Center

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Abstract. Surgical treatment of head and neck wounds in 29 wounded patients is described. All wounds were treated primarily, with primary reconstruction of the defects of tissues. There were no infections or flap necroses.

Key words: *esophagus; face; head and neck wounds; nose; reconstructive surgery; tissue grafts; wounds and injuries*

Introduction

The Zadar region was caught in the war against Croatia from its very beginning. On September 1, 1991, the town came under attacks from the land, air and sea. The enemy used classical weapons, mostly infantry and artillery.

War medical service in Zadar was based on mobile surgical teams which were able to provide a high-quality medical care at the site of wounding. In this report, results of the treatment of head and neck injuries in Zadar Medical Center, i.e. the fourth echelon, are described.

Subjects and Methods

From August 1, to October 31, 1991, 293 wounded persons were admitted to the Zadar Medical Center, and 108 of them were hospitalized. Twenty patients were treated as inpatients at the Department for Maxillofacial Surgery and 9 as outpatients. The following wounds were treated surgically: a bullet in the orbita, without a bulbus injury (one); a bullet in maxillary sinus (one); fracture of both ethmoidal sinuses with rupture of ethmoidal artery and retrobulbar bleeding and extreme protrusion (one); explosive wound of the upper lip with a two-third defect (two); explosive wound of the lower lip with a commissural defect (one); defect of the external nose, upper lip and preauricular defect of the face, defect of the bottom of the oral cavity and medial part of the mandible (one); defect of the medial part of the face, fracture of the mandible on the left side and defect of the mandible on the right side (one); firearm penetrating wound of the neck with rupture of the cervical part of the esophagus (one); firearm penetrating wound with fracture of the transversal processus of the atlas with rupture of the vertebral artery (one); firearm penetrant wound of the neck without injury to the large blood vessels and nerves (two); firearm penetrating wound with a lesion of the trachea and subcutaneous emphysema on the neck, thorax, face and pneumomediastinum (one); defect of the skin in the preauricular part of the face (two); defect of the lower eyelid in 25% of the length and 30% of the width (two); auricular skin defect (two); complete unilateral defect of the nose (one); minor wound of the face (five); wounds of the skull soft tissue without lesions of the bones (four).

All patients were preoperatively given a combination of penicillin and gentamicin.

Results and Discussion

A doctrine of primary treatment of the wounds and primary reconstruction of defects was followed. The concept of delayed reconstruction belongs to the past, since the hospitalization and

adverse effects of the patient's psychology are thus prolonged.

The ABE-Estlander's method was used for the upper lip reconstruction (1). A flap of the lower lip was used (normal tissue of appropriate thickness) for the full reconstruction of the vermilion. Cosmetically, the effect is maximal. Although in most cases transposition of the flap from the upper lip results in a commissural deformation (which requires an additional corrective operation), the functional result is excellent.

Defects of the medial parts of the face were reconstructed with cervicofacial flaps (2). In such a way covering of large defects is ensured and, since the remaining skin of the face and neck is used, the esthetic effect is excellent, particularly with respect to the color and sensitivity of the skin. Interpolated skin flaps do not result in optimal esthetic effect.

Defect in the auricular area was reconstructed by a face-lifting technique (3-6). The technique is superior for this area. It covers large defects, the scars are invisible and the final esthetic result is excellent.

In a patient with mandibular defect on one and fracture of the mandible on the other side, osteosynthesis of the fracture was performed. We decided to delay the mandibular reconstruction because we had to do complete reconstruction of the face first and the reconstruction of the mandible appeared too risky. It should be emphasized that the mandible should be properly posed with respect to the occlusion; this was achieved by periodontal wire ligatures.

A rather interesting case was our patient with retrobulbar hemorrhage from the frontal ethmoid artery due to the fracture of the ethmoid. The injury was caused exclusively by an air blast wave after an explosion, without any damage to the skin and zygomata. To our knowledge, such an example has not been described so far. Due to the extreme protrusion of the bulbus, it was urgent to perform decompression of the orbit, and ligature of the anterior ethmoidal artery. There are several approaches to decompression of the orbit (7,8); we opted for external ethmoidectomy, because the fracture of the ethmoidal bone caused the bleeding from the frontal ethmoidal artery requring a ligature.

A defect of the lower eyelid was directly sutured in one case (a defect not exceeding 25% of the eyelid length), inasmuch as this is the maximal defect that can be sutured primarily without adverse effects on the function and appearance. In case of a 30% defect of the eyelid, the eyelid was reconstructed after lateral cantholysis (9,10). In our institution, this method was found to yield excellent functional and esthetic results in the lower eyelid reconstruction after operations of carcinomas.

The bottom of the oral cavity was reconstructed with a lingual tissue flap (11). Although reconstruction of the oral cavity can be performed according to several methods primarily using interpolated musculo-skin flaps (11-13), we used the tongue flap, because it is associated with the lowest risk of necrosis and most rapid recovery of the patient.

The rupture of the esophagus should be treated immediately, with an obligatory drainage of the neck. The application of a probe and waiting for spontaneous healing is not an optimal strategy, and should be utilized only when the former cannot be done. In that case, the patient should be transported to an institution where the rupture can be properly treated.

In a patient with the lesion of the trachea and pneumomediastinum, the cervical part of the trachea down to the jugulum was exposed and inspected; since no lesions were found, the neck skin was cut, all neck fascias were cut, and the neck was drained.

Rupture of the vertebral artery, encountered in one patient, is also quite rare, because the rupture was caused by fracture of the transversal processus of the second cervical vertebra. The vertebral artery was ligated through a retropharyngeal approach, after the incision of the m. capitis longisimus and a part of the m. trapezius and levator scapulae.

Wilkinson's method was used to reconstruct the unilateral defect of the nose (14), because our experience with it is quite favorable. It should be emphasized that in the paranasal skin flap used for the reconstruction of the nose, the cartilage should be implanted to obtain the proper contour of the top of the nose. The cartilage was taken from the auricle as it is most suitable for modelling. The original Wilkinson's method does not include cartilage implantation but, according to our experience, without the cartilage the esthetic result is not optimal.

In conclusion, we believe that war wounds of the head and neck area should be treated primarily, with primary reconstruction of all defects. There were no infections or necrosis of the grafts in any of our patients.

References

1 Estlander J. Eine Methode aus der einen Lippe Substanzverluste der anderen zu ersetzen. (English translation.) Plast Reconstr Surg 1968;42:361-4.

2 Stark RB. Plastic surgery of the head and neck. New York, Edinburgh, Melbourne: Churchill Livingstone, 1987.

3 Aufrich G. Surgery for excess skin of the face. Trans 2nd Int Congr Plast Surg. Edinburgh: E&S Livingstone Ltd, 1960.495-508.

4 Guerrero-Santos J, Espaillat L, Morales F. Muscular lift in cervical rhytidoplasty. Plast Reconstr Surg 1974;54:127-30.

5 Mitz V, Peyronis M. The superficial musculo-aponeurotic system (SMAS) in the parotid and cheek area. Plast Reconstr Surg 1976;58:80-5.

6 Rees TD. Aesthetic plastic surgery. Philadelphia: Saunders, 1980.

7 Lore JM. An atlas of head and neck surgery. Philadelphia: Saunders, 1973.

8 Pearl RM, Vistnes L, Troxel S. Treatment of exophtalmos. Plast Reconstr Surg 1991;87:236-44.

9 Beyer-Machule CK. Plastic and reconstructive surgery of the eyelids: A practical guide. New York, Stuttgart: Thieme-Stratton Inc, 1983.

10 Mustarde JC. Repair and reconstruction in the orbital region. Edinburgh: E&S Livingstone Ltd, 1966.

11 Guerrero-Santos J. Tongue flaps. In Grebb WC, Hyers MB, editors: Skin flaps. Boston: Little-Brown, 1975: 201-23

12 Ariyan S. The pectoralis major myocutaneous flap: A versatile flap for reconstruction in head and neck. Plast Reconstr Surg 1979;63:73-8.

13 Morain WD, Colen LB, Hutchings J. The segmental pectoralis major muscle flap: A function-preserving procedure. Plast Reconstr Surg 1985;75:825-30.

14 Wilkinson TS. Alar hinge flap in heminasal reconstruction. Ann Plast Surg 1978;481-4.

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War Blast Injuries of the Ear

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Abstract. From the beginning of the war against Croatia until December 1, 1991, 39 patients with 60 ear lesions were treated at the Zagreb School of Medicine ENT Department for blast injuries of the ear. Expressed in percentage, 77% of them were under the age of 30, 25% were hospitalized more than 2 weeks after infliction of the injury because of impossible evacuation (e.g., those from besieged Vukovar) or due to polytraumatism of the wounded requiring emergency treatment of other wounds. In 36.7% of the patients, only ear drum injuries were found, in 25% perceptive hearing loss alone was observed, whereas ear drum injuries with perceptive hearing loss was recorded in 36.7% of the wounded. Hematotympanum was found in 1.6% of the patients. Minor ear drum defects were allowed to heal spontaneously, in case of major defects ear drum reposition with silicone foil placed over the ear drum was performed, whereas in defects that did not heal or healing could not be expected due to defect extent, myringoplasty or tympanoplasty was performed.

Key words: *blast injuries; hearing loss; myringoplasty; tympanoplasty*

Introduction

As the ear is an organ most susceptible to blast effects, blast injuries of the ear are quite frequent in war. The blast consists of a short-term positive high-pressure velocity wave followed by a prolonged one of negative decreased velocity, exerting a suction-like action. Injuries of the ear are caused by positive high-pressure velocity wave (Friedlander's curve). Beside ruptured ear drums, other ear structures may also be involved, e.g., the inner ear, auditory ossicle and fenestrae (1,2).

In the treatment of blast injuries of the ear drum, reposition of the ear drum with a silicone foil, paper or Gelfilm placed over it, and myringoplasty or tympanoplasty are the commonly used methods. The frequency of spontaneous ear drum healing is about 80% (1,3-5). Ear drum reposition with a silicone foil, paper or Gelfilm placed over it has been reported to lead to healing in more than 90% of cases (6). Myringoplasty or tympanoplasty can be used immediately after the wound infliction (7) or the ear is allowed to heal spontaneously. Only ear drums that would not heal over a several-month period should be operated on (3). The above combination of methods has proved successful in about 90% of cases (8).

Patients

From the beginning of the war in Croatia till December 1, 1991, 104 patients were examined at the ENT Department of the Zagreb University School of Medicine for blast injuries of thee ear. Thirty-nine patients were hospitalized, 38 (97%) males and 1 (3%) female. The patients' age was 18-49 yrs (mean, 27.9 yrs), 77% of them were under the age of 30. The time elapsed from the wound infliction to hospitalization ranged from several hours to 76 days (mean, 13.9 days). Fifteen (38.5%) wounded subjects were admitted within 72 hours.

Results

Thirty-nine patients were treated at the Zagreb School of Medicine ENT Department for blast injuries of the ear. In 21 patients, both ears were involved, whereas 18 patients had unilateral lesions, which made 60 ear lesions in total. There

blast injuries of the ear. In 21 patients, both ears were involved, whereas 18 patients had unilateral lesions, which made 60 ear lesions in total. There were 22 (36.7%) cases of blast injury of ear drum, 15 (25%) cases of perceptive hearing loss greater than 30 dB due to inner ear lesions, and 22 (36.7%) cases of ear drum lesions with perceptive hearing loss due to inner ear lesions. Hematotympanum was found in 1 (1.6%) case. Perceptive deafness generally referred to high frequencies, usually 4-6 kHz, but in 8 (21.6%) cases the frequencies below 2 kHz were also involved.

In 17 cases, myringoplasty was performed, in 15 of them with temporal fascia and in 2 with tragus perichondrium. In 10 cases, myringoplasty was performed within a month from the wound infliction, whereas in the remaining 7 cases more than a month had elapsed from the wounding.

Ear drum reposition with the insertion of Gelfilm and silicone foil in the middle ear and ear drum, respectively, was performed in 9 cases, in 6 of them within 48 hours, and in 3 cases 7, 20 and 37 days after the wounding. In cases where reposition could not be carried out within 48 hours after the wounding, the rims of the defect were refreshed to improve spontaneous healing. In one case, the rims were treated with electrocoagulation. One patient had a hematotympanum the content of which was removed by myringotomy, whereafter a ventilation tube was inserted for eustachian tube dysfunction.

Seventeen defects involving only a minor part of the ear drum area were allowed to heal spontaneously.

Discussion

The number of blast injuries of the ear recorded at our Department only until December 1, 1991, exceeded the final war statistics reported elsewhere (5,8). Hearing loss due to blast injuries of the ear most frequently affects subjects younger than 30 yrs (77%).

About 40% of the patients were hospitalized within 72 hours from the wounding, whereas 25% of the injured subjects were hospitalized only after one or more weeks due to impossible evacuation (e.g., from Vukovar under siege) or for polytraumatism of the wounded requiring emergency treatment of other, more severe lesions.

Both ears suffered blast injuries in more than 50% of the wounded, the ear on the side of explosion being more severely injured.

Blast causes lesions to the ear drum and middle ear, but also to the inner ear. Ear drum lesions without perceptive hearing loss were observed in 50% of the wounded, whereas the remaining 50% had both ear drum and inner ear injuries. These results appear to confirm the statement that an ear drum injury does not exclude the existence of an inner ear lesion (4).

Among all blast injuries, 62% referred to perceptive hearing loss greater than 30 dB, i.e. perceptive deafness alone was found in 25%, and perceptive deafness accompanying ear drum injury in 37% of cases. Perceptive hearing loss always involved frequencies exceeding 3 kHz, whereas deafness to high frequencies also involved speech frequencies of up to 2 kHz in only 20% of cases. The results obtained are consistent with those reported by others (9), indicating the frequency areas between 4 and 6 kHz to be most commonly affected by blast injuries.

As spontaneous healing of the ear drum has been reported in about 80% of cases and almost all defects involving less than 30% of the ear drum area heal spontaneously, 17 (38.6 %) cases were allowed to heal without surgical intervention. All defects in patients hospitalized within 48 hours where spontaneous healing could not be expected because of the defect extent and twisting of its rims, reposition of the ear drum was performed and a silicone foil placed over it. The same method was employed in several defects older than 48 hours, but then the epithelium was removed from the defect margins, thus favoring further spontaneous healing of the defect.

Myringoplasty was performed in cases where spontaneous healing did not occur or could not be expected to occur. In 2 cases of minor defects, the tragus perichondrium was used, and in the others the ear drum was reconstructed using the temporal muscle fascia. In patients with greatly reduced conduction, exploration of the middle ear and tympanoplasty were performed.

References

1 Pahor AL. The ENT problems following the Birmingham bombings. J Laryngol Otol 1981;95:399-406.

2 Sudderth ME. Tympanoplasty in blast-induced perforation. Arch Otolaryngol 1974;99:157-9.

3 Kerr AG, Byrne JET. Concussive effects of bomb blast on the ear. J Laryngol Otol 1975;89:131-43.

4 Roth Y, Kronenberg J, Lotem S, Leventon G. Blast injury of the ear. Harefuah 1989;117:297-301.

5 Singh D, Ahluwalia KJS. Blast injuries of the ear. J Laryngol Otol 1968;82:1017-28.

6 Masservy M. Unilateral ossicular disruption following blast exposure. Laryngoscope 1972;82:372-5.

7 Ruggles RL, Votypka R. Blast injuries to the ears. Laryngoscope 1973;83:974-6.

8 Makki HT. An evaluation of myringoplasty in war injured people. J Laryngol Otol 1989;103:945-6.

9 Ylikoshi J. Acute acoustic trauma in Finnish conscripts. Etiological factors and characteristics of hearing impairment. Scand Audiol 1989;18:161-5.

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Ozone Treatment of War Injuries

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Abstract. Seven patients, five with gunshot wounds with excessive involvement of the lower leg soft tissues and bones, and two with frostbiten feet, were treated with ozone. The results obtained were very encouraging, because Thiersch's skin grafts could be applied in all cases after only 15 days. The grafts took in at least 60% of their surface. In two patients with severe foot frostbites, all initial symptoms except pain subsided, with a demarcation line far below the expected level, i.e. with the entire extremity preserved.

Key words: *frostbite; ozone, therapeutic use; skin grafting; wounds, gunshot*

Introduction

The antiseptic action of oxygen (O_2) has been widely used in the management of septic wounds by treating the patients in hyperbaric chambers (1). Ozone (O_3) is characterized by an even greater bactericidal, fungicidal and virucidal action, and has been demonstrated to favor tissue perfusion, stimulate the metabolism and clean the wound, thus contributing to faster wound healing (2).

Labbe and Oudin were the first to use ozone for therapeutic purpose in humans in 1894, enriching oxygen from the air with ozone and using the mixture for inhalation in patients with pulmonary tuberculosis (3). During World War II, Wolff used ozone in the treatment of patients with wound infections as well as in those with decubital ulcers and fistulae (4).

Since 1935, ozone has been used in the form of large intestine insufflation in patients with fistulae, mucous colitis, ulcerative colitis, Crohn's disease or osteomyelitis (5). The immunosuppressive action of ozone has also been demonstrated, so it has been introduced as an additive in the treatment of rheumatic diseases (6).

Patients and Methods

Seven patients, five with gunshot wounds with excessive involvement of the lower leg soft tissues and bones, and two with bilateral foot frostbites, were treated at the Department of Surgery, Zagreb Clinical Hospital.

Patients with gunshot wounds (the smallest tissue defect was sized 5 x 4 cm, and the largest 20 x 8 cm) were admitted to local medical centers immediately after infliction of the wound and treated there during a mean period of 25 ± 4 days. After surgical treatment of the wound with excision of devitalized tissue and hemostasis, Ceporex (1000 mg 4 times a day) was ordered in all patients. In two patients, the extremities were immobilized by a femoral splint, whereas in the remaining three patients external fixators were applied. Upon admission to the Department, wound swabs for aerobes and anaerobes were taken in all patients.

The treatment was performed by means of an Oxyzon instrument (Dieter Stein Medizintechnik, Buerstadt, Germany) converting pure oxygen into ozone. The procedure was as follows: a plastic bag was attached to the lower leg. Then, as much air as possible was manually sqeezed out of the bag.

After fixation and sealing by a special belt, the Oxyzon was connected *via* a system for gas supply/discharge and the remaining air pumped out by pressing the appropriate switch. Then, the desired ozone concentration was selected on a dial and its supply activated for 6 minutes. When the instrument stopped working automatically, the action of ozone was prolonged for 8 minutes more. The whole procedure, including preparation, took about 20 minutes. In three patients with external fixation of the lower leg, plastic bags with a greater volume than the original ones were used for the treatment.

During first three sessions, the concentration of ozone was 50 μg/ml, whereafter it decreased to 30 μg/ml. Wound swabs for aerobes and anaerobes were taken before each ozone application, and all wounds were regularly redressed with sterile gauze soaked with saline. Body temperature was measured in the morning and in the evening.

Clinical appearance of the wound and bacteriologic findings of the wound swabs were used as criteria for assessing the clinical status of the wound. When granulations were observed to have started forming at the bed of the wound, i.e. when epithelization of the wound margins had begun, a Thiersch's skin graft was transplanted employing a standard procedure and its viability observed.

Two patients with frostbites were admitted to the Department after having lain with gunshot wounds of the thighs in the cornfield near Vukovar for 3 and 8 days, respectively. Upon admission, the inspection revealed a dark-blue to black-colored skin of both feet, up to the level of Chopart's articulation, with severe local pain, edema and bullae of the toes. Movements of the feet and weight bearing were impossible. The pulse in dorsal feet arteries could not be palpated.

The ozone therapy procedure was the same as described above. Naturally, wound swabs were not taken in these cases. Therapeutic success was judged by the appearance of a distinct demarcation zone between the necrotic and normal tissue to allow amputation at an appropriate level. Apart from the therapy protocol, the feet were warmed up by absorbent cotton dressings.

Results

The following mixed flora was isolated from wound swabs for aerobes and anaerobes taken from the patients with gunshot wounds of the thighs upon admission to the Department: *Serratia species* (N=5), *Proteus vulgaris* (N=4), *Staphylococcus aureus* (N=3), *Proteus mirabilis* (N=3), *Pseudomonas aeruginosa* (N=2), *Staphylococcus epidermidis* (N=2), *Clostridia species* (N=1), *Acinetobacter species* (N=1) and *Escherichia coli* (N=1). The number of species in wound swabs was reduced by 33% already after the second ozone therapy session, with concurrent body temperature decrease from 38.5°C to 37.2°C. The following bacteria were isolated: *Serratia species* (N=5), *Proteus vulgaris* (N=4), *Proteus mirabilis* (N=3), *Pseudomonas aeruginosa* (N=2) and *Staphylococcus epidermidis* (N=2).

In each patient, the average number of ozone therapy sessions was 7 ±1, prior to the transplantation of free Thiersch's skin grafts. A body temperature decrease below 37°C was recorded in all patients. One patient had a sterile wound swab, whereas in other patients' bacteriologic swabs only 44% of the initial number of bacterial species were isolated, i.e.: *Serratia species* (N=4), *Proteus vulgaris* (N=4), *Proteus mirabilis* (N=3) and *Pseudomonas aeruginosa* (N=1).

Skin grafts were controlled three days after transplantation and were found to be vital in more than 60% of their surface. The patients were then referred to rehabilitation centers for further treatment.

In the two patients with frostbites, the ozone treatment had to be applied on four occasions, every other day. Notable regression of the dark-blue to black color and skin edema occurred already after the second application of ozone, but pain persisted throughout the treatment period.

At the end of the treatment, in the patient who had spent 8 days without medical aid, lying in the cornfield, a demarcation line of necrotic tissue appeared at the half of the proximal great toe phalanx and proximal interphalangeal articulation of the second toe. Therefore, amputation through both metatarsophalangeal articulations was performed. The postoperative course and wound healing were normal. With the exception of pain, the initial frostbite symptoms completely disappeared in the right foot of this patient as well as in both feet of the other patient who had been without medical aid for 3 days. Moderate weight bearing on the heels and walking with crutches were possible in both patients. No demarcation surface of necrosis was observed. After the treatment at our Department, both patients were referred to centers for rehabilitation.

Discussion

Within the scope of international medical aid to Croatia, an ozone treatment device has been installed at our Department. Although primarily designed for different purposes (e.g., ulcus cruris, large intestine insufflation, etc), it was used in the treatment of war wounds, especially in cases of resistant infection and severe foot frostbites.

The ultimate and at the same time most important outcome of the treatment was the fact that all Thiersch's skin grafts took in at least 60% of their surface, despite persistent presence of mixed bacterial flora. As compared to our previous experience of the lysis of the graft after wound dressing with hydrogen peroxide and hypertonic solution, the above described outcome was considered very encouraging. The mean duration of the treatment was 15 days, which presented a considerable reduction in the duration of hospitalization of war patients.

In the two cases of frostbites, a significant improvement was also observed. Regression of all initial symptoms except pain, along with the occurrence of a demarcation line far below the expected level and preservation of the entire extremity, support the hypothesis that tissue perfusion is favored by ozone.

In conclusion, it should be emphasized that our results reaffirmed the great advantage and benefits of the ozone treatment of war injuries. It should not be forgotten, however, that appropriate surgical treatment of a war injury is the main precondition for ozone therapy.

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References

1 Kuzin MI, Kostočenok M. Rani i ranavae infekcie. Moskva: Medicina, 1981:13-35.

2 Martindale. The Extra Pharmacopoea. 28th edition. London: The Pharmaceutical Press, 1982:1739-9.

3 Klug W, Cnoch HG, Rosche W. Blutgasanalitische Untersuchungen nach rectaler Insufflation von dem ozonisiertem Sauerstoff-Tierexperimentalle Untersuchungen. Colo-proctol 1987;6:336-40.

4 Wolff H. Das medizinische Ozon. 2nd edition. Heidelberg: Verlag fuer Medizin, 1982.

5 Payr E. Ueber Ozonbehandlung in der Chirurgie. Muench Med Wochenschr 1935;82:220-91.

6 Fahmy Z. Immunological effect of ozone (O_3/O_2) in rheumatic diseases. Ozon Nachrichten 1984;3:75-8.

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Wounds Inflicted by High Velocity Projectiles

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Abstract. High and low velocity bullets differ significantly in their wounding capacity. This is most obvious in the shape of their entrance/exit wounds. On the basis of 31 autopsies performed on war casualties (43.6% Croatian National Guard soldiers, 29.3% unidentified, 16.4% Yugoslav Army soldiers and 10.7% civilians) at the Institute for Forensic Medicine and Criminology, Zagreb University School of Medicine from April 1 to December 1, 1991, several characteristics of wounds inflicted by high velocity bullets are presented. Explosive wounds were the most frequent cause of death in Croatian Army soldiers (55.8%, while only 30.7% of Yugoslav Army soldiers died from the same cause).The most important fact that a forensic professional should bear in mind is that the wounds caused by high-velocity projectiles may resemble the ones inflicted by blunt mechanical force.

Key Words: *casualties; Croatia; high velocity bullets; wounds, gunshot; war*

Introduction

The classification of projectiles between high and low velocity projectiles is nowadays accepted in forensic medicine because of the different injuries they may inflict on the human body (1).

In periods of peace, forensic medicine usually deals with wounds inflicted by low velocity projectiles, such as pistol bullets. The initial velocity of such projectiles may range from 270 m/s up to 650 m/s. This delineates the limit between low and high velocity projectiles (2,3).

Projectiles fired from high velocity weapons have different wounding effects; while an injury of a vital organ caused by low velocity bullet may cause death, a person hit by a bullet fired from a high velocity weapon usually dies of shock, without any damage to vital organs (4).

The formation of temporary pulsating cavitation is the primary concern of wound balistics.

The maximum volume of the temporary cavitation depends on the type of the projectile, its surface, cross section stress and the density of the material it penetrates (5,6).

Methods

In the period from April 1 to December 1, 1991, at the Institute for Forensic Medicine and Criminology, Zagreb University School of Medicine, 1,154 autopsies were performed, 317 of them on war casualties. These cases were analyzed further and all relevant data were taken from the autopsy files.

Results

Of 31 war casualties, Croatian National Guard soldiers constituted the largest group (43.6%), 9 cases (29.3%) were unidentified, (16.45%) were Yugoslav Army soldiers and the smallest group were civilians (10.7%)

89% of them died on battlefield and only 11% died in hospitals. This distribution of war casualties does not represent the overall distribution of war casualties in Croatia (according to the Medical Corps Headquarters, more than 50% of the killed are civilians), but rather reflects the cases which arrive at our Institute. Most of the autop-

Figure 1. Stellate skin defect (diameter 3.5 cm) in the middle of the frontoparietal region. Nine cm-long laceration, running to the right eye corner, extends from the wound. Multiple skull fractures and brain contusion are visible. Two linear symetrical excoriations with hematoma (butterfly shape) are found in the place of glasses' frames. This wound was inflicted by a high velocity projectile which caused a temporary cavitation effect, resembling an explosion from the inside of the skull. This resulted in bone fractures and skin laceration, as well as in skin contusion in the area of inner eye corners which hit the glasses.

sies of the civilians are performed in regional institutions.

Gunshot wounds were the most frequent cause of death in unidentified victims (60.3%), civilians (52.9%) and Yugoslav Army soldiers (51.9%). In the group of Croatian National Guard soldiers explosive wounds were the most frequent cause of death (55.8%), while explosive wounds were the second most frequent cause of death in the other three groups of casualties.

Discussion

Altough this research is not a complete epidemiological study of all the casualties of the war against Croatia, it may be valuable in supplying a forensic pathologist with useful information.

Entrance gunshot wounds can be recognized by a round skin defect and the observable phenomena around the wound (a contusion ring). Exit gunshot wound is usually larger. However, the entrance gunshot wound can be larger than the exit gunshot wound if the projectile is fired from a very close range. Defining the entrance gunshot wound on the basis of the relative and absolute distance from which a bullet has been fired is not a problem (7).

High velocity projectiles can cause completely different wound shapes and more complex tissue and organ damage than low velocity projectiles. This is the result of a large amount of energy discharge during the penetration of the body. Due to the high striking velocity of a projectile and the great amount of energy discharged into the tissue, the entrance wound may be significantly larger than the exit wound (8), often shapeless, with skin laceration and without visible contusion rings (most frequent with gunshot wounds of the head) (Fig. 2).

Considering the fact that temporary cavitation can measure 2 cm in diameter, tissue and organ injuries may be extremely complex, without a typical cylinder shape (9).

Apart from the injury and the effect a temporary cavitation may have on the complexity of the body and tissue injuries, secondary missiles can be very important. When a projectile passes through a bone, the projectile shatters it into particles which can further damage the surrounding organs and tissue (10). Moreover, when high velocity projectiles penetrate the body, they fragment, causing several exit wounds (11).

If a wound canal inflicted by high velocity bullet is located near the skin, the temporary cavity may extend into the skin and cause linear laceration which could be mistaken for incision wounds (Figs. 1 and 2).

High velocity projectile causes most serious injuries to the parts of the body rich in water, or consisting of a mashy mass (e.g., brain), because liquid cannot be compressed (12).

Figure 2. Three firearm wounds of the right leg (top). Two round entrance wounds (diameter 5 mm) and a 10 cm-long wound canal stretching from the right ankle up to the knee (bottom). The wound resembles a laceration that was caused by temporary cavitation, which led to extensive skin and tissue laceration of the right calf. The bullet was recovered from the thigh.

Therefore, head wounds can be described as "explosions from the inside". Eye-balls often protrude and can be seriously injured. If a projectile penetrates the liver, such complex injuries are inflicted that the wound canal cannot be reconstructed.

Lung injuries are different, mainly because of the elastic properties of the lung tissue. Large ruptures are common, although the entrance wound is found as an oval skin defect, which allows partial reconstruction of the wound canal. The shapes of exit gunshot wounds inflicted by high velocity pro-

Figure 3. Explosive entrance wound (diameter 2 x 1.5 cm) resembling a gunshot entrance wound.

Figure 4. Gunshot wound inflicted by a high velocity projectile. Extensive injury of soft and bone tissue led to partial amputation of the thigh, so that a piece of soft tissue connected it to the foreleg.

jectiles vary from oval to elongated, depending on the exit angle of the bullet.

In war time, explosive wounds are also common and, according to the size and the extensity of the injury should be clasiffied as wounds inflicted by high-velocity projectiles. They are mostly oval in shape and can have smaller or bigger contusion rings. They may even resemble ordinary entrance gunshot wounds, with oval, perforated skin defect (2 mm wide) and a contusion ring (Fig. 3). As shell pieces vary in size (several mm to several cm) and velocity (400-2000 m/s), the injuries range from simple to very complex (6). In one case, the autopsy revealed complex damage of internal organs inflicted by a bomb fragment measuring less than 0.5 g (Fig. 3).

In conclusion, gunshot wounds inflicted by high velocity projectiles vary greatly in their size,

shape and the intensity of tissue damage. Sometimes the entrance and exit wounds cannot be discerned. Moreover, temporary cavity may cause skin ruptures similar to incisive wounds, or even cause a partial or complete amputation of the extremity (Fig.4).

References

1 Forster B. Praxis des rechtsmedizin. Stuttgart-New York-Munich: Georg Thieme Verlag, 1986.

2 Ragsdale BD. Gunshot wounds: historical perspective. Mil Med 1984;49:301-15.

3 Rich NM. Missile injuries. Am J Surg 1980;139:414-20.

4 Mueller B. Gerichtliche medizin. Berlin-Heidelberg-New-York: Springer-Verlag, 1975.

5 Sellier K. Schusswaffen und schusswirkungen. Luebeck: Verlag Max Schmidt-Romhild, 1969.

6 Fisher H, Spann W. Pathologie des trauma. Munich: Verlag JF Bergmann, 1967.

7 Fatteh A. Handbook of forensic pathology. Philadelphia-Toronto: JB Lippincott Company, 1973.

8 Light FW. Gunshot wounds of entrance and exit in experimental animals. J Trauma 1963;3:120-8.

9 Fackler ML, Bellamy RF, Malinowski JA. The wound profile: illustration of the missile-tissue interaction. J Trauma 1988;28:21-9.

10 Ragsdale BD, Josselson A. Experimental gunshot fractures. J Trauma 1988;28:109-15.

11 Mendelson AJ. The relationship between mechanism of wounding and principles of treatment of missile wounds. J Trauma 1991;31:1181-202.

12 Gordon DS. Penetrating head injuries. Ulster Med J 1988;57:1-10.

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Identification of the Dead in War: The Case of the Twenty Killed Croatian Soldiers Found near Pakrac

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Abstract. This paper describes the method of identification of twenty members of the Croatian Police and National Guard killed and buried by Serbian terrorists and Yugoslav Federal Army soldiers near the village of Kusonje on September 8, 1991. They were exhumated almost five months later. Forensic expertise revealed extensive postmortal changes, so that the mechanisms of deaths could not be established with certainty. Three cadavers had hands tied with pieces of wire, and one of them the legs tied with a wire. One of the cadavers had his penis cut off with a sharp object. The authors suggest an identification procedure suitable for a large number of cadavers in war circumstances.

Key words: *forensic expertise; identification; war*

Introduction

In the first few months of the war against Croatia, the problem of identification of victims was rarely encountered. However, the discovery of many places where the aggressor had buried the dead, both Croatian soldiers and civilians, has created the problem of identification. By medico-legal definition, identification is a process of establishing the identity of persons, parts of the body, other traces and objects (1,2). A common characteristic of many identification techniques is that the forensic findings are compared to the ones that already exist (3). Dactyloscopy is one of the most relevant techniques (2), as well as dental records, photographs, jewelry, etc (4,5). In the case of the identification of a large number of cadavers, the exhumation and the transport of the dead to the place of autopsy pose additional problems. In peace, catastrophes like airplane crashes, train wrecks, earthquakes and floods bring a large number of dead for identification. Each of these accidents poses special identification problems, such as carbonized and deformed cadavers in airplane crashes, or the displacement of cadavers miles away from the scene of accident. In war, circumstances may impose serious problems for identification: the identical clothing and underwear of soldiers, extensive migration of the population, great distance between the time of death and exhumation and deliberate obstruction of identification by the destruction of the personal documents.

The Department of Forensic Medicine and Criminology of the Zagreb University School of Medicine has extensive experience in the identification of cadavers, gained in two of the three major accidents that occured in Croatia (a train crash on the Zagreb Main Railway Station, and an airplane crash over the village of Vrbovec) and numerous smaller accidents. An identification protocol was developed (Table 1), including the collection of data from two main sources: relatives (protocol A) and autopsy (protocol B). The data are then compared and supplemented with dental records and dactyloscopy.

Table 1. Protocols for collecting data from relatives of the missing persons and the autopsy of the cadavers for medico-legal identification

Protocol A: data collected from relatives and friends of the victims	**Protocol B: Autopsy data**
General	Description of the clothing (in the order of removal from the cadaver)
Name and surname	Clothes - description, material, color, design, cut
Sex	Size
Age	Label
Height	Buttons
Weight	Belts
Special Marks	Patent zippers
Tattoos	Autopsy
Scars	Sex
Moles	Age
Healed fractures	Height
Deformations	Weight
Amputations	Moles
Diseases	Hairness
Surgical operations	Surgical scars
Miscellaneous	Dentures
Clothing	Amputations
Clothes - description, material, color, design, cut	Tatoos
Size	Surgical operations
Label	Age spots
Buttons	Nails
Belts	Miscellaneous
Hair	Hair
Length, color and quality	Length, color and quality
Haircut	Haircut
Mustaches	Mustaches
Beard	Beard
Color of the eyes	Color of the eyes
External genitalia	External genitalia
Shoes	Skull sutures
Type	Costal cartilages
Label	Nucleus pulposus
Color	Epiphyseal cartilage
Material	Internal organs
Jewelry	Blood vessels
Watch	Diseases
Bracelet	Uterus
Rings	Ovaries
Necklace	Dactyloscopy
Earrings	
Miscellaneous	
Occupation	

Identification of the Cadavers Found in the Village of Kusonje

The Department of Forensic Medicine and Criminology, Zagreb University School of Medicine, received a list of the twenty members of the Croatian Police and National Guard forces believed to have been killed and buried in a common grave by the Yugoslav Federal Army (YFA) and Serbian terrorists in the village of Kusonje near Pakrac on September 8, 1991. According to the eye-witness statements, 20 members of the Croatian Police and National Guard forces (18 guardsmen and 2 policemen) were ambushed by Serbian terrorists and the YFA while driving in an armored vehicle. Several soldiers that ran out of the vehicle were killed on the spot, and the rest of them were captured, imprisoned in a private house in Kusonje, tortured and killed. All bodies were then buried in a large pit dug on the north side of the village. The exhumation of the cadavers was performed on January 28, 1992, after the area of Pakrac had been liberated by the Croatian forces. One of the authors was present on the spot and gave instructions on the designation and transport of the cadavers. Three cadavers were found to have their hands tied with wire, one of them also had tied legs (Fig. 1). The autopsy was performed at the Department of Forensic Medicine and Criminology in Zagreb on January 30, 1992. After the examination of the clothing, autopsy and criminal investigation, 19 persons from the list were identified. One person remained unidentified because the autopsy findings did not match the existing description. Table 2 presents the methods of identification used and the number of positive findings that helped the identification. Due to the putrefaction process, dactyloscopy could be performed in a small number of cadavers and proved useful in only five cases. Ten cadavers were identified on the basis of two or more positive findings and nine on the basis of only one positive finding. Considering the extensive postmortal changes of the cadavers, the high number of identifications on the basis of two or more findings is surprising. The identification was further impaired by the fact that the bodies were buried with a steam shovel, which inncured additional trauma of the bodies (Fig. 2). Since the putrefaction process mostly destroyed the signs of vital reaction to the injuries inflicted during life, the autopsy could not discern these injuries from those inflicted mechanically during the burial. However, it was unequivocally determined that the penis of one man was cut off with a sharp object (Fig. 1). Together with the finding of the hands and legs tied with pieces of wire in three decedents, this indicates the cruelty of torturing the prisoners were subjected to before execution. In four cases, personal documents were found on the cadavers. The identity of the victims was confirmed after the autopsy was performed and data collected from relatives.

Table 2. Techniques of identification and positive findings in the killed Croatian soldiers from the village of Kusonje

Technique	Positive finding
Dactyloscopy	5
Dental status	4
Special marks	4
Personal documents	4
Description and recognition	9
Jewelry	2
Watch	2

Discussion

The experience of the forensic identification of the 20 Croatian soldiers killed in Kusonje em-

Figure 1. A cadaver exhumated from a common grave near the village of Kusonje in Western Slavonia. Hands were tied with wire (top). The penis of the same cadaver was found to be cut off with a sharp object (bottom).

phasized several problems which will probably be encountered in future identification of war victims in Croatia. The cadavers were exhumated a long time after their death, so that the putrefaction process impaired the use of crucial identification techniques, such as dactyloscopy, or search for characteristic marks, such as moles or tatoos. In the Kusonje case, the relatives reported the presence of moles in six persons, but these could not be found during the autopsy. It is important to emphasize that the Croatian soldiers did not have any official identification (army tags), which significantly impaired identification. The case of the one unidentified person from the common grave in Kusonje indicates that the transposition of the bodies can be intentional and that this will have to

Figure 2. A cadaver exhumated from a common grave near the village of Kusonje in Western Slavonia. Saponification of the body is visible. The mechanism of the head injury could not be established because of the advanced putrefaction and possible additional mechanical trauma caused by steam shovel.

be considered in future cases. Further identification problems will be posed by the traditionally poor dental records of the population, long absence from home (which can result in natural changes in appearance) and the fact that the victims are often robbed of all jewelry.

In conclusion, the medico-legal identification should be performed on several levels:

1. **Exhumation of the cadavers.** Every cadaver should be marked with a number and placed in a special plastic bag with a zipper: all objects found by the body should be collected into a separate bag. Both bags should have the same number as the cadaver. The original identification set contains one more plastic bag for documents, jewelry, etc. Every cadaver and the objects found by it should be individually and collectively photographed. The identification number should be clearly visible on each photograph. A forensic expert must be present on the spot.

2. **Examination and the autopsy of the cadavers.** The autopsy is an imperative in order to collect as many data as necessary for identification (Table 1). All findings should be recorded and photographed and criminal investigation performed and recorded.

3. **Collection of data from relatives and friends of the missing persons** (Table 1). The objects found at the autopsy should be exhibited for possible recognition.

4. **Final identification.** The final identification includes also other data gathered from dental and medical records, dactyloscopy, etc.

References

1 Zečević D, Škavić J, Strinović D, Palmović V, Mikulčić V, Bušljeta M, et al. Zagreb: Sudska Medicina. Jumena, 1989.

2 Glaister J. Medical jurisprudence and toxicology. Edinburgh-London: Livingstone, 1953.

3 Spitz WV, Fisher RS. Medicolegal investigation of death. Springfield-Illinois: Charles C Thomas Publisher, 1978.

4 Gonzales TA, Vance M, Helpern M, Umberger M. Legal medicine. New York: Appleton-Century-Crofts, 1954.

5 Camps FE. Grandwohls legal medicine. Bristol: John Wright Ltd, 1968.

6 Rathbun TA, Buikstra JE. Human identification: case studies in forensic anthropology. Springfield-Illinois: Charles C Thomas Publisher, 1978.

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Chemical and Ecological Aspects of the War against Croatia

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Abstract. Chemical and ecological aspects of the 1991 aggression on Croatia are partially described. Information released by the Yugoslav Federal Army (YFA) affirmed that the YFA possessed various kinds of chemical warfare (CW) agents: nerve gases, mustard-gas and irritants. There are indications that the YFA used tear gases against civilians and Croatian National Guard (CNG) forces. White phosphorus from grenades caused poisonings and burns among people. Deliberate destruction of the Croatian oil-manufacturing and other industrial facilities by the YFA artillery and combat aircraft caused serious contamination of the environment. Some psychological effects of the threat by chemical weapons are shortly described and discussed in this paper.

Key words: *chemical warfare agents; Croatia; environmental pollution, chemical; war*

Introduction

Since the beginning of the still unterminated war against the Republic of Croatia, several aspects of the Yugoslav Federal Army (YFA) and Serbian extremists' (Chetniks) aggression became obvious. Somewhat less known facts about various chemical substances used in combat, as well as environmental pollutants released accidentally or intentionally during attacks on Croatia will be described in following article. However, our knowledge of the above mentioned is still incomplete due to dynamics of war actions. The aim of this article is to present certain aspects of purposely used harmful chemical substances against Croatian soldiers and civilians, as well as accidental pollution of the environment by the aggressor, without direct intention of action against the opposite side, nevertheless causing enormous, almost devastating damage to the environment, and striking the inhabitants of the affected areas, regardless of nationality, political or military affiliation. All modern wars are characterized not only by loss of human life, but also by endangering the survival of all other living species in the war affected areas. Among the most threatening instruments of highly developed modern war machinery the chemicals have a distinguished position. The psychological pressure inflicted by the aggressor on the opposite side by threats of using chemical substances and endangering the population on a large scale, was present in several wars of recent decades, the most notorious example being the Iraqi conduct during the Gulf war. Therefore, it is not surprising that the aggressor used such powerful tools of psychological pressure, which can be exercised over entire population of large towns, in order to realize political and military goals.

Evidence of Chemical Warfare Agents Possessed by YFA

The complete information about all chemical warfare agents, possessed by the YFA, their production and the facilities related to their experimentation, will most probably never be accessible. However, certain facts about that undeniably existent machinery were disclosed by military staff who crossed to the Croatian side.

The sythesis of the chemical warfare (CW) agents has been going on for the past several years

at the Mostar Department of the Belgrade Military Technical Institute. These agents have also been biologically tested. The synthetic capacity of such a small, semi-industrial plant of nerve agents would be approximately 200 kg of sarin (GB) and/or V nerve gas per year. Students from the Military Technical Academy in Zagreb and Military Medical Academy in Belgrade were regularly educated at the Mostar Department. The synthesis of other CW agents, particularly CS, was done in a semi-industrial manner at the Security Institute of the Ministry of Internal Affairs in Belgrade. The tests of application of CW agents in various weapons, as well as the possibilities of decontamination and antidote application were performed near the village of Krivolaka in Macedonia. The extent of the testing and exercise oscillated; during the 1989, extensive testing of potential application of nerve agents in projeciles deployed in various weapons was performed. Presently, the YFA possesses sarin, V-agents, CS (2-chlorobenzylidenemalononitrile), which can be applied by means of hand grenades (lacrimator and incapacitation agents), heavy artillery (incapacitation agents and nitrogen mustard), sarin for multiple rocked launchers projectiles, and airplane bombs (nitrogen mustard and nerve agents).

Use of CW Agents in Aggression on Croatia

The use of the CW agents by the YFA in the strict sense, during this aggression on Croatia (1), was suspected but never undeniably proved. One of the reasons why CW agents were not objectively identified was the obstruction of physical communication between the areas suspectedly affected and the competent chemical laboratory.

During July of 1991, several of Croatian Guardsmen fighting on the edge of the front line, in the village of Bilje (Baranya), suddenly presented signs of severe psychic distress, starting with hallucinations and maniacal behavior. The soldiers were disarmed by their comrades and hospitalized in the Osijek General Hospital, where they were examined and treated by psychiatrists. All of them fully recovered. The samples of their urine and sera were tested in Zagreb, but no traces of incapacitating agents could be detected by available techniques. However, the clinical report from the Osijek Hospital strongly indicated the intoxication with a hallucinogenic agent. One of the reasons why the results of the chemical analysis performed in Zagreb were negative could be the prolonged and inadequate transport of samples during hot weather conditions and more than 270 km of dangerous roads to pass.

Lacrimators, although considered police and nonfatal agents, are explicitly forbidden in war operations. In combination with a physical attack of enemy forces they may result in a large number of the dead and wounded, because the exposed civilians and soldiers are unable to escape or defend themselves. There is a number of suspected cases of tear gas use, practically throughout the entire East Slavonia frontline. However, it seems that the most barbaric and inhuman use of tear gases occurred in Vukovar (Fig. 1), where the Chetniks used it to force the civilians out of their shelters. Such a use of forbidden weapons was never objectively proven in a laboratory because the town of Vukovar was under severe military siege for several months. Unfortunately, many witnesses gave their testimonies about massacres of people that had been forced to leave their basements with tear gas.

Lacrimators were also used by the YFA to induce panic among population in towns far behind the frontline. The most notorious example happened in the beginning of November 1991, in the town of Čakovec (Fig. 1), when enemy aircraft dropped containers filled with lacrimating agents, causing considerable panic among civilians. Later on, the containers were examined and the residua of irritating agents proven in the Police Laboratory in Zagreb.

White phosphorus is extensively used in modern army weapons, mostly for artillery-fire-correction signalization. Grenades filled with white phosphorus are powerful combustible ammunition. Apart from direct burns and intoxication of humans, white phosphorus can cause enormous ecological damage as well (2,3). Dispersed in air it rapidly oxidizes in highly reactive and hygroscopic white fumes of phosphorus pentoxide, which irritate the mucosal surfaces, because of its conversion into o-phosphoric acid (4). Although it was used against several civilian as well as military targets in virtually all assaulted areas, its application is probably best documented for the YFA attacks on Vinkovci and Vukovar. During one attack on Vukovar, on October 25, 1991, a young woman (S.I., aged 21) was hospitalized in the Vukovar Medical Center, with extensive burns of the face and the rest of the exposed parts of the body. The burns were caused by explosion of a phosphorus-filled bomb in her vicinity (5). Although the complete documentation, including photographs, was taken away by the YFA after the capture of the Medical Center (6), the scars over her skin will be a permanent testimony of war horrors.

A large-scale use of phosphorus-filled projectiles was registered in Vinkovci, on January 2, 1992, when the town was shelled by virtually all YFA heavy artillery weapons available, including conventional and napalm airplane bombs. A grenade, later found to had been filled with white phosphorus, fell in front of a CNG vehicle with four guardsmen. Shortly after the event, all of them showed signs of mucosal irritation, lacrimation, coughing, paraesthesia of the oral cavity and nausea. They were transported to the nearest hospital for a check up and were released after hospitalization and appropriate treatment, fortunately without permanent damage.

Use of Materials with Unknown Purpose

The YFA applied several types of materials with the appearance of CW agents, whose purpose has remained unknown to us.

Figure 1. A map of Croatia. The places mentioned in the text are indicated.

The most notorious example was wide-spread application of a cobwebby material released by the YFA aircraft. The first data of such actions were reported near the town of Sinj, during September of 1991, and later practically all over the country. Both frontline and rear areas were exposed to those agents for several months (Figs. 1 and 2). The material was covering large areas and caused great concern, but the performed analysis proved it harmless. Possible biological application and purpose of such large-scale use of the material are still unclear. Coincidentaly, the released material entrapped numerous spiders at the time of their normal air-migration (Northern and Eastern Croatia; Zagreb, Varaždin, Virovitica, Osijek and Županja), inflicting considerable panic among the civilians and fear of eventual biological weapon. Our extensive research revealed that the entrapped spider species were typical for this geographic area, mostly *Tibellus sp.* and *Hysticus ulmi* (7,8), so that the possible implication of spiders as a biological weapon was discarded and panic subdued.

During its intensive combat engagement in Eastern Slavonia, the YFA littered TNT powder from their airplanes, also causing panics among civilians. It has not been clarified up to now if those actions were abortive trials of TNT use as an aerosol bomb or the YFA had some other intention, possibly a psychological one.

In the autumn of 1991, the YFA commenced a massive littering of dry leaves from helicopters, mostly over the battlefield and surrounding areas. Corn, tobacco and other crop leaves were widely distributed. It is interesting that the leaves of particular crops were used mostly in accordance with the cultures grown in the affected area. A possible distribution of some specific phytovirus was suspected, and extensive research to demonstrate it was undertaken, but without conclusive proof up to the present. However, those actions caused understandable panic among rural inhabitants and were one of the reasons why the corn-crop was not completely harvested.

Diversions on Water Supply Systems

Chemical diversions were suspected in several places. Most frequently they involved local water supplies, but in one proved case a large water supply of Zadar and Kruševo was affected. Chetniks and the YFA took control of water wells and pools of Zadar water plants early in the beginning of the war. Zadar was left without water in the most critical part of the year (summer 1991). By the middle of July, the water was abruptly let into the aqueduct. In Kruševo, a whole local CNG unit showed signs of alimentary intoxication: vomiting, diarrhoea, nausea and headache. All men drunk water from the cistern that had been filled when the water was let into the reservoir. Affected peo-

Figure 2. Cobwebby material on a nettle leaf (Kutina, November 7, 1991). The "cobweb" consists of very fine long white threads and is spread by the wind many kilometers from the place of release. Larger conglomerations are visible to the naked eye. On the ground, the material sticks to a surface. Photo: Toxicology Division, Croatian Medical Corps Headquarters, Zagreb.

Figure 3. Part of the destroyed pipe system of the Sisak Oil Refinery, Sisak, October 10, 1991. The attacks on the oil refinery intensified from September 2 to November 20, 1991, and the first three days of 1992, just before the 15th cease-fire agreement. Photo: Ž. Grgurinović, *Večernji list*, Zagreb.

Figure 4. Power plant after the attack, Osijek, September 17, 1991. The fuel tank was set on fire by a direct hit. The extinguishing of the fire took several hours. The ecological consequences were great: enormous quantities of toxic gases were released into the atmosphere and a large area was soaked with liquid fuel and foam from fire extinguishers. Photo: G. Pichler, *Večernji list*, Zagreb.

ple were examined and treated by a physician from a larger military unit, and all recuperated entirely after a few days. The water from the same reservoir was sampled, and the presence of some acetylcholinesterase inhibitor was proved in a bioassay. Gas chromatography and mass spectrometry failed to reveal the structure of the acetylcholinesterase inhibiting agent; it was not any known organophosphate insecticide (9).

The already strict control of the water systems in Croatia became even more particular after this case, especially in the areas where water wells were controlled by the Chetniks and YFA. It is probably beyond the purpose of this article, but it must be mentioned that Chetniks contaminated some local water supplies by throwing the bodies of their victims, together with animal carcasses into the wells.

Ecological Catastrophes due to Aggression

The aggression on Croatia is characterized by massive and very often purposeless, even from military point of view, destruction of entire towns, infrastructure, industrial facilities, historical and cultural objects, culminating in open artillery attack on the old town of Dubrovnik which is under direct protection of UNESCO. In order to understand the behavior of the aggressor it will be sufficient to mention that, through the Serbian media, the Serbian extremists and YFA threatened the Croatian Government with destruction of the nuclear electrical plant in Krško (Slovenia), and with the destruction of rocket fuel repository in Kerestinec, both located in the vicinity of Zagreb. Nitrous gases released during the explosion would have an enormous hazardous effect on the surrounding population, as has been described in several sporadic cases of nitrous gas poisoning (10-12).

The closest possible approximation of ecological catastrophes already provoked by the YFA aggression will be a difficult task of many consecutive investigations. It is impossible even to list all

mayor destruction with enormous consequences to the environment. Only some of those events will be mentioned here:

Rubber Factory in Borovo, near Vukovar, completely destroyed (pollution of air due to fire, pollution of water and soil by released chemicals);

Saponija Osijek Chemical Industry and Osijek Power Plant (several aspects of pollution, Fig. 3);

Crude Oil Storage in Djeletovci (mostly air pollution due to fire);

Gavrilović Meat-processing Industry, Petrinja (release of ammonia into the air);

Uncontrolled depositions by YFA of large quantities of several kinds of strategic material at several places along the coast. To accentuate the extent of the environmental pollution, the data concerning destruction of Oil Refinery in Sisak will be presented in more detail (Fig. 4). During several attacks on the refinery, more than 100,000 tons of crude oil and derivatives were spilt or burned. Moreover, 2,000 kg propylene dichloride, 600 kg of dimethylsulphide, 200 kg of additives for oil conditioning, and 200 kg of very poisonous biocides leaked out. More than 300 tons of different fire extinguishers were used and released into the environment.

Conclusions

On the basis of the data collected at the Department of Toxicology, Croatian Medical Corps Headquarters, the following conclusions can be drown: (a) throughout the war, the YFA possessed chemical warfare agents, but field reports indicated only the use of CS agents; (b) the YFA intentionally damaged Croatian chemical industry, causing enormous ecological pollution; (c) the YFA used numerous means to threaten civilian population and introduce panic and resignation.

References

1 Anonymous. On the street. Portland: Applied Science and Analysis (ASA) 1991;(6):4.

2 Diaz-Rivera RS, Collazo PJ, Pons ER, Torregrosa MV. Acute phosphorus poisoning in man: A study of 56 cases. Medicine 1950;29:269-98.

3 Pietras RJ, Stavrakos C, Gunnar RM, Tobin JR Jr. Phosphorus poisoning simulating acute myocardial infarction. Arch Intern Med 1968;22:430-4.

4 Mahan BH. University Chemistry. Reading: Addison-Wesley Publishing Company, 1967:515-6.

5 Bosanac V. A letter to international missions and UN (with case history). Vukovar, November 7, 1991.

6 Aleksijević Z, Aleksijević A. Miracles in war. In: Marušić M, editor. Medical testimony of the Vukovar tragedy, Zagreb: Croatian Medical Journal, 1992:11-4.

7 Perović F. Spider systematization report No. 694/91. Zagreb, Croatian Natural History Museum, 1991.

8 Jones D. Der Kosmos-spinnensfürer. Stuttgart: Kosmos, 1985.

9 Hayes WJ Jr. Pesticides studied in man. Baltimore-London: Williams & Wilkins, 1982:301-12.

10 Tse RL, Bockman AA. Nitrogen dioxide toxicity; Report of four cases in firemen. JAMA 1970;212:1341-4.

11 Jones GR, Proudfoot AT, Hall JI. Pulmonary effects of acute exposure to nitrous fumes. Thorax 1973;28:61-5.

12 Yockey CC, Eden BM, Byrd RB. The McConnell missile accident: Clinical spectrum of nitrogen dioxide exposure. JAMA 1980;244:1221-3.

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Infections of War Wounds

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Abstract. From April to September 1991, 415 wounded subjects were treated at the Rebro Clinical Hospital in Zagreb, 362 at the Department of Surgery and 53 at the Department of Neurosurgery. Infections developed in 15.7% of the wounded (wound infection in 14.6% and sepsis or meningitis in 1.1%). All cases of sepsis and meningitis, as well as 88.2% of wound infections, were hospital-acquired infections, whereas 7.9% of wound infections occurred within 48 h from injury infliction. Aerobic bacteria (*Enterobacteriaceae, Pseudomonas aeruginosa, Staphylococcus aureus, Acinetobacter species*) were found in 90%, whereas 9% of cases referred to mixed aerobic-anaerobic flora. In one injured subject, a clinical picture of gas gangrene developed. No streptococcal infections or tetanus were recorded.

Key words: *infection; microbiology; war injuries*

Introduction

War injuries are always contaminated with bacteria from the natural environment, the skin and clothes of the wounded and, in cases when gastrointestinal system or large bronchi are injured, also with bacteria from these sources. On the other hand, the injuries encountered in the war against Croatia are extensive, causing massive tissue lacerations, which in turn favor the growth of microorganisms and development of direct wound infections. Most important groups of bacteria are *clostridia* (causes of tetanus and gas gangrene), *streptococci*, *staphylococci*, gram-negative aerobic bacteria sensitive to antibiotics and, in the injuries involving the gastrointestinal system, other anaerobic bacteria except *clostridia* (*peptococci, bacteroides*) (1,2).

In severely wounded subjects, long-term hospitalization is usually required or they have to be moved to large hospital centers where they are exposed to the risk of infections with bacteria resistant to antibiotics. Infections observed in the wounded patients treated from April until September 1991 at the Zagreb Clinical Hospital are described in this report.

Material and Methods

From March 31 until September 30, 1991, 415 injured subjects, either admitted directly from the battlefield (N=165) or transferred from other health institutions (N=201), were treated at the Zagreb Clinical Hospital (Rebro), 362 of them at various divisions of the Department of Surgery, and 53 subjects with craniocerebral injuries at the Department of Neurosurgery. No data on the time of wound affliction were available in 49 patients. Samples of wound secretion, blood culture and cerebrospinal fluid were examined for aerobes and anaerobes at the Laboratory of Microbiology using standard qualitative methods (3). Tests of sensitivity to antibiotics were performed by a standard disk-diffusion method (3). Samples were taken according to clinical indications (local infection of the wound or signs of generalized infection), and at some divisions routine wound swab samples

Table 1. Distribution of infections according to the site of infection and hospital departments

Localization of infection	Surgery		Neurosurgery	
	Wounded No. (%)	Infection No.	Wounded No. (%)	Infection No.
Wound infection	53 (14.6)	73	3 (5.6)	3
Sepsis and meningitis	4 (1.1)	4	5 (9.4)	8
Total	57 (15.7)	7	8(15.1)	11
Total number of the wounded	362 (100)		53 (100)	

Table 2. Distribution of infections according to groups of agents (N=88)

Group of agents	No.	%
Aerobic bacteria	79	90
Aerobic + anaerobic bacteria*	8	9
Candida albicans**	1	1

*Clinical picture of gas gangrene developed in one patient.

**Sepsis developed in one patient, after previous antimicrobial therapy of meningitis.

were also taken after the completion of preventive antimicrobial therapy.

All the wounded brought directly from the battlefield, received early preventive antimicrobial therapy (penicillin + gentamicin in cases of non-penetrating wounds, + metronidazole in cases of penetrating wounds, and + sulfamethoxazole + trimetoprim in cases of craniocerebral injuries, during 5-7 days). Those referred from other health institutions were treated according to the time elapsed from the time of wound infliction, and to the clinical evaluation of the injury. Anti-tetanus prophylaxis was administered to all patients.

In this study, a combination of clinical signs and a single or repeated isolation of bacteria from wound secretion was taken as a criterion for wound infection (4). Isolation of bacteria without clinical signs of infection was considered a wound colonization.

Results

During the six months of the war, among 415 wounded subjects treated at our hospital 65 (15.7%) subjects developed 88 infections, 46 of them one, 15 of them two, and three patients three consecutive infections each. Fifty of these infections were induced by a single cause, while 38 were polymicrobial.

Six (3.6%) infections developed within less than 48 h after wound infliction, 79 after more than 48 h, whereas no such data could be obtained for 3 infections.

Table 3. Causes of sepsis and meningitis

Cause	Number of infections	
	Sepsis	Meningitis
Serratia species	3	
Klebsiella pneumoniae	2	
Proteus mirabilis	1+1*	
Pseudomonas aeruginosa	1*	1
Staphylococcus epidermidis		2
Acinetobacter species		1
Candida albicans	1	
Total	8	4

*Same infection (polymicrobial sepsis).

Table 4. Causes of wound infections

Cause	Infection No. (%)	Time elapsed from wound infection <48h No.	>48h No.	? No.
Pseudomonas aeruginosa	10 (13.2)		10	
Pseudomonas aeruginosa + *Enterobacteriaceae*	10 (13.2)		10	
Pseudomonas aeruginosa + *Staphylococcus aureus*	5 (6.6)		5	
Staphylococcus aureus	6 (7.9)		5	1
Staphylococcus aureus + *Enterobacteriaceae*	5 (6.6)	1	4	
Staphylococcus aureus + *Acinetobacter species*	4 (5.3)		4	
Acinetobacter species	10 (13.2)		10	
Enterobacteriaceae single species	9 (11.8)	2	7	
Enterobacteriaceae multiple species	7 (9.2)	1	5	1
Aeromonas hydrophila + *Enterobacteriaceae*	1 (1.3)		1	
Enterococcus species	1 (1.3)		1	
*Anaerobic bacteria** + *Enterobacteriaceae*	8 (10.5)	2	5	1
Total	76	6	67	3
Total %	100	7.9	88.2	3.9

*One patient had gas gangrene (*Clostridium perfringens*), and the others had local infection of the wound (*Clostridium species*, 5; *Bacteroides*, 1; and *Peptococcus species*, 1).

Table 1 shows infection distribution according to localization and clinical assessment, whereas their distribution according to causes is presented in Table 2.

Most severe infections, sepsis and meningitis, developed in 9 wounded persons. Among them, four patients with craniocerebral injuries developed meningitis, including three with sepsis due to some other agent during hospitalization. The three wounded patients with sepsis also had local infection due to the same agent, and in one of them the infection was polymicrobial (*Pseudomonas aeruginosa* + *Proteus mirabilis*).

Table 5. Sensitivity of *Pseudomonas aeruginosa* to antibiotics (N=25)

Antibiotic	Sensitive strains No.	Resisitent strains No.
Gentamicin	9	16
Amikacin	13	12
Netilmicin	13	12
Piperacillin	15	10
Ciprofloxacin	19	6
Ceftazidime	24	1
Imipenem	24	1

Table 6. Sensitivity of *Staphylococcus aureus* to antibiotics (N=20)

Antibiotic	Sensitive strains No.	Resisitent strains No.
Meticillin	5	15
Gentamicin	6	14
Netilmicin	20	-
Clindamycin	6	14
Pefloxacin	12	8
Sulfamethoxazole + Trimetoprim	18	2
Vancomycin	20	-

Table 7. Sensitivity of *Acinetobacter species* to antibiotics (N=14)

Antibiotic	Sensitive strains No.	Resisitent strains No.
Gentamicin	2	12
Amikacin	3	11
Netilmicin	12	2
Pefloxacin	-	14
Ciprofloxacin	6	8
Ceftazidime	3	11
Imipenem	14	-
Ampicillin + Sulbactam	14	-

Table 8. Bacteria isolated from the swabs of uninfected wounds (colonization flora)

Bacterium	No. of isolates
Enterobacteriaceae	
single strain	4
multiple strains simultaneously	17
*Enterobacteriaceae + anaerobes**	5 (12.8%)
Acinetobacter species	7
Pseudomonas aeruginosa	6
Total	39

**Clostridium perfringens*, 4 strains; *Clostridium species*, 1 strain.

Causative agents of sepsis and meningitis are presented in Table 3. It should be emphasized that all these infections were acquired in hospital, i.e. more than 48 h after patients' admission. Table 4 shows causative agents of wound infections. *Pseudomonas aeruginosa*, *Acinetobacter species* and gram-negative bacilli from the genus of *Enterobacteriaceae*, and *Staphylococcus aureus* were the most frequent individual causes of infection. It should be noted, however, that gram-negative bacilli from the genus of *Enterobacteriaceae* were fairly sensitive to antibiotics, whereas the remaining 3 agents were mostly resistant species (Tables 5, 6 and 7).

Mixed aerobic-anaerobic infection was rare (1.9% of all wounded), and gas gangrene developed in one person only.

It appears interesting to single out the infection due to *Aeromonas hydrophila* isolated on three occasions at 10-day intervals in one patient, which disappeared with the wound healing.

Table 8 shows the wound colonizing flora. All bacteria that may cause infection, except for *staphylococci*, were isolated.

Discussion

Early surgical treatment and prophylactic administration of antibiotics in war injuries have significantly reduced the number of wound infections (1,2,5). In our group of 165 wounded admitted directly from the battlefield, early wound infection, most probably caused by bacteria entering the wound on infliction, developed in only 6 (3.6%) subjects. It was not possible to analyze the time (in hours) elapsed from infliction of the wound to initial treatment and dose of prophylactic antibiotic administered, but we know that access to the injured and their transfer were accompanied by great difficulties due to communication blockade. Therefore, it appears quite reasonable to conclude that the percentage of initial infections was low and that surgical treatment of the wounds and antimicrobial prophylaxis were satisfactory, which was strongly supported by our findings: no streptococcal infections were observed; among 20 staphylococcal infections, only one was an early infection (Table 4); and, with 9% of mixed aerobic-anaerobic infections, a clinical picture of gas gangrene developed in one patient only (Table 2). The anti-tetanus prophylaxis could also be considered appropriate because no case of tetanus was observed.

A total infection percentage of 15.7% is comparable to those recorded in some recent wars (e.g., 12% in the Yom Kippur war, 1973) (2), the more so, it is within the limits of the peace-time traumatic injury infections, i.e. 8.4% (4) and 15.2%-16.3% (7).

The bacteria causing hospital infections of war wounds are mostly identical according to species and frequency to those leading to hospi-

tal infections of other surgical lesions (4). However, Tables 4 and 8 should be carefully compared: the infection flora is identical to the colonizing one, with the exception of *staphylococcus*, which appeared only as a cause of infection (8).

This finding supports a generally well known need of careful assessment of the microbiologic testing of the wound secretion.

References

1 Bowen TE, Bellamy RF, editors. Infections. In: Emergency war surgery. 2nd ed. Washington DC: US Department of Defense, 1988:163-77.

2 Hell K. Characteristics of the ideal antibiotic for prevention of wound sepsis among military forces in the field. Rev Infect Dis 1991;13(Suppl 2):164-9.

3 Balows A, editor. Manual of clinical microbiology. 5th ed. Washington DC: American Society for Microbiology, 1991.

4 Olson MM, Lee JT. Continuous 10-year wound infection surveillance. Arch Surg 1990;125:794-803.

5 Rautio J, Paavolainen P. Afghan war wounded: experience with 200 cases. J Trauma 1988;28:523-5.

6 George WL. Other infections of skin, soft tissue and muscle. In: Finegold SM, George WL, editors. Anaerobic infections in humans. San Diego: Academic Press, 1989:486-506.

7 Cruse PJE. Wound infections: epidemiology and clinical characteristics. In: Howard RJ, Simmons RL, editors. Surgical infectious diseases. 2nd ed. Norwalk, CT/San Mateo, CA: Appleton & Lange, 1988:319-30.

8 Yip AWC, Yuen KY, Seto WH, Choi TK. A new semiquantitative culture method for early detection of surgical incision wound infection. J Infect Dis 1990; 161:972-6.

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Letters to the Editor

Injuries Acquired in the War in the Area of Sisak City During 1991

During the first trimester of the war against Croatia (third trimester of 1991), Croatian forces (Croatian police and National Guard) were armed by infantry weapons only, facing the third largest army of Europe. During the second trimester, manpower of the Croatian defence increased significantly, with the arrival of artillery, armored vehicles and other heavy weapons; although much of the indispensable was still in a great shortage (air and naval forces), the tactics of the war changed tremendously: the second part of the war was very much marked by enemy's fire from long distances, aimed primarily to civilian objects and population. This makes comparison of war injuries inflicted during the two trimesters very difficult. In the war against Croatia war injuries are both military and civilian medical problem (1).

Total number of patients admitted to this institution during the two war trimesters (June 26 until December 26, 1991) was 1040 (436 and 608, respectively). Croatian military forces constituted 77%, civilians 22% and enemy soldiers 1% of the patients. Dead on admission group, 82 during the first, and 92 during the second trimester, along with the injured patients who died on the operation table immediately after admission (two in the first, and 10 in the second trimester) made 186 dead during the entire period. Head and brain injuries were the major problem in patients who died immediately after admission. An overview of regions injured in admitted patients is given in Table 1. Of all the wounded admitted 12 (1.1%) died. Table 2 lists the operative procedures as an illustration of the demand for surgery rather than a detailed study of the surgical indications and procedures. Operative procedures performed during the observed period are a good example showing the quantity of surgical work neccessary during the war.

Artillery shelling of the city and its suburbs inhabited by civil population contributed to the formate of population of wounded in this particular situation. It should be stressed out that the hospital itself came under artillery fire and experienced problems with water and electricity supply. Extreme demand for surgical and medical appliances

Table 1. The type of injuries in patients admitted to Sisak Medical Center from June 26 to December 26, 1991

	June 26 Sep. 26	Sep. 26 Dec. 26	Total
Head injuries			
-soft tissue	32	59	91
-fracture of the scull	1	2	3
-penetrating injuries	2	4	6
-eye injuries	1	2	3
-ENT region	13	26	39
Neck injuries			
-soft tissue	9	17	28
-ENT injuries		1	1
Thorax injuries			
-soft tissue	44	54	98
-rib/sternum fractures	14	3	17
-penetrating injuries	16	26	42
Abdominal injuries			
-nonpenetrating	20	14	34
-penetrating	28	39	67
-urinary tract	3	6	9
Extremities			
-soft tissue	183	268	451
-fractures	76	97	173
-nerves	6	7	13
-conquassations	3	18	21
Genitals	0	1	1
Spine			
-with medulla lesions	2	1	3
-without medulla lesions	0	3	3
Contusions			
-head	14	19	33
-neck	1	3	4
-thorax	15	22	37
-abdomen	13	7	20
-extremities	31	95	126
Total			1252

Table 2. Surgical procedures performed in injured patients

Procedure	Number
Debridement, drainage, primary delayed suture	851
Secondary sutures	180
Plastic operation after Thiersch	33
External fixation of fractures	66
Extension	5
Drainage of the thorax	13
Explorative thoracotomy	1
Thoracotomy with operation of the lungs or pleura	12
Thoracotomy with operation of the mediastinum	2
Explorative laparotomy	7
Splenectomy	5
Resection or suture of the liver	17
Resection or suture of an abdominal organ	33
Nephrectomy or suture of the kidney	6
Suture of the urinary bladder	2
Operation of abdominal blood vessels	3
Suture of the diaphragm	7
Operation of peripheral blood vessels	11
Finger amputation	13
Amputation of extremities	14
Orchidectomy	1
Osteosynthesis after external fixation	6
Osteosynthesis, other	13
Treatment of burns	5
Treatment of frostbites	4

was felt all the time. Technical aspects of the management of gunshot and blast wounds, along with generally known problems encountered (2,3), often presented additional problems of tissue destruction caused by high-velocity bullets and exploding bullets (forbidden by international conventions, but the Yugoslav Federal Army and Serbian terrorists used them against both civilian and military targets). External fixation (4) was of great help in complicated wounds of extremities. Careful wound care and dressing (5,6) required additional nursing manpower. In patients with large skin defects caused by high-speed bullets or chemical warfare agents, covering of the wound surface by a synthetic porous membrane was very useful (5). Irrigation of wounds (3) or open cavities that appeared grossly contaminated with isotonic sodium chloride was also rather effective.

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References

1 Rignault DP. Is war surgery a speciality? Mil Med 1990;155:91-7.

2 Coupland R.M. Technical aspects of war wound excision. Brit J Surg 1989;76:663-7.

3 Dire DJ, Welsh AP. A comparison of wound irrigation solution used in the emergency department. Ann Emerg Med 1990;19:704-8.

4 Koržinek K, Pavlović K, Gregurić I, Koržinek M. CMC (Croatian Medical Corps) external fixator intended for war surgery. Croat Med J 1992;(War Suppl 1)33:71-6.

5 Foresman PA, Tedesci KR, Rodehaekar GT. Influence of membrane dressings on wound contraction. J Surg Res 1986;4:335-9.

6 Hartl WH, Klommer HL. Gunshot and blast to the extremities. Management of soft tissue wounds by a modified technique of delayed wound closure. Acta Chir Scand 1988;154:495-9.

External Fixation for Injuries in the War against Croatia

Patients admitted in our hospital with war injuries were treated by external fixation in cases of gunshot wounds of extremities with bone lesions and explosion wounds for which reconstruction of soft and bone tissue was impossible (1). This paper also includes patients who were already treated by external fixation in the previous echelon of medical care (2). More than 90% of the wounded had explosive injuries. The following type of fixators were used in treatment in our hospital: Synthes system (Rohr, Switzerland), Zagreb 1, Zagreb 2, Ilizarov (Instrumentaria, Croatia), Englebrecht (Waldermar-Link, Germany) and others. Other medical centers (second and third echelons of medical care) applied mostly transport fixation (single use), and in several cases Zagreb 1 and 2 and Synthes system.From the beginning of the war, 22.5% of our patients with war injuries fulfilled the criteria for external fixation. Almost half of them (40.7%) had already been treated by external fixation in other medical centers. Most of these patients (74.2%) needed further surgical treatment because of displaced fragments (31.8%), loosening of pins (4.2%) and infection (64%). In such cases the existing fixation was remodelled, which included additional securing fixation or construction alteration, or this type of treatment was abandoned in favor of internal fixation, conservative treatment (plaster), or amputation (3). According to the preliminary results of external fixation, the degree of education and skill of our colleagues in the second and third echelons was satisfactory. Complications were also observed in several cases treated at our department, which were mostly due to infections acquired previously, or an unsatisfactory achievement of bone axis. This was corrected through necrectomy and remodelling of external fixator. Types of fixators had no influence on the observed complications.

On the basis of our current experience and knowledge we recommend the following:

- external fixation should be used with all open fractures (grade I - II) and war injuries with bone lesions;

- pins of the fixator should be positioned at a distance of at least 2 cm from the wound edges when applied as the first means of immobilization;

- screws and pins should be positioned in healthy tissue;

- application of transport fixation should be performed in medical centers with appropriate equipment and by an educated medical officer;

- ideal position of fragments is not essential for final treatment, as delayed corrections are always possible within three weeks; and

- regular care should be taken in order to avoid infection.

Slavko Davilla
Vesna Kušec

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Zagreb, Croatia

References

1 Geissler WB, Teasedall RD, Tomasin JD, Hughes JL. Managment of low velocity gunshot-induced fractured. J Orthop Trauma 1990;4:39-41.

2 Zerna M, Klenke R. External fixator in the district hospital. Zentralbl Cir 1990;115:1031-40.

3 Epps CH. Complications in orthopaedic surgery. Philadelphia,Toronto: J.B. Lippincot Company, 1978.

Children in War: Four Case Reports from Split

Injuries of the limbs are the most frequent war injuries, predominantly due to explosive devices and including open fractures often associated with injuries of nerves and blood vessels (1). Shell fragments have less kinetic energy than bullets, but affect large areas of the body (2). Bullets have a great kinetic energy, and therefore even the slowest ones easily produce fractures (3). In war, children predominantly suffer in the rear of the front lines (4). Although the children are a priority, just after wounded persons (5), their world is radically changed and they cannot find a way to adapt to it. Although there were no formal military operations in the Split area during the beggining of the war against Croatia, four wounded children were admitted to our hospital:

H.D., aged 14, was wounded during warship shelling of Split, when a shell exploded in the vicinity. The child had excoriations and contusions of both legs without other grave injuries. Treatment was conservative.

H.K., aged 14, was playing with a hand grenade and activated it. The explosion injured her left (dominant) hand. The thumb and forefinger were partially conquassated and amputated, with excoriations of the palm. A necrectomy was performed and the wound was closed. Gentamicin and metronidazole were prescribed. Seven days later a full thickness autologous skin transplantate was used to cover the defect. Physical and social rehabilitation is under way. The patient already writes with the injured hand. However, since the accident she has never looked at it. She is under a psychologist's supervision.

B. Lj., aged 11, was shot by a sniper in the calf while waiting for a bus. The bullet lodged in the tibia, causing a fracture of the medial condyle . The bullet was removed and the condyle was retained by two wires. Recovery was complete.

V.T., aged 14, was playing in a minefield when a mine exploded. He lost both calves, which were conquassated and amputated. The explosion affected the area around scrotum. Shock developed. Resuscitation and reamputation were performed and the wounds were closed. Penicillin, gentamicin and metronidazole were ordered. After 11 days, secondary closure of the wound was performed and physical and social rehabilitation started first in our institution and was continued in France. The patient is learning to walk with prosthesis on both legs.

In summary, the injuries of our patients were typical war injuries, all involving the limbs. Two patients fully recovered and two needed physical and social rehabilitation.

Zoran Vukić
Dubravko Furlan
Dražen Budimir,
Ivo Jurić
Mihovil Biočić
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References

1 Papo I, editor, Ratna hirurgija. Beograd: Vojno izdavački zavod, 1980.

2 Georgi BA, Massad M, Obied M. Ballistic trauma to the abdomen: shell fragments versus bullets. J Trauma 1991;31:711-6

3 Hughes JL, Van der Griend R, Bennett TH.. Gunshot fractures. Unfallchirurg 1986;89:515-20

4 Cigit I, Milić Ž, Fattorini I, Pedišić I, Vrdoljak J. Ratne ozljede kod djece. Liječ Vjesn 1991;113:220-4

5 Singer S. The protection of children during armed conflict situations. Inter Rev Red Cross 1986, May-June, No 1-38.

Blood Transfusion Service in Sisak Medical Center during the 1991 War against Croatia

Dr. Ivo Pedišić Medical Center in Sisak is a subregional hospital providing medical service to some 120,000 persons. Before the war, the Center had 621 beds: Surgery with Intensive Care Unit 172, Infectology Ward 40, Gynecology 103, Orthopedics 22, Medicine 106, Ophthalmology 36, Neurology 36, and Iodine Treatment Unit 32.

Table 1. The number of collected blood doses by the Blood Transfusion Unit during three time periods*

Time period	Area		Total
	Sisak	Surroundings**	
1990, whole year	3084	474	3568
1991, Jan-June	1660	278	1938
1991, July-Dec	1478	0	1478

*Large-scale war in this area started in July 1991.
**Petrinja, Glina, Hrvatska Kostajnica, Dvor na Uni.

Table 2. Use of the blood and blood derivatives (doses) in Sisak Medical Center during first (without the war) and second (large-scale war) half of 1991[a]

Blood derivative	Used by Surgery No. (%)	Other wards No. (%)	Total No. (%)
First part of the year (no significant war activities):			
Whole blood	246 (17.6)	100 (12.3)	346 (15.6)
Packed erythrocytes	690 (49.5)	562 (68.9)	1.252 (56.6)
Fresh frozen plasma	454 (32.5)	154 (18.9)	608 (27.5)
Platelet concentrates	5 (0.4)	0 (0)	5 (0.2)
Total	1.395 (100)	816 (100)	2.211 (100)[b]
Second part of the year (large-scale war):			
Whole blood	734 (42.6)	0 (0)	734 (37.6)
Packed erythrocytes	394 (22.9)	216 (99)	610 (31.2)
Fresh frozen plasma	588 (34.1)	2 (0.1)	600 (30.7)
Platelet concentrates	6 (0.4)	0 (0)	6 (0.3)
Total	1.722 (100)	218 (100)	1950 (100)[c]

[a]Percentages are given in parentheses.
[b]Plus 85 g albumin and 25 g fibrinogen.
[c]Plus 200 g albumin and 44 g fibrinogen.

Beside the city of Sisak, blood donations were also organized in Petrinja, Glina, Hrvatska Kostajnica and Dvor na Uni (Dvor being some 70 km away from Sisak). The blood was collected in 350-ml glass bottles. This hindered the production of complete palette blood derivatives. They used to be provided by the Blood Transfusion Institute of Croatia in Zagreb.

Table 3. Content (percentages of doses) of blood transfusions given to wounded persons in Sisak Medical Center during the second part of 1991

Blood/blood derivative	No. of doses given (%)
Whole blood	734 (60.8)
Packed erythrocytes	100 (7.9)
Fresh frozen plasma	372 (30.8)*

*Plus 200 g albumin and 44 g fibrinogen.

Due to the combat in the area covered by the Center, blood collection outside Sisak ceased by June 26, 1991 (Table 1) and, due to frequent artillery and air raids on Sisak, by October 2, 1991, it also ceased in the town itself. The donors still used to come to the Center to donate blood, and the total amount of blood collected did not diminish with the war (Table 1). Interestingly, the total amount of the blood used during 1991 was quite comparable to that used during 1990. It appears that the increased need for the blood for wounded was "compensated for" by a decreased use for usual patients treated in peace time: during the second half of 1991, the Surgery Ward used much more and other wards much less blood and blood derivatives (Table 2). The Center treated a total of 1046 wounded patients, of whom 179 received blood transfusions. The data shown in Table 3 reveal that most of the transfusions used whole blood, which should be ascribed to the specific indications in wounded persons with multiple, mostly explosive wounds.

Through the intensification of the Unit's work, with the derivatives in stock, our service fully covered the needs that occured during the war. Every patient who required a transfusion, received the amount and type of blood preparation required.

Nada Bošnjak
Meri Prinčić

Sisak Medical Center
Sisak, Croatia

CROATIAN MEDICAL JOURNAL

News and Comments

A Comment on Croatian Medical Journal, War Supplement 1

One of the most pleasurable occasions of the year's calendar of events at Zagreb Medical School was the appearance of the first issue of the Croatian Medical Journal, which coincided with the century-long dream of Croatians to establish their own sovereign state.

The will of the people was demonstrated on the referendum of May 19, 1991. It resulted in the termination of all state and legal relations with the Socialist Federal Republic of Yugoslavia, as effected by the Croatian Parliament (*Sabor Republike Hrvatske*) on October 7, 1991.

The well-documented medical articles published in the Croatian Medical Journal - War Supplement 1, have made a scientifically established contribution to the better understanding of this anachronistic war raging in the heart of Europe. Acts of such inconceivable brutality, often incomprehensible for the civilized world, have been linguistically captured in the word of French origin: "massacre". As described in the *Leksikografski zavod* encyclopedia, the word "massacre" semantically comprises the notions of "slaughter", "bloodshed", "mass murder" and "torture", which overlap with the notion of "severe offenses", as used in the proclamations of the international law promulgated in the Geneva Conventions. According to the Geneva Conventions, severe offences against humanity comprise "intentional killings" (1,2), "torturing or inhuman infliction of severe bodily or mental sufferings" (3,4), as well as "illegal deportation and displacements" (5).

The analysis of the data collected and registered in the Croatian Medical Journal - War Supplement 1 has additional significance when viewed against the fact that the former Yugoslavia ratified all the conventions of the Geneva Agreement of August 12, 1949, including the Convention on the Treatment of Prisoners of War, the Convention on the Improvement of the Position of the Wounded and the Sick in the Armed Forces, the Convention on the Improvement of the Position of Wounded, Sick and Shipwrecked Sailors at Sea, and the Convention on the Protection of Civilians in War. By accepting the Conventions, Yugoslavia committed itself "to make the provisions of the Conventions known to its populace, as well as to prescribe legal sanctions against, and persecute persons who have committed such offences or issued orders for them" (6).

Regarding the violations of the Conventions, as registered in the Croatian Medical Journal - War Supplement 1, it follows that former Yugoslavia was efficient only in prescribing legal sanctions for a series of criminal offences against humanity and international law. All other binding provisions have become a dead issue, since neither the military nor Serbian terrorists were made aware of the consequences of their deeds, nor have the perpetrators of severe offenses been charged.

After all these atrocities and sufferings, the only solace left to the Croatian people is the hope that the international community will take steps to formulate another treaty modelled after the London Convention of August 8, 1945, when an International Military Tribunal was established to try the war crimes and the crimes against humanity committed during the Second World War. The rising number of criminal offenses against the Croatian people demands a similar international action against the perpetrators of war crimes.

Finally, let us hope that the Croatian Medical Journal will establish itself as an internationally acclaimed health publication, in honour and pride of its country and people.

Darko Bošnjak
Zagreb University School of Medicine

References

1 Marcikić M, Kraus Z, Marušić A. Civilian massacre in Dalj. Croat Med J 1992;33(War Suppl 1):29-33.

2 Dobi-Babić R, Katalinić P, Gudelj L, Jonjić S. Civilian massacre in Lovinac. Croat Med J 1992;33(War Suppl 1):35-41.

3 Kovačević S, Judaš M, Marušić A. Civilian Massacre in Banija: Kraljevčani and Pecki. Croat Med J 1992;33(War Suppl 1):43-7.

4 Marcikić M, Kraus Z, Dmitrović B, Mošunjac M, Marušić A. Civilian massacre near Podravska Slatina. Croat Med J 1992;33(War Suppl 1):49-54.

5 Kujundžić M, Kern J, Ivanković D, Budak A, Dragun D, Vuletić S. Person displacement pattern in Croatia. Croat Med J 1992;33(War Suppl 1):55-60

6 Geneva Conventions on the Protection of War Victims; August 12,1949. Translated and published by the Federal Bureau for Foreign Affairs, Belgrade 1962.

Action *Children in War*

Teachers and students of the University of Zagreb Medical School, together with Croatian Association *Our Children*, organized a charity action for the children in war. The main purpose was to help wounded and sick children in Croatia. Necessary funds have been secured by selling Christmas cards specially designed for this purpose (the designs on the cards were created by children), as well as by contributions made by various donators. Thanks to the unselfish and voluntary work of the Board of Action members and their associates as well as the free services of the *Copygraph*, *Narodne novine Publishers*, *University Press* and *Školska knjiga* publishing houses the printing of 45,000 cards has been realized. Students of the Medical School, together with students of the Teachers Training College, helped distribute the cards. More than 80% of the cards were sold. The net profit amounted to one million HRD. Unsold cards were sent to Germany and USA for distribution. In collaboration with the Medical Corps Headquarters of Croatia, we decided to purchase portable infant incubators. Two incubators with extra equipment have already been paid for. They will be delivered to hospitals in Zadar and Dakovo.

Thanks to the kindness of the members of the International Forum of Cardiologists and Rheumatologists, as well as the physicians of the *Holy Spirit* Hospital in Zagreb, a shipment of medications, sanitary supplies, fruit and clothes was sent from Germany in time for Christmas. A large part of the above mentioned donation was set apart for our relief. Fruit was distributed among wounded, sick and displaced children, while clothes and toys were given to the displaced children living near Karlovac and Daruvar, places of their temporary residence. Finally, by the end of December 1991, a promotion of the fine arts map *Sketches of the War* by Krešimir Bauer and Krešo Skozret, was held on the premises of the Student Press Center. Net profit from selling the publication will be donated to the children's relief fund. Funds additionally collected will be used for the purchase of equipment to be used in public health institutions for children, that were destroyed during the war.

Our future plans include exhibitions of selected children's drawings. With the help of physicians abroad, we will try to collect the funds for education of at least some of the children who lost one or both parents during the war. By spreading the action through new forms and contents, gathering new members and collaborators, collaborating with other charity organizations, it will be easier to help provide a brighter future for those whose childhood has been ruined.

After the recognition of Croatia, our action continues under the name *With Heart for the Children of Croatia*.

Aida Salihagić
Zagreb University School of Medicine

Robert Peter Gale Visited Croatia

Dr. Robert Peter Gale, a well known hematologist from UCLA, Los Angeles, CA, USA, visited Croatia from December 12-16, 1991. The idea to visit and spend a few days in Zagreb and get a more precise information about the war in Croatia came from Dr. Gale himself. As a true humanist, he always wants to help people who suffer, especially if they are his friends. He has proven it many times, as following the nuclear accidents in Chernobil and Brasil (1) and after the earthquake in Armenia. His letter from November 12 confirmed completely his willigness to come and help us: "I tried calling many times, but unsuccessfully. Our hearts are with you in this terrible (and senseless) tragedy... Also, it is quite impossible to be indifferent when one has dear friends affected, or one has walked the streets of Zagreb and Dubrovnik. What more can I do to help? Would my visit be of any benefit? If so, addvise me and I shall be happy to come. Perhaps a scientific diversion might be a relief for you and your colleagues." After this there was no dilemma whether or not to invite Dr. Gale. He arrived in Zagreb on December 12, 1991, and we arranged the scedule of his three-day visit. We arranged numerous interwievs with Croatian and foreign journalists, esspecialy with CNN, as well as a press conference. However, the main reason for Dr. Gale's visit was the war, and we had to show him the reality of it, wounded civilians and militaries, refugees, destroyed cities and villages, ruined monuments and medical facilities as military targets. We were aware that in Zagreb he could not get a real impression about the war. We decided to take him to Sisak, Osijek and Vinkovci. On December 13, 1991, just before we left for Sisak, Dr. Gale was informed about the civilian massacre in the village of Škabrnje near Zadar. Dr. J. Dujella, a pathologist from Zadar, sent us the forensic evidence and photographs of the causalties.

In Sisak we were informed about the attacks on the city. The Sisak Medical Center was hit by

more than 100 rounds of artillery fire. On the front line in Mošćenica, near Sisak, we met ill-equiped members of the Croatian National Guard. Nevertheless, the guardsmen were proud, very enthusiastic and assured of the final victory. In Sisak hospital, the majority of patients were seriously wounded persons, both civilians and militaries. Some parts of the hospital were destroyed and out of use, such as the Center for Dialysis and the Out-patient Clinic for Ophtalmology. Dr. Gale stated: "Anyone familiar with technics of targeting of modern weapons can have no doubt whatsoever that these hospitals are primary military targets. The magnitude and duration of these attacks make it impossible to ascribe the damages to inaccurate or even indiscriminate targeting by artillery or aircraft. In Sisak, one artillery shell landed directly within 10 m from a Red Cross sign painted on the hospital roof." (2). The contact we had with the refugees in Sisak's *Panonija* hotel showed us again the tragedy and senseslessness of this war. It was sad to see a hopeless old man sitting at the ground floor of the hotel. We felt they were expecting someone or something. How do you explain to these people why they were displaced, why their homes were ruined, and where their families are now.

Two days later, we visited Osijek and Vinkovci. A beautiful sunny winter morning was a great contrast to the deserted and destroyed city of Osijek. We felt strange walking along the empty streets at 11 a.m., and seeing destroyed buildings, churches and the theatre. The hospital, which is located near the battlefront, has been hit by more than 200 rounds of artillery fire. Some wards were completely or partially ruined. All patients were being cared-for in make-shift wards in the hospital basement. The staff was well equipped. They told us that they could not start with the reconstitution of the destroyed parts because continous attacks on the hospital were still in progress. The situation in Vinkovci hospital is hard to describe. In the first moment, we felt helpless. The doctors, nurses and other medical personnel were working in conditions unbelievable for an American, but very professionally, without any signs of panic. The hospital was completely destroyed, every room and every corridor. In front of the hospital there were three burned ambulances, also the targets of shelling. More than 20 artillery rounds landed during our visit. The medical staff, 17 doctors and about 150 nurses and others were taking care of wounded persons. They believed they could save still more lives of severely injured persons. They were performing surgery in a boiler-room. As soon as possible, the patients were evacuated to the nearest tertiary facilities. "How can we help these people? Can we stay and work with them?" Dr. Gale asked me. I felt the same way. Could we leave Dr. Švagelj, Dr. Matić and many others without any help? We asked them what kind of help they needed. The answer was: "We have everything. We need just one more anesthesiologist." On the way to Zagreb, I was thinking again about Dr. Gale's idea to stay and help in Vinkovci hospital. The physician who had published more than 500 papers in journals with the greatest scientific impacts, one of the world's best-known hematologists, has shown once again that he was an extraordinary man. But Dr. Gale would help us in a more suitable and more important way: he would tell the world the truth about Vinkovci, Osijek, Sisak...In numerous interviews and press conferences Dr. Gale pointed out a few basic points: in this war, civilian and cultural sites, like hospitals and churches are primary targets; the war is being fought on Croatian soil; Yugoslavia does not exist any more.

Dr. Gale also gave a lecture on nuclear terrorism. This subject was very important to us in view of a possible terroristic attack on the nuclear power plant in Krško and its catastrophic consequences for Zagreb and the surrounding area. The attack was announced by terrorist circles. The main message of Dr. Gale's lecture was: "A nuclear power plant anywhere is a nuclear power plant everywhere". This means that an incidental accident or terrorist attack on a nuclear power plant could result in a catastrophy which, because of its extensive radiation affects a great part of the world, as was shown after Chernobil catastrophe. Dr. Gale also claimed that the effect of any nuclear war would be of such magnitude that any type of medical care for the wounded, burned or irradiated would be completely impossible. After the lecture, Dr. Gale was awarded a honorary membership in the Croatian Medical Association.

At the Zagreb Clinical Center, we had the privilege to discuss with Dr. Gale the new results of the International Bone Marrow Transplant Registry, especially bone marrow transplantation in patients with acute leukemia. It has to be mentioned that Dr. Gale also submitted a typescript to Time: "The US Should Recognize Croatia Now".

It is best to finish this letter with the citation from the last letter of Dr. Gale to us, which clearly shows his opinion about Croatia now: "What can I say? I am enroute to Los Angeles and will certainly do everything I can to help Croatia. In reflecting on my experience, I have no doubt that independence is the only route, and that the United States should move expeditiously to recognize Croatia. Ideally we should be the first, not the last, to support freedom".

Boris Labar
Zagreb University School of Medicine

References

1 Gale RP, Hauser T. Posljednja opomena. Zagreb: Jumena, 1989.

2 Gale RP, Labar B. Croatia: Civilian hospitals as military targets. Lancet 1992;339:48.

Positions Opened

OSIJEK GENERAL HOSPITAL AND THE ZAGREB UNIVERSITY SCHOOL OF MEDICINE - OSIJEK BRANCH invite you to inquire/apply for the positions of the Heads of the following Departments in Osijek General Hospital, Osijek, Croatia: Surgery, Gynecology, Pediatrics and Neurology.

Requirements

1. Associate professor academic level which, for Croatian formal requirements, means at least 10 years of teaching and 20 scientific papers published in journals listed in the Current Contents.
2. Willingness to live in Osijek for the agreed period of time, at least one full academic year.
3. Willingness to teach at the Osijek School of Medicine (approximately 150 hours per year).
4. Willingness to conduct professional and scientific work at the Department, including mentorship, application and realization of projects.
5. Knowledge of English and willingness to learn Croatian.
6. All publications produced during the stay will bear the name of the Osijek Hospital and Medical School Branch.

The Offer Includes:

1. Salary at a respective Croatian level (compared to Western standards, the salary is low, but sufficient for comfortable life in Croatia).
2. Possibility of permanent (tenure) position, although, as stated above, the position may be temporary, taken during the sabatical, etc.
3. An appropriate dwelling is secured, with respect to your family situation. A low-rent apartment is offered.
4. Paid travel and stay in Osijek for candidates invited for an interview.

Additional Data:

1. Basic data on Osijek and the Osijek General Hospital can be found in English (Glavina et al. Croat Med J 1992;33(War Suppl. 1):61.)
2. The Hospital has been heavily damaged during the war against Croatia in 1991, but repair of the damage is under way. The Hospital has never stopped any of its functions.
3. Osijek General Hospital and University of Zagreb are equal opportunity employers.

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CROATIAN MEDICAL JOURNAL

INSTRUCTIONS TO AUTHORS

AIMS AND SCOPE

Croatian Medical Journal (CMJ) is conceived as an international journal open to all scientists and fields of medicine. It publishes invited Editorials, Original Articles, Clinical Reports, Laboratory Reports, invited Reviews, Medical Intelligence Articles, Special Articles, Letters to the Editor, Book Reviews and Reports of Scientific Meetings.

PREPARATION OF MANUSCRIPTS

1. The manuscripts should be written in English and the authors are responsible for ensuring that the language is suitable for publication. All material is assumed to be submitted exclusively to the CMJ. The editor retains the customary right to style and if necessary, shorten the material accepted for publication.

2. Type the complete manuscript double-spaced. Each manuscript section should begin on a new page, in the following sequence: title page; abstract and key words; text; acknowledgments; references; tables (each table complete with title and footnotes on a separate page); and legends for illustrations.Illustrations must be good-quality, unmounted glossy prints, usually 13x17 cm, but not larger than 20x25 cm. Tables and illustrations should be numbered in Arabic numerals.

3. The title page should carry (a) the title of the article, which should be concise but informative; (b) first name, middle initial, and last name of each author; (c) names of department (s) and institution (s) to which the work should be attributed; (d) name and address of the author responsible for correspondence about the manuscript; (e) name and address of the author to whom requests for reprints should be addressed; (f) source(s) of support in the form of grants, equipment, drugs, or all of these; and (g) a short running head of not more than 40 characters (count letters and spaces) placed at the foot of the title page and identified.

4. All persons designated as authors should qualify for authorship. The order of authorship should be a joint decision of the coauthors. Each author should have participated sufficiently in the work to take public responsibility for the contents. Editors may require authors to justify the assignment of authorship.

5. The second page should carry an abstract (of not more than 150 words. The abstract should state the purpose of the study or investigation, basic procedures (selection of study subjects or laboratory animals; methods of observation and analysis), main findings (give specific data and their statistical significance, if possible), and the principal conclusions. Emphasize new and important aspects of the study or observations.Below the abstract provide, and identify as such, 3 to 10 key words or short phrases that will assist indexers in cross-indexing the article and may be published with the abstract. Use terms from the medical subject headings (MeSH) list of Index Medicus; if suitable MeSH terms are not yet available for recently introduced terms, present terms may be used.

6. The text of observational and experimental articles is usually - but not necessarily - divided into sections with the headings Introduction, Methods, Results, and Discussion. Long articles may need subheadings within some sections to clarify their contents, especially the Results and Discussion sections. Other types of articles, such as case reports, reviews, and editorials, are likely to need other formats.

7. **Ethics.** When reporting experiments in human subjects, indicate whether the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional or regional) or with the Helsinki Declaration of 1975, as revised in 1983. Do not use patients' names, initials, or hospital numbers, especially in any illustrative material.

8. **Statistics.** Describe statistical methods with enough detail to enable a knowledgeable reader with access to the original data to verify the reported results.

9. **Acknowledgments.** In an appendix to the text, one or more statements should specify: (a) contributions that need acknowledging but do not justify authorship, such as general support by a departmental chairman; (b) acknowledgments of technical help; (c) acknowledgments of financial and material support, specifying the nature of the support; (d) financial relationships that may pose a conflict of interest.Technical help should be acknowledged in a paragraph separate from those acknowledging other contributions.

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11. **Tables.** Type each table double-spaced on a separate sheet. Do not submit tables as photographs. Number tables consecutively in the order of their first citation in the text and supply a brief title for each. Give each column a short or abbreviated heading. Place explanatory matter in footnotes, not in the heading.

12. **Illustrations.** Submit the required number of complete sets of figures. Figures should be professionally drawn and photographed; freehand or typewritten lettering is unacceptable. Instead of original drawings, roentgenograms, and other material, send sharp, glossy black-and-white photographs not larger than 20x25 cm. Letters, numbers, and symbols should be clear and of sufficient size so that when reduced for publication each item will still be legible. Titles and detailed explanations should be placed in the legends for illustrations, not in the illustrations themselves.

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Triplicate copies of complete manuscripts should be sent to the Editor of the respective field, to the following address:

Name of one of the respective Editors: H. Banfic (Basic Sciences), B. Labar (Clinical Sciences) or Ž. Prebeg (Public Health), and M. Marušić for nonspecific matters; Croatian Medical Journal, University of Zagreb School of Medicine Šalata 3b, 41001 Zagreb, Croatia. Telephone: +38 41 27 11 88 (ext. 222); telefax: +38 41 27 20 50.

REPRINTS

25 reprints of the published article are provided free of charge.

P.E.A.C.E. Resolution

We, the undersigned, officers and members of the Professional Emergency Action for Croatian Excellence (P.E.A.C.E.) group do hereby resolve to provide our talents, time and resources to achieve the following goals:

First: To restore Croatia's human resources and excellence in health, and social, economic, educational, natural resources and infrastructural development.

Second: To forge a stable partnership among Croatians and their allies abroad, i.e. Europe, the Americas, Asia, and Africa so as to begin an integrated nation-building process in war-torn Croatia

Activities:

Since August, 1991, we have sent a plane-load of medical supplies and four containers of winter clothing to CARITAS, Zagreb, to be used by wounded Croatian soldiers and displaced persons. We have mailed hundreds of letters, sent fax messages, made phone calls to President Bush, Senators/Congressmen and with Dr. Frane Golem we have had personal contacts with members of the United nations General Assembly in support of the independence initiatives of Croatia and Bosnia-Herzegovina.

In early 1992, a need assessment of personnel, the equipment and supplies required in each community will be made through the Croatian government. This technical report will be the basis on which P.E.A.C.E. volunteers will begin a series of two week to three-month work activities with their Croatian colleagues in the fields of human resources development and integrated nation building. All professionals from abroad will pay their transport and housing expenses.

The president, Dr. Luka Milas, will involve other professionals in America and Asia to participate in this gigantic task. Likewise, Medugorje pilgrims and their congregations worldwide will be asked to adopt and help rebuild devastated communities. By Spring of 1992, Dr. Luka Milas, Eng. Ivo Dabelić, Dr. Davor Katić and Ms. Sylvia Kentgens will have explored, in Europe, the opportunities for investment in post-war Croatia and Bosnia-Herzegovina. The possibility of creating new joint-venture companies between Croatian firms and foreign investors will be our main concern aimed at openning new job opportunities in Croatia and Bosnia-Herzegovina.

Other activities will follow depending on the degree of involvment of people of good will.

Signed in the Year of Our Lord,

January 13, 1992 at
9300 Gamebird
Houston, TX 77034
Phone: 731/944-3633; Fax: 731/944-8797

Dr. Luka Milas, *President*

Eng. Ivo Dabelić, *Vice-President*

Dr. Davor Katić, *Secretary*

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