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## ANALYSIS OF TRAUMATIZED PATIENTS IN THE EMERGENCY MEDICAL SERVICE JAGODINA, SERBIA

### ANALIZA TRAUMATIZOVANIH PACIJENATA U SHMP JAGODINA

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**Summary:** INTRODUCTION. Trauma (injury) is defined with the damage to the organism caused by an external force that can be of physical, chemical, biological and psychogenic origin.

The aim of this paper is to present and analyze the structure of traumatized patients who were treated by Emergency Medical Service (EMS) Jagodina during 2018.

METHODOLOGY. Retrospective analysis used data from the outpatient and field protocol of EMS Jagodina as well as from the information system Heliant.

RESULTS. During 2018, the total number of examined patients in EMS Jagodina was 30,675, of which 26,764 (87.25%) were examined in the outpatient clinic, and 3911 (12.75%) in the field. With the diagnoses of trauma from ICD X (International Classification of Diseases 10th revision, S00-S99) there were 5217 patients or 17.01% of the total number of patients. The traumatized were classified into groups according to the injuries they had.

DISCUSSION. Unlike other studies that analyze the type of injury, mechanisms, especially traffic injuries, etc., we dealt exclusively with the types of injuries according to the injured part of the body. The obtained data, indicate that injuries of the upper extremity were the most common, with 28.93% and 1903 patients, respectively. Among them, hand injuries are the most common. These injuries were predominantly injuries at work and at home, followed by falls at any time and injuries in traffic. Secondly, head injuries follow and are mainly the result of traffic injuries, falls and fights. Injuries of the neck structures, chest, abdomen and pelvis were less common, because they are mainly a consequence of severe trauma.

CONCLUSION. The care of each traumatized patient has its own specifics; primary and secondary assessment to determine the mechanism and severity of the injury. Continuous re-evaluate the condition of the traumatized patient until the decision on the next step. The easy trauma is more often than severe trauma.

**Key words:** traumatized patients, emergency medical service

## INTRODUCTION

Trauma is one of the leading causes of death, especially in young people and adolescents, and represents a significant problem for the health system and whole society. [1] Trauma (injury) is defined with the damage to the organism caused by an external force that can be of physical, chemical, biological and psychogenic origin. The consequences of trauma are various, from temporary damage with complete recovery, to immediate death. Severe trauma is the traumatic destruction of a vital organ or organ system that can lead to the destruction or severe and permanent damage to an important part of the body or an important organ, but also to the death of an injured person. [2]

The leading causes of severe trauma are traffic accidents, falls, injuries caused by physical attacks, firearms or cold steel. There are also a large number of intentional self-injuries that lead to life-threatening injuries, as well as injuries that occur at work and at home. [3] Developing countries have the highest percentage of deaths caused by traffic accidents. [4]

Falls are the second leading cause of accidental deaths and severe trauma in the world, especially among the elderly population, construction workers, electricians and miners. In the middle-aged population, they mainly occur in the workplace (falls from roofs, terraces, scaffolding, ladders and other heights, slips on snow, ice and wet surfaces, when using elevators, etc.). [5]

There is also a particularly large number of injuries caused by inflicting firearms or cold steel with a fatal outcome or severe disability. After the traffic accident, these types of traumas are in the second place in terms of mortality in the population aged 18 to 29. [6]

According to the latest Berlin definition, polytrauma is an injury to at least two body regions with Abbreviated Injury Scale (AIS)  $\geq 3$ , associated with one or more of the following physiological parameters: hypotension (SBP  $\leq 90$  mmHg), state of consciousness (GCS  $\leq 8$ ), acidosis (BE  $\leq -6$ ), coagulopathy (INR  $\geq 1.4$  or PTT  $\geq 40$  s), age ( $\geq 70$  years). [7] Polytrauma is a term that is still in use but has been largely

replaced by the term severe trauma which is not synonymous.

The outcome of severe trauma is influenced by the following factors:

- mechanism (severity of injury),
- site of injury (distance from the hospital),
- initial care,
- applied therapy,
- age,
- comorbidities. [2,5]

Protocols for treating patients with trauma are Pre Hospital Trauma and Life Support (PHTLS) and The Advanced Trauma Life Support (ATLS). Care protocols provide easy access to evaluation and treatment. The basic concept of the protocol consists of:

- 1) Initial care of the leading, life-threatening injury,
- 2) Care of the injured is not delayed due to the lack of a definitive diagnosis,
- 3) Detailed history is not necessary in the primary assessment.

A systematic approach enables precision and speed in the treatment of severely injured patients. The time within which the patient's condition is assessed and the necessary therapy is applied determines the following elements of access to the traumatized patient:

1. Preparation
2. Triage
3. ABCDE - primary assessment
4. Resuscitation
5. Supplement to primary assessment and resuscitation
6. Consideration of the need for patient transport
7. Secondary assessment and medical history
8. Addendum to secondary assessment
9. Continuous monitoring and re-evaluation
10. Definitive care. [8,9]

The primary assessment of the patient is performed on the basis of vital functions, existing injuries and the mechanism of injury. The establishment, maintenance and stabilization of vital functions allow detailed secondary examination and definitive care. Patient assessment using the ABCD criteria of the ATLS protocol immediately identifies life-threatening conditions. The overall approach and treatment of the traumatized patient

includes the provision of the airway, its patency and oxygenation, then the assessment of cardiac output, intravascular volume and any bleeding present. Identifying and stopping bleeding is a crucial step in patient care. Neurological evaluation involves the assessment of a state of consciousness. [8,9]

The aim of this paper is to present and analyze the structure of traumatized patients who were treated by Emergency Medical Service (EMS) Jagodina during 2018.

Methodology. Retrospective analysis used data from the outpatient and field protocol of EMS Jagodina as well as from the information system Heliant.

## RESULTS

During 2018, the total number of examined patients in EMS Jagodina was 30,675, of which 26,764 (87.25%) were examined in the outpatient clinic, and 3,911 (12.75%) in the field. Insight into the data, with the diagnoses of trauma from ICD X (International Classification of Diseases 10th revision, S00-S99) there were 5,217 patients or 17.01% of the total number of patients. In order to make it easier to see the results, the traumatized were classified into groups according to the injuries they had.

Head injuries, (S00-S09), were diagnosed in 1,072 patients (20.55%) of the total number of traumatized. Dominant among head injuries were superficial head injury (S00) (8.59%) with 448 patients and open wounds of the head (S01) with (6.50%) 339 patients. Other head injuries are injuries of the eye, nose and face, (S02,S03,S05) 233 patients (4.47%), and other injuries with 52 patients (1%).

A total of 53 patients (1.01%) were diagnosed with neck injury (S10-S19), and 43 patients (0.82%) were predominantly diagnosed with superficial neck injuries (S10). Other neck injuries were found in 10 patients (0.19%).

Chest injuries (S20-S29) were present in 368 patients (7.05%). 280 patients (5.37%) had superficial chest injuries, 41 (0.79%) thorax contusion, and 19 patients (0.36%) had fractures of the ribs, sternum or vertebrae of the spine

(S22). Other chest injuries participate with 0.53% or 28 patients.

Injuries to the abdomen, lumbosacral spine and pelvis (S30-S39) were diagnosed in 156 patients (2.99%), of which contusions were present in 17 patients (0.33%). Open wounds (S31) were diagnosed in 60 patients (1.15%), fractures of some of the bone regions (S32) in 45 patients (0.86%). Other abdominal and pelvic injuries had 0,65% of patients (34).

Shoulder and upper arm injuries (S40-S49) were present in 291 patients (5.58%). Of these, 204 patients (3.91%) had superficial injuries, 31 patients (0.59%) contusions of the deltoid and upper arm region, and dislocations, distortions and distensions of the shoulder joint (S43) had 25 patients (0.48%). Other injuries involve with 0.59% or 31 patients.

394 patients (7.55%) had elbow and forearm injuries (S50-S59), of which superficial injuries were diagnosed in 127 patients (2.43%), open injuries (S51) in 72 (1.38%), and fractures (S52) of the forearm bones in 53 (1.02%). Other injuries were present in 142 patients (2.72%).

Hand injuries (S60-S69) were diagnosed in 1218 patients (23.35%), of which superficial injuries were present in 348 (6.67%), open injuries (S61) in 514 (9.85%), and dislocations, distortions and distensions of the joints (S63) in 47 patients (0.90%). Other injuries account for 5.92% (309) of patients.

Hip and thigh injuries (S70-S79) were present in 333 patients (6.38%), of which superficial injuries in 164 (3.14%), hip contusions in 22 (0.42%) and femoral fractures (S72) in 76 patients (1.46%). Other injuries were present in 71 patients (1.36%).

Knee and lower leg injuries (S80-S89) were diagnosed in 619 patients (11.86%), of which superficial injuries were present in 234 (4.48%), knee contusions in 132 (2.53%) and open injuries (S81) in 138 patients (2.64). Other injuries were present in 115 patients (2.20%).

Ankle and foot injuries (S90-S99) were present in 713 patients (13.67%), of which superficial injuries of the maleolus and foot region were present in 340 (6.52%), open injuries (S91) in 82 (1.57%) and luxations, distortions and distensions (S93) in 186 patients (3.56%). Other injuries were found in 105 patients (2.02%).

## DISCUSSION

According to the data of the Republic Bureau of Statistics to the last census from 2011, the total number of inhabitants on the territory of Jagodina was 71,195. [10] The emergency medical service within the Health Center Jagodina takes care of all emergency and urgent conditions on the territory of the city with one doctor in the clinic and one who takes care of patients in the field with one off-road vehicle. [11] Over 30,000 patients are cared for annually through EMS. The share of the traumatized in the total number is about 17%.

Our data were compared with the statistics of the Agency for Health Research and Quality from the United States of America (USA), where 17% of the total number of patients admitted to emergency centers were due to trauma, which corresponds to our data. [12] In the USA, there is The National Electronic Injury Surveillance System (NEISS) where every injury that is taken care of in emergency centers is electronically recorded.

Data from the City Institute for Emergency Medical Aid Belgrade published in 2018, show that the frequency of injuries in the total number of examined and cared for patients coincides with the data obtained from our analyzes. [13]

The one-year analysis by diagnostic groups as performed in our institution aimed to see which regions of the body are most represented in injuries, classified according to ICD 10. Unlike other studies that analyze the type of injury, mechanisms, especially traffic injuries, etc., [2-6,12] we dealt exclusively with the types of injuries according to the injured part of the body. The obtained data, collectively, both on an outpatient basis and from the field, indicate that among the injured, injuries of the upper extremity were the most common, with 28.93% and 1903 patients, respectively. Among them, hand injuries are the most common. These injuries were predominantly injuries at work and at home, followed by falls at any time and injuries in traffic. Secondly, head injuries follow, which according to our data are mainly the result of traffic injuries, falls and fights.

Comparing the data with the elderly over the age of 65, the prevalence of injuries is different, starting with head injuries followed by fractures of the upper and lower extremities. [14] Our data show a frequency of only 1.46% of those traumatized with a femoral fracture, while this frequency is much higher in the population over 65 years of age. [14]

According to the World Health Organization (WHO), in 2013, 54 million people participated in traffic accidents, of which 1.4 million (2.04%) died in them. Research shows that in the world, 22% of all traffic accidents are pedestrian trampling. [4]

When we look at falls as a cause of traumatic injuries, in 2013, 155 million people suffered a traumatic injury due to falls, of which 556 thousand died. These falls in the elderly population can seem harmless and often occur at home. The highest number of falls from a height occurs in the population up to the age of 65, and they are related to injuries in the workplace. [5] Other falls (unspecified) occur mainly at home and in large numbers among persons over 65 years of age. [5, 14]

The fact is that injuries of the neck structures, chest, abdomen and pelvis were less common, because they are mainly a consequence of severe traffic trauma, are related to more difficult survival and are more fatal. [15]

## CONCLUSION

The care of each traumatized patient has its own specifics; primary assessment, adherence to ABCD criteria, and adequate secondary assessment to determine the mechanism and severity of the injury. Secondary assessment includes a detailed physical examination, a request for diagnostic procedures, and a medical history. The obtained anamnestic data are mainly from the emergency doctor, who took care of the traumatized patient and accompanied the patient. Continuous re-evaluation of the condition of the traumatized patient is performed until the decision on the necessary surgical treatment, admission to the intensive care unit or discharging home. The easy trauma is more often than severe trauma.

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## ANALIZA TRAUMATIZOVANIH PACIJENATA U SHMP JAGODINA

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**Sažetak:** UVOD. Trauma (povreda) se definiše oštećenjem organizma izazvanom spoljnom silom koja može biti fizičkog, hemijskog, biološkog i psihogenog porekla.

CILJ RADA je da predstavi i analizira strukturu traumatizovanih pacijenata koje je Služba hitne medicinske pomoći (SHMP) Jagodina lečila tokom 2018. godine. METODOLOGIJA. Retrospektivnom analizom korišćeni su podaci ambulantnog i terenskog protokola SHMP Jagodina, kao i iz informacionog sistema Heliant. REZULTATI. Tokom 2018. godine ukupan broj pregledanih pacijenata u SHMP Jagodina iznosio je 30.675, od čega je 26.764 (87,25%) pregledano u ambulanti, a 3911 (12,75%) na terenu. Sa dijagnozama traume iz Međunarodna klasifikacija bolesti, 10. revizija, S00-S99 bilo je 5217 pacijenata ili 17,01% od ukupnog broja pacijenata. Traumatizovani su klasifikovani u grupe prema povredama koje su imali. DISKUSIJA. Za razliku od drugih studija koje analiziraju vrstu povrede, mehanizme, posebno saobraćajne povrede itd., bavili smo se isključivo vrstama povreda prema poredenom delu tela. Dobijeni podaci ukazuju da su povrede gornjeg ekstremiteta bile najčešće, sa 28,93%, odnosno 1903 pacijenta. Među njima su povrede ruku najčešće. Ove povrede su pretežno povrede na radu i kod kuće, praćene padovima u bilo kom trenutku i povredama u saobraćaju. Slede povrede glave, i uglavnom su rezultat saobraćajnih povreda, padova i tuča. Povrede vratnih struktura, grudnog koša, stomaka i karlice bile su ređe, jer su uglavnom posledica teške traume. ZAKLJUČAK. Tretman svakog traumatizovanog pacijenta ima svoje specifičnosti; primarna i sekundarna procena radi utvrđivanja mehanizma i težine povrede. Potrebna je kontinuirana ponovna procena stanja traumatizovanog pacijenta do odluke o sledećem koraku. Laka trauma je češća od teške traume.

**Ključne reči:** traumatizovani pacijenti, služba hitne medicinske pomoći

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