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Patients with multiple injuries – diagnosis and treatment in Emergency Department

Technological progress in contemporary societies involves a constant growth in the number of injuries and cardiovascular diseases. Injuries as a result of trauma is one of the greatest and still growing medical and social problem. It is estimated that each year 5 mln people die because of trauma. In Poland, yearly, 3,500000–4,000000 people sustain injuries of various kinds; 350,000 of them are taken to the hospital, and 32,000 die, out of whom about half die on the spot of accident. Trauma is consider as one of three main reasons for death all over the world. In young and healthy people it is the primary cause of death and disability. The most dangerous results come from multiple injuries. In recent years there has been a significant growth in both the number of trauma patients and the severity of injuries. Seriously injured patients with polytrauma are still the greatest unsolved problem in trauma surgery. As many studies indicate, deaths and failures in the treatment of the post-traumatic disease are partly due to the imperfections in the procedures of dealing with the accident victims (mainly the excessive time of transport), insufficient diagnostic and therapeutic equipment, occasionally, also the inadequate experience of the emergency team or the impossibility of collaboration between specialists (2, 4, 6). In accordance with the present medical knowledge of the emergency care, following the experiences of the western countries, Poland has been trying to built up a new emergency services system since late nineties (5). One of the aims of this effort is an improvement in polytrauma treatment.

MATERIAL AND METHODS

Emergency Department in University Hospital no. 1 in Lublin, as one of five emergency hospitals in the city which have 24-hour emergency duty, provides medical care to 640 thousand population of Lublin and its neighbourhood. The hospital also admits patients from beyond the Lublin region sent in by other specialists within a few hours to several days after the accident. On average, there are 10,000 adult patients with a wide range of illnesses (over 14 years old) treated in this department for a year. During the analysed period 40,750 patients were treated in our department. A retrospective study of medical documentation of 532 patients with multiple injuries, who were treated in Emergency Department between 1.I.2000 to 31.XII.2003 is presented. All of multiple injured patients were admitted to the hospital wards: Trauma Department and Intensive Care Unit, 339 cases (79%) and 133 (21%), respectively.

RESULTS

In the period under analysis the Emergency Department in Hospital no. 1 in Lublin provided

treatment to 40,750 emergency patients, of whom 14,385 (35.3% of all treated) sustained injuries. 3,212 (22.3%) of injured patients were hospitalised include 532 patients with multiple injuries (3.7% of all trauma and 16.6% of the hospitalised trauma patients, respectively). (Tab. 1).

Table 1. Patients treated in Emergency Department in Hospital no 1 in Lublin

	All patients	Trauma patients	Patients with multiple injuries
No. (% of all patients)	40 750 (100%)	14 385 (35,3%)	532 (1.3%)
Deaths* n (% of each group)	1920 (4.71%)	502 (3.5%)	54 (10.1%)

* Death was recognized if appeared within 30 days' period after admission to emergency department

Emergency department in University Hospital in Lublin admitted 532 patients with more than one body region injured in the period from 1 I 2000 to 31 XII 2003. In this group 382 (78.1%) patients were male and 150 (28.2%) female. The mean age of all patients was 34 years (range 16 to 82). In the analysed group the age of males was significantly ($p<0.001$) lower than for female: 35 and 45 years old, respectively.

Table 2. Age and sex structure in analysed group

	Patients with MI	%	Mean age
Male	382	71.8	35 (16–76)
Female	150	28.2	45 (15–79)
Total	532	100	34 (16–79)

Multiple injuries are more common in males (71.8%) than females (28.2%). The difference is statistically significant. In the analyzed group 20 (37.5% mortality in ED) patients died in Emergency Department within the first 3 hours, while resuscitation and diagnostic procedures were performed, although average mortality in this group is 10.1%, which means that of 532 with multiple injuries 54 patients finally died.

Table 3. The cause of injury concerning patients with polytrauma regards the sex

Cause of injury	Total no. (% of 532)	M no. (% of 382).	F no. (% of 150)
Traffic accident	311 (58.1%)	213 (55.7%)	98 (65.1%)
a) driver	61 (11.5%)	46 (12.0%)	15 (9.8%)
b) passenger	84 (15.8%)	53 (13.9%)	31 (20.4%)
c) pedestrian	166 (31.2%)	114 (29.8%)	52 (34.9%)
Falls	87 (16.3%)	49 (12.8)	38 (25.4%)
Muggings	42 (7.9%)	33 (8.7%)	9 (6.3%)
Others	92 (17.3)	87 (22.8%)	5 (3.2%)
Total	532 (100 %)	382 (100%)	150 (100%)

There are three main causes of multiple injuries: traffic accidents, falls and muggings. The main cause of injury in 532 multiple injured patients were traffic accidents, 311 cases (58.5%). In this group pedestrians are the most prone to injury; in our material, those are 166 cases, which is almost a third (31.2%) of all road users who were causalities of traffic accidents. On the second place there were patients who fell down from heights – 87 cases (16.3%). The third most frequent reason for polytrauma were muggings – 42 patients (7.9%). The other 92 patients (17.3%) were injured in other circumstances (explosions, crushes, injuries through machines and devices used in the workplace).

Table 4. Number of injured body regions

Number of injured body regions	Number of cases	%	Total
2	280	52.6%	560
3	211	39.7%	633
4	36	6.8	144
5	5	0.9	25
Total	532	100	1362

The majority of patients with multiple injuries, 52.6%, had injuries of two regions, 39.7% had three injured regions and four or five regions were injured in 6.8 and 0.9% of cases, respectively.

Table 5. Time and place where intubations, oxygen ventilation and fluid resuscitation were started

Time and place of procedure	At the place of accident no. (%)	Emergency Department no. (%)	Hospital ward, ICU, operating theatre no. (%)	Total no. (%)	Not done no. (%)
Intubation, ventilation with oxygen	18 11.5% of 156	83 53.2% of 156	55 35.3% of 156	156 29.3% of 532	376 70.7% of 532
Fluid resuscitation	337 76.6% of 439	92 21.1% of 439	10 2.3% of 439	439 82.5% of 532	93 17.5% of 532

DISCUSSION

Patients with multiple severe and multiorgan injuries following a major trauma are characterized by various combinations of coexisting lesions, biological conditions and preexisting diseases, which necessitates individual management in each case. Severely injured patients constitute a real challenge for the system of trauma care, which necessitates active and precise management since the early stages following trauma (6, 7). After admittance to the trauma unit prompt, noninvasive diagnostic procedures are recommended in order to establish priorities and introduce necessary emergency surgical procedures in the most severely damaged regions. In some cases simultaneous interventions of two or even three teams are needed to save the patients' life. Introduction of optimal "golden standards" is of high importance in most seriously injured patients in order to minimize and prevent the development of dangerous complications and squealed of trauma (3, 9, 10). It is imperative that physicians caring for trauma patients have to be experts in various surgical emergency procedures and in the critical care management of severely injured patients. Evaluation of the overall quality and effectiveness show that most errors and deficiencies in diagnostic and therapeutic management contributing to avoidable deaths occur both in the early and late stages of management of trauma patients (4, 5, 8). These oversights, which is underlined by Gwoździewicz, Lasek and others (2, 4, 5), result from different causes: imperfection of diagnostic methods, hurry, inexperience, inattention and improper surgical technique. Shortcomings and errors in the prehospital organization of trauma patients care (mainly delayed transport to the hospital), inadequate shock treatment and monitoring, delay in clinical diagnosis, delay surgical operations and failure to perform the operation, were detected in the resuscitative phase, mostly in multiply injured patients (8, 10, 11).

Management of trauma victims constitute a difficult medical and organizational problem, which should be included in the changing system of health service in our country. In our country, especially in bigger cities, patients following severe trauma should be treated in specially designed trauma centers (units) integrated with emergency medicine departments securing competent intensive therapy and

surgical interventions of well prepared trauma teams introducing optimal and modern trauma algorithms. The established trauma centers should promote research in the field of traumatology.

Polish medical literature contains few articles where authors, working on the basis of a large number of cases, analyse methods, treatment and ways of dealing with patients suffering from polytrauma. Injury of several body regions may, in the early stages, lead to an oversight of one of them, resulting in serious complications and unsuccessful treatment. Many articles concerning this problem refer to the number of patients who have died of sustained injuries. According to many authors (1), a well prepared diagnostic basis is necessary for proper treatment and precise estimation of trauma severity. Patients brought to the hospital in a serious condition, often in shock with injuries of several body regions, require special care from a highly experienced medical staff. Full-profile Hospital Departments where further diagnostic and therapeutic processes continue are the base for the Emergency Medicine Department. These departments are as follows: Anaesthesiology and Intensive Care Unit, Trauma and Orthopaedic Surgery, General Surgery, Vascular Surgery, Internal Medicine, Maxillofacial Surgery, Ophthalmology, Gynaecologic Surgery and Obstetrics. Operating rooms in surgical departments with Operation Teams on duty, ready to carry out an emergency or immediate operation are available 24 hours a day.

Polytrauma patients present an enormous therapeutic and social problem. That is why it is necessary to do one's very best to improve the organisation in bringing help to the victims of accidents.

CONCLUSIONS

We concluded that patient with multiple injuries are more difficult to treat and diagnose than any other admitted in Emergency Department with higher mortality than in other groups of patients. Medical care before admission to the hospital and in the Emergency Department has a considerable influence on the treatment results of patients suffering from multiple injuries. The organisation of an Emergency department and emergency team's work must be appropriate to a wide range of diagnostic and therapeutic procedures applied to critically ill patients with multiple injuries.

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SUMMARY

A patient with multiple injuries is not a very common case in the emergency department, but if he appears, he is the most problematic and take lots of attention. Diagnosis and treatment of such patients demand a lot of knowledge, experience and skills from the medical staff. The aim of the study is to present the authors' observations concerning the management of patients with multiple injuries in Emergency Department in University Hospital no.1 in Lublin. In this Department the average 10,000 patients a year are treated. During the analysed period 40,750 patients were treated, among them there were 532 patients with multiple injuries. The retrospective study of medical documentation of 532 patients with multiple injuries who were treated in Emergency Department between 1 I 2001 to 31 XII 2003 is presented. The main risk factors concerning patients with multiple injuries which significantly influence the treatment results of this group of patients and require proper medical care in early stages of management are as follows: - diagnostic problems, - methods of dealing with traumatic shock and haemorrhages, - fighting hypoxia. We present observations concerning the organisation of the emergency team's work in Emergency Medicine Department in Lublin with the focus on the medical care of patients suffering from polytrauma. We concluded that patients with multiple injuries are more difficult to treat and diagnose then any other admitted in Emergency Department with higher mortality than in other group of patients. Medical care before admission to the hospital and in the Emergency Department has a considerable influence on the treatment results of patients suffering from multiple injuries. The organisation of an Emergency department and emergency team's work must be appropriate to the wide range of diagnostic and therapeutic procedures applied to critically ill patients with multiple injuries.

Pacjenci z obrażeniami mnogimi – diagnoza i leczenie w Oddziale Ratunkowym

Pacjenci z mnogimi obrażeniami ciała nie są zbyt często występującymi pacjentami oddziałów ratunkowych, ale jeśli się pojawią, stają się najbardziej problematycznymi pacjentami, wymagającymi wykorzystania doświadczenia i wysokich umiejętności personelu medycznego. Celem pracy było przedstawienie doświadczeń i obserwacji autorów dotyczących diagnostyki i leczenia pacjentów z mnogimi obrażeniami ciała, leczonych w Szpitalnym Oddziale Ratunkowym SPSK-1 w Lublinie w okresie od 1 I 2001 do 31 XII 2003. W analizowanym okresie w oddziale tym leczonych było łącznie 40 750 pacjentów, wśród których znajdowało się 532 chorych z mnogimi obrażeniami ciała. Stwierdzono, że zasadnicze czynniki ryzyka to: problemy diagnostyczne, walka ze wstrząsem urazowym i krwotokami, leczenie hipoksji tkankowej. Przedstawiono także proponowane zasady pracy zespołowej w oddziale ratunkowym, mające na celu poprawę efektywności działań ratunkowych wykonywanych u pacjentów z mnogimi obrażeniami ciała. Na podstawie analizowanego materiału postawione zostały wnioski: pacjenci z mnogimi obrażeniami ciała przysparzają więcej problemów niż inne grupy pacjentów leczonych w oddziale ratunkowym, a śmiertelność w tej grupie chorych jest znacznie wyższa. Znaczący wpływ na ostateczny wynik leczenia mają działania w warunkach przedszpitalnych. Właściwa organizacja pracy personelu medycznego musi odpowiadać szerokiemu zakresowi zagrożeń występujących u chorych z mnogimi obrażeniami ciała.