Multi-trauma Patients Management: a Cross-sectional Study

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Introduction: The aim of this study was to evaluate the multi-trauma critical patient management in the Clinical Emergency County Hospital of Tîrgu Mureș, Romania.

Material and method: We conducted a cross-sectional study, data collection was achieved by extracting records from hospital patients database. We collected the data from January 2007 until June 2011. The initial search revealed a number of 784 patients diagnosed with multi-trauma. From this sample we included in the study only a number of 312 patients diagnosed with critical multi-trauma from whom 194 underwent emergency surgery. We evaluated clinical consults distribution, the frequency of mechanisms of injury, therapeutical and diagnostic procedures, clinical transfers, lesions associations, traumatic lesions that required emergency surgery, injured organs and thoracic injuries that required emergency surgery.

Results: From the total number of patients, 214 (68.58%) were men and 98 (31.42%) were women. The incidence of multi-trauma regarding age, showed a peak in the 1st and 2nd decade. Regarding the mechanism of injury, the main cause is represented by car accidents, followed by assault and fall. It was observed that the most frequent clinical consults were the surgical ones, followed by orthopaedic and neurosurgical consults. In the Surgical Department, in the studied period of time, there was admitted a number of 272 patients diagnosed with critical multi-trauma.

Conclusions: In recent years, the incidence of critical multi-trauma patients increased especially in the first and second life decades. Critical multi-trauma patients with emergency surgery presented a low vital prognosis, with a mortality of 4.77%. Survival of this category of patients could increase due to the establishment of a complete chain of care (patient management): accidents site, transport, emergency service, hospital operating room, intensive care postoperative therapy.

Keywords: emergency, multi-trauma, management, surgery

Introduction

It is essential that physicians taking care of trauma patients be involved in the planning and preparation for care of the patient in the prehospital setting and the hospital phase. Decisions and protocols must be made long before the patient is seen to determine how to train prehospital personnel and what procedures will and will not be performed in the field The history of the accident, the environment, the mechanism of injury, and any history about the patient's prior medical conditions may be very important. The prehospital setting may be the only place where this information can be obtained [1].

The other place for preparation is the hospital phase. Decisions must be made as to what will occur when the patient arrives prior to arrival. The resuscitation area should be familiar to the physicians involved and must have the proper equipment. Deciding who will be called when the major trauma patient arrives is important as well. The hospital should develop an activation process where the proper personnel are available when a patient with major trauma arrives. These personnel should include not only doctors but also specialized hospital personnel including representatives from nursing, laboratory, radiology, and respiratory therapy.

The management of casualties with multiple injuries has changed considerably in recent years [2–7]. This is in keeping with the developments that have occurred in the fields of molecular biology, genetics, resuscitation, intensive care management and pharmacological agents, and with the better understanding of the host inflammatory response to trauma. In addition, improved rescue times have allowed resuscitation measures to be applied early, facilitating the practice of clinical and diagnostic procedures according to established trauma protocols.

The aim of this study was to evaluate the multi-trauma critical patient management in Emergency Clinical County Hospital, Tîrgu Mureş.

Material and method

We conducted a cross-sectional study, data collection was achieved by extracting records from hospital patients database. We collected the data from January 2007 until June 2011.

The initial search revealed a number of 784 patients diagnosed with multi-trauma. From this sample we included in the study only a number of 312 patients diagnosed with critical multi-trauma from whom 194 underwent emergency surgery.

The patients included in the study were both males and females with ages between 1 to 96 years old.

Critical patients selection for the surgical treatment study was made using AIS (Abbreviated Injury Scale) and were included the ones who presented Class V (critical injuries, incert survival).

We evaluated clinical consults distribution, the frequency of mechanisms of injury, therapeutical and diagnostic procedures, clinical transfers, lesions associations, traumatic lesions that required emergency surgery, injured organs and thoracic injuries that required emergency surgery.

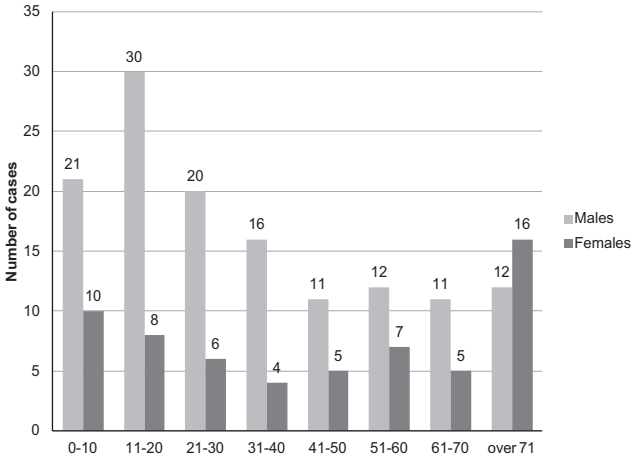

Fig. 1. Patients age and sex distribution

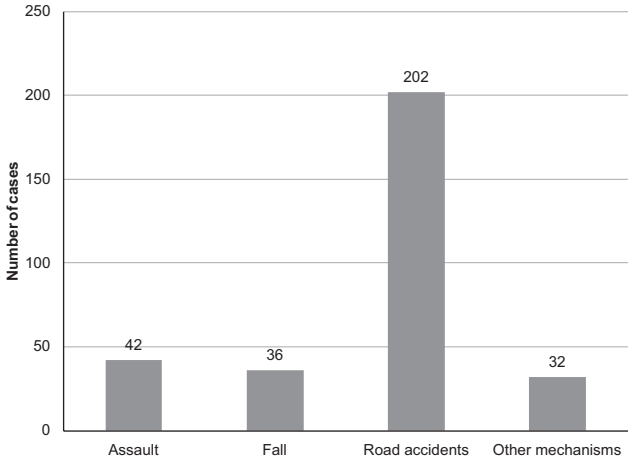

Fig. 2. Mechanisms of injury

Results

From the total number of patients, 214 (68.58%) were men and 98 (31.42%) were women. The incidence of multi-trauma regarding age, showed a peak in the 1st and 2nd decade (Figure 1).

Regarding the mechanism of injury, the main cause is represented by car accidents, followed by assault and fall. Other mechanisms of injury are represented by work, sports, domestics and railroad accidents (Figure 2).

For the evaluation of multi-trauma patient management in the Emergency Department, we studied the number and distribution of the clinical consults. We observed that the most frequent clinical consults were the surgical ones, followed by orthopaedic and neurosurgical consults, which represent the main clinical departments where the patients were transferred to (Figure 3). We mention other clinical consults, such as urological, cardiological, ENT and internal medicine.

After the patients reevaluation, it was decided the diagnostic and therapeutical procedures necessary to achieve an accurate multi-trauma diagnostic. The most frequent procedures performed in the Emergency Department are the following: peritoneal washing, pleurostomy, and superficial wounds suture (Figure 4).

The injuries of the critical multi-trauma patients involve at least two internal organs and the injuries associations that place them in the critical multi-trauma category are (Figure 5):

- Cranium-thorax;
- Cranium-abdomen;
- Thorax-abdomen-limbs.

In the Surgical Department, in the studied period of time, there was admitted a number of 272 patients diagnosed with critical multi-trauma, 194 of them being sent directly to the operating room, 65 were admitted for further medical surveillance and reevaluation and we found 13 deaths (Figure 6).

Although the thoracic traumatic injuries are more frequent, the study referred only to the ones who needed emergency surgery, in this case we observed smaller number of these injuries in comparison with abdominal traumatic ones and some cases that required both thoracic and abdominal surgery (Figure 7).

The surgical treatment applied varies depending on lesion characteristics of each patient. The most frequent interventions were in haemoperitoneum cases. In this category of patients, the most affected organ was the spleen. We

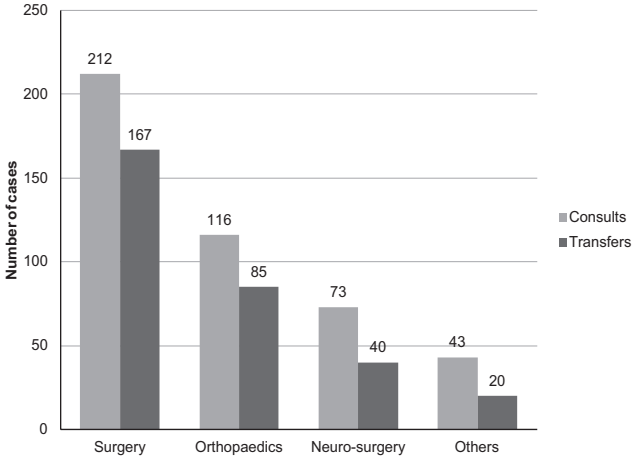

Fig. 3. Clinical consults and patients transfer distribution

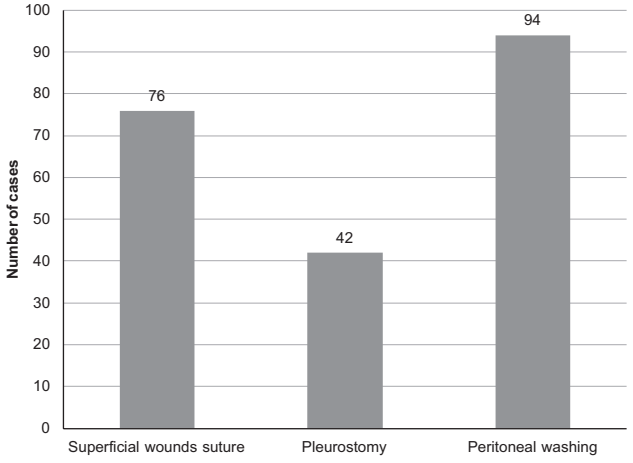

Fig. 4. Diagnostic and therapeutical procedures

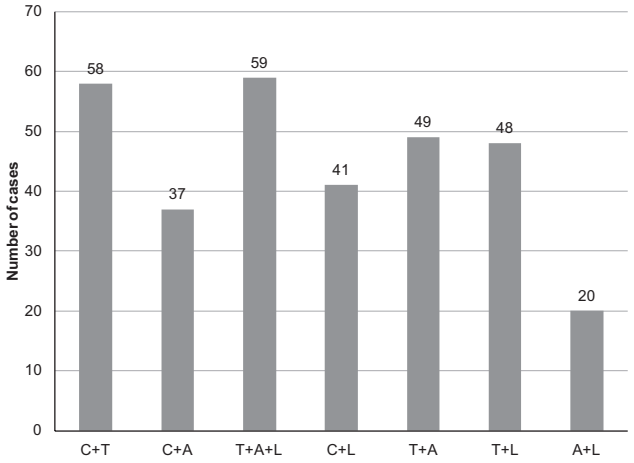

Fig. 5. Traumatic associations in critical multi-trauma patients

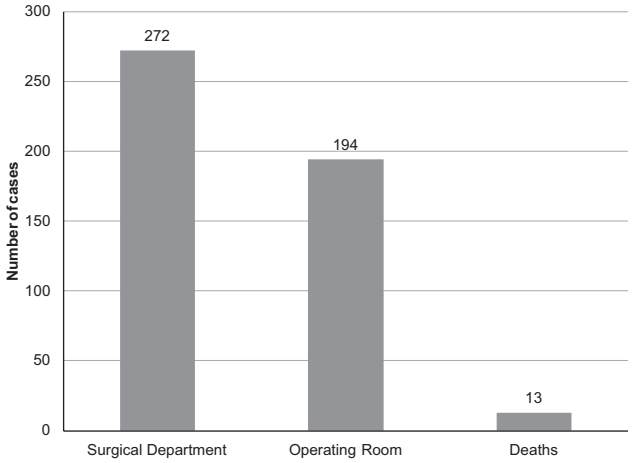

Fig. 6. The distribution of critical multi-trauma patients admitted in the Surgical Department

found that this organ was injured in 113 cases (47.67%). The spleen injury consisted of both localized and in association with other organ injuries.

Liver lesion, commonly associated with splenic trauma, occurred in 53 critical multi-trauma patients (22.36% of cases).

We also found 38 cases of mesentery trauma, 14 cases of digestive tract trauma, 10 cases of bladder trauma and 9 cases of epiploon trauma.

Most of acute surgical abdomen diagnosis was found in a large proportion by peritoneal washing which indicated the presence of blood in the peritoneal cavity. In conclusion we can say that most of the laparotomy procedures were performed to the critical multi-trauma patients, diagnosed with haemoperitoneum.

In 24 cases, laparotomy was decided by the diagnosis of peritonitis with peritoneal irritation. Although there was an association with haemoperitoneum, the clinical preoperative and laboratory diagnosis has been set for peritonitis.

In cases of thoracic injuries, the most frequent procedure was chest drain suction in a percentage of 12.6%, performed in the Emergency Department. A small number of cases (13) suffered emergency thoracotomy. Chest wounds caused by assault with cutting tools are first among the causes which led to performing emergency thoracotomy (7 ca-ses), while blast lung injuries occurred in closed lung trauma were less frequent (4 cases). The injury mechanism was in all cases represented by car accidents. In 12 cases, an emergency thoracotomy was performed to fix a flail chest (Figure 9).

Discussion

It is important to mention the efficiency of the critical multi-trauma patient management, implemented in Tîrgu Mureş by using the latest emergency protocols. The management efficiency increased with faster response of the intervention teams and due to the fact that the ambulance is most of the time accompanied by a doctor.

However, regardless of ambulance equipment and personnel, the conditions for assessing the primary diagnosis and correct treatment of the critical multi-trauma patients are optimal in the Emergency Department.

The diagnosis and therapeutic procedures performed in the Emergency Department are essential for the correct diagnosis of the patient. Some studies show a high sensitivity and specificity of peritoneal washing [8] with an accuracy of 98.6%, thus this procedure is recommended in most of

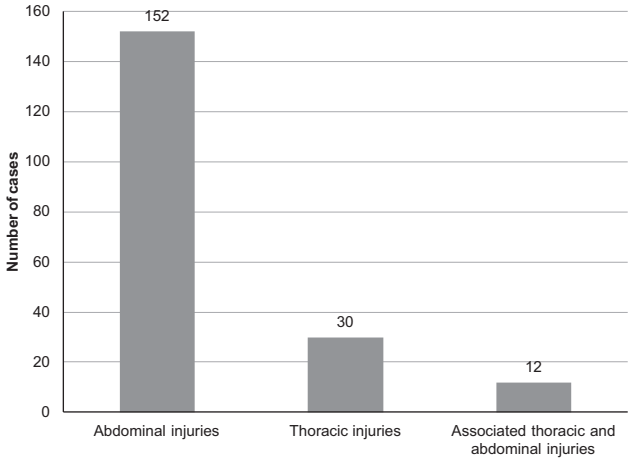

Fig. 7. Traumatic injuries that required emergency surgery

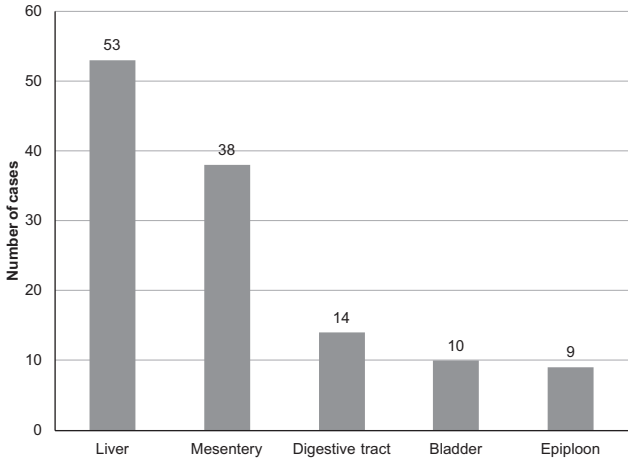

Fig. 8. Internal organs injury

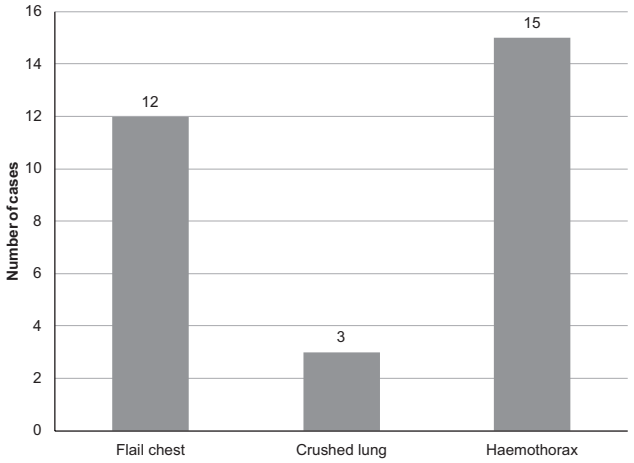

Fig. 9. Thoracic injuries that required emergency surgery

the cases. In the present study there were performed 94 peritoneal washings.

The incidence of critical multi-trauma is critical in the context of the increasing trauma "epidemic". The trauma injuries involving the active population is a reality that resides from the large number of cases recorded between the ages of 21 to 40 years. Multi-trauma is considered to have a very high incidence and is the first cause of death between the ages decades mentioned. [9].

The peak incidence between the ages of 1-10 years is also worth mentioning. An evaluation of these patients allowed us to capture a large number of diagnoses associated with road accidents.

In the same context we found a large number of male victims of multi-trauma, as a consequence of male involvement in active life longer than the females.

Multi-trauma injury mechanisms are different. The car accidents in our country, like in other industrialized countries, are the main cause for the multi-trauma: 202 cases (64.74%). The remaining cases studied occurred in sports, home and work injuries.

The primary evaluation, the first diagnosis and therapeutic procedures, and the initiation of treatment are performed in the Emergency Department. In this department are made the interdisciplinary appointments, after which is established where the patients are sent next. The most frequent transfers are made to the Surgery Department, the most likely explanation is the high incidence of thoracic and / or abdominal trauma injuries.

From all the cases included in the study a number of 272 patients were transferred to Surgery Department (87.17%). Our attention was directed to the critical patients to whom emergency surgery was performed. The rate of deaths prior to patients transfer was of 4.77% (13 cases).

The small number of thoracic injuries may be surprising, knowing that these injuries occupy a leading position regarding injuries frequency. The explanation derives from the fact that there were studied only those injuries that required surgery. It is important to mention that once the number of injured organs increases, vital prognosis decreased.

Conclusions

In recent years, the incidence of critical multi-trauma patients increased especially in the first and second life decades.

Critical multi-trauma patients with emergency surgery presented a low vital prognosis, with a mortality of 4.77%.

Survival of this category of patients could increase due to the establishment of a complete chain of care (patient management): accidents site, transport, emergency service, hospital operating room, intensive care postoperative therapy.

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