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Severe Thoracic Trauma Initial Evaluation and Management Our 15 Years' Experience

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Abstract

Introduction: Severe thoracic trauma is main cause of deaths in US about 10-20 % of deaths. Causes of Severe Thoracic Trauma are different.

Aim of study: Analyses of patients with Severe Thoracic Trauma, Initial Evaluation and Management analyses of our cases period of time July 2004-July 2018 treated in thoracic surgery service.

Material and Methods: 105 Patients were treated in our hospital during July 2004- July 2018. Male to female ratio was 3:1. Age of presentation varied from 9-71 years. Mean age presentation 49 ± 6.5 . Blunt chest wall trauma 41 (39%) and penetrating chest wall trauma 64 (61%) patients. Ribs and sternal fractures, two or more costal fractures in 21 (15.7%) patients (flail chest 7 patients); unilateral pneumothorax 38 (35.7%) patients, bilaterally pneumothorax 10 (10.5%) patients; massive haemothorax 12 (12.6%) patients, pneumomediastinum et subcutaneous emphysema 6 (6.31%) patients Hamman's syndrome, lung contusion and parenchymal pulmonary hematoma in 15 (15.7%) patients; bronchial rupture 2 (2.1%) patients, tracheal rupture 2 (1.8%) patients.

Results: Only medical treatment in 32 (30%) patients; unit lateral pleural tub drainage 42 (44%) patients, bilateral chest drainage 18 (18.9%) patients; unilateral thoracotomy in 29 (30.5%) patients, wedge resection, lung haemostasis and aeration from lung lacerations, bronchial lobar rupture left lower lobe 1 (1%) patient, bilateral thoracotomy 3 (3%) patients, clamshell incision in 1 (1%) patient; thoracic abdominal approach 2 (2%) patients. Flail chest wall stabilization 7 (7.3%) patients by viral suture, steel wire suture 3 (3%) patients, titanium plate 3 (3%) patient.

By VATS are treated 2 (2.1%) patients. Mean hospital day staying was 11 days (average 3-36 days). Morbidity rate in 6 (6.3%) patients, mortality was on 5 (5%) patients.

Conclusion: Most common thoracic injury locations was lung and chest wall injuries. Further reduction of the lethality rate and a reduction of the complication rate should be a goal for the next decades.

Keywords: Blunt trauma of chest wall; Penetrating thoracic injury; Surgery treatment

Introduction

Severe thoracic trauma is one of the tenth most common causes of death worldwide [1]. Severe thoracic injuries are responsible for 25% of all trauma deaths [2-4]. Furthermore, the lethality of multiple injured patients who sustained a thoracic trauma was assessed to be significantly higher than in multiple injured patients of equal severity without a thoracic trauma [5,6].

Injury to the thorax may affect the thoracic wall (e.g., rib, sternum fracture) as well as thoracic organs (e.g., lung, heart, vessels) to a different extent. Only a minority of patients with thoracic trauma tends to develop respiratory failure requiring intubation and ventilator support to correct hypoxia and hypercapnia [3,4].

Compared to former controlled mechanical ventilation regimes, the early use of spontaneous breathing ventilation modalities is associated with a shorter duration of ventilator support and a reduced length of intensive care unit (ICU) stay [7]. We aim to determine a measurable influence of severe thoracic trauma's severity and how initial evaluation and management are affected of the outcome.

Material and Methods

This was a retrospective study conducted in the Thoracic Surgery Service during 15 years from July 2004 up to July 2018. Demographic and clinical characteristics were evaluated using descriptive statistics. Continuous variables are presented as mean with standard deviation (SD), while categorical variables are

presented as number of cases with percentages. 105 patients were treated in our hospital, in the Thoracic Surgery Service from July 2004 to July 2018. Patients were excluded if they were transferred from or to an outside hospital, in the event of unsuccessful emergency resuscitation. Male to female ratio was 3:1. Age of presentation varied from 9-71 years. Mean age presentation 49 ± 6.5 .

Results

Blunt chest wall trauma were 41 (39%) and penetrating chest wall trauma resulted 64 (61%) patients. Ribs and sternal fractures, two or more costal fractures were observed in 21 (15.7%) patients (flail chest 7 patients); unilateral pneumothorax 38 (35.7%) patients, bilaterally pneumothorax 10 (10.5%) patients; massive haem thorax 12 (12.6%) patients, pneumomediastinum et subcutaneous emphysema 6 (6.31%) patients. Hamman's syndrome, lung contusion and parenchymal pulmonary hematoma was observed in 15 (15.7%) patients; bronchial rupture 2 (2.1%) patients and tracheal rupture 2 (1.8%) patient. The used ways for the treatments were: Thoraco abdominal approach 2 (2%) patients. Flail chest wall stabilization 7 (7.3%) patients by viral suture, steel wire suture 3(3%) patients, titanium plate 3(3%) patients. By Video Assisted Thoracic Surgery were treated 2 (2.1%) patients., due to the injury locations.

Mean hospital stay was 11 days (average 3-36 days). Morbidity rate in 6 (6.3%) patients, and consisted of sepsis, organ failure and respiratory failure (**Figure 1,2**). Mortality was on 5 (5%) patients and death usually occurred mostly the ICU patients, due to multiorgan failure and one of the reason is the lack of ECMO (Extracorporeal Membrane Oxygenation machine) in the ICU in our hospital (**Table 1**).



Figure 1: Post traumatic Aorta-venous fistula, right haem pneumothorax and multiple right fractures.

Table 1: The modalities of the treatment were as below:

unilateral pleural tub drainage 42(44%) patients,
thoracotomy in 29 (30.5%) patients,
Only medical treatment in 32 (30%) patients;
bilateral chest drainage 18 (18.9%) patients;
bilateral thoracotomy 3(3%) patients,
wedge resection, lung hemostasis and aerostasis from lung lacerations, bronchial lobar rupture left lower lob 1(1%) patient, clamshell incision in 1 (1%) patient.



Figure 2: Toraco-abdominal trauma (fracture costae, biliophytysis, diaphragmaticrupture, hepatic rupture).

Penetrating wound 4/5 intercostaledexterlineapreste rnaledhe 4/5 sinister lineapresternale with damage of right internymamaryartrie et PNx bilateral laceration bilaterally of the parenchymal lung treated by Clamshell approach.

Discussion

We present a retrospective analysis of severely injured patients suffering from thoracic traumas of different magnitude, initial treatment and management. As in other studies [6,8,9-12], our population consists mainly of middle-aged males. Other studies showed that severely injured patients with head and chest injuries require intensive care stay and mechanical ventilation [12], and thoracic injury is known to be an independent risk factor for 30-day mortality and poor outcome in patients suffering traumatic brain injuries [11]. Our study showed a decline in the mortality rate of severely injured patients in recent years irrespective of the severity of the chest trauma they sustained. This observation concurs with prior data reporting an overall drop in the mortality of severely injured patients [6]. This study is limited by its retrospective nature and sometimes and sample tests not ensure data quality.

Conclusion

Most common thoracic injury locations were lung and chest wall injuries. The extent of thoracic trauma in severely injured patients is a relevant risk factor for intensive care therapy, organ failure, sepsis, and mortality. Further reduction of the lethality rate and a reduction of the complication rate should be a goal for the next decades.

One of the ways of improving our service is the use of new technologies and methods especially to be present ECMO, which must be priority of the health care policy. To prevent thoracic trauma, we need to strengthen the legislation on weapons and improve the vehicle braking systems, also mediatic campaign to advice people to be prudent during driving cars.

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