

Prevalence of Chest Trauma at Tertiary Care Institute: A Cross Sectional Study

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Abstract

Background: Trauma is the leading cause of mortality and disability, especially during the productive age, and is the third most common cause of death. Present study carried out to assess the general spectrum of chest injury patients at tertiary care institute of Gujarat. **Subjects and Methods:** A total number of 500 patients were admitted with chest were included in the study. Details of all these patients were entered in the study from their records with specific reference to age, sex, mode of injury, severity of injury, number of ribs fractured, treatment employed and final outcome. **Results:** Out of a total of 500 patients, the maximum was in the age group of 20-29 years and the next common decade was the 4th one. There were 380 male and 120 female patients. Blunt trauma was responsible for the injury in 405 patients and 95 patients sustained chest injury after penetrating trauma. Regarding treatment profile, no active treatment was required in 135 cases with either one or two rib fractures on x-rays without any haemopneumothorax. Intercostal drainage was required in 330 patients and thoracotomy was essential in 35 patients. **Conclusion:** Early recognition and management of associated injuries and complications is of paramount importance in reducing the morbidity and mortality. The majority of these patients can be managed by simple intervention i.e., intercostal drainage and only less than 10% require thoracotomy. For ICD, results of negative suction pleural drainage are better as compared to simple underwater seal drainage.

Keywords: Haemopneumothorax, Intercostal drainage, Thoracotomy, Trauma

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Received: 21 December 2019

Revised: 27 January 2020

Accepted: 1 February 2020

Published: 26 May 2020

Introduction

Trauma is the leading cause of mortality and disability, especially during the productive age, and is the third most common cause of death.^[1] Accidents which are unexpected and unplanned events are becoming the major epidemic of the present century. The number of accidental deaths in India is even higher than in the Western World. Thoracic trauma contributes heavily to these figures besides head injury, abdominal injury and orthopedic injuries. Approximately one quarter of civilian trauma deaths are caused by thoracic trauma and many of these deaths can be prevented by prompt diagnosis and correct management.^[2]

Thoracic cage contains the most vital organs - heart, lungs and the great vessels and it has to give protection to the vital organs as well as preserve the unique function of expansion of lungs to ensure proper oxygenation of blood. Although, the ribs sternum and vertebral column which form this sturdy but pliable rib cage gives enough protection, there are certain weak points in this structure like the intercostal spaces, angles of ribs and costochondral junctions. Thoracic traumas might

lead to severe consequences, even though less than 50% of them required a surgical revision.^[3] Thoracic traumas can be divided in blunt or penetrating, according to the presence of open wound in the chest.

In blunt traumas, rib fractures are common and they might be associated with haemothorax, pneumothorax or haemopneumothorax that are the most typical lesions that need to be faced by thoracic surgeons; moreover, lung injuries such as contusion or laceration can also be found.

On the other hand, penetrating trauma is mostly related to stubbing and gunshot and they usually present with lung or other thoracic organs lesions. Mortality related to penetrating chest traumas is significantly higher than blunt traumas, and more than 90% is not able to reach the hospital alive; nevertheless, mortality for patients with no cardiac involvement is less than 1%.^[4]

In spite of the high mortality rates, about 90% of the patients with life threatening thoracic injuries can be managed by a simple intervention like drainage of the pleural space by tube thoracostomy.^[5] Present study carried out to assess the general

spectrum of chest injury patients at tertiary care institute of Gujarat.

Subjects and Methods

Particulars of all patients with chest trauma who required hospitalization in the last year were recorded and analyzed. A patient was labeled as a case of chest injury when he was having injury to the chest associated with fractured ribs with or without haemopneumothorax or injury to the chest with haemopneumothorax even without fractured ribs. A total number of 500 patients were admitted with chest were included in the study. Details of all these patients were entered in the study from their records with specific reference to age, sex, mode of injury, severity of injury, number of ribs fractured, treatment employed and final outcome.

Statistical analysis

The data were analyzed using SPSS version 15 (SPSS Inc., Chicago, Illinois, USA). For all tests, confidence level and level of significance were set at 95% and 5% respectively.

Results

Five hundred patients were admitted primarily because of chest injury. The rest of the patients were having head injury, abdominal injury or other injuries. Out of a total of 500 patients, the maximum was in the age group of 20-29 years and the next common decade was the 4th one. So more than half of all the patients were in the 3rd and 4th decade of life and the incidence was low for very young and very old patients. There were 380 male and 120 female patients. Blunt trauma was responsible for the injury in 405 patients and 95 patients sustained chest injury after penetrating trauma. In blunt trauma, road-side accidents was the commonest cause, others being fall from height, assault, etc. [Table 1].

The right side was involved in 240 and the left side in 165 patients with blunt injury, while in penetrating injuries, the right side was affected in 35 and the left side in 60 cases. Single rib fracture was evident on x-ray in 70 patients, two fractured ribs were seen in 105 patients and in 255 patients there were multiple ribs fractured. In 65 patients, multiple rib fractures were also associated with flail chest. In 80 cases there was no evidence of fractured ribs on x-ray but still they developed either pneumothorax or haemopneumothorax. Regarding treatment profile, no active treatment was required in 135 cases with either one or two rib fractures on x-rays without any haemopneumothorax. Intercostal drainage was required in 330 patients and thoracotomy was essential in 35 patients [Table 2].

Ventilatory support to maintain O2 saturation was needed in 45 patients. Out of these 45 patients, ventilatory support was

needed in 35 patients because of flail chest and in 10 patients after thoracotomy. Various indications of thoracotomy are shown in [Table 3].

In the majority of patients i.e., in 330 cases, tube thoracostomy was the main treatment employed. Initially, we were treating these cases by simple intercostal drainage and they required tube drainage for 2-9 days. And lately we have started applying negative suction to the drainage system requiring intercostals drainage for 2-6 days. If we analyze the final outcome of all the chest injury patients (500), 390 patients were discharged in satisfactory condition within 7-10 days, while hospital stay was prolonged in 60 patients because of some complications of ICD and 50 patients could not be saved despite adequate and aggressive treatment. Complications seen after ICD were residual haemothorax, recurrent pneumothorax and empyema. Out of 25 patients with empyema, 18 were treated by prolonged ICD and the remaining 7 developed chronic empyema with thickened pleura requiring thoracotomy with decortication.

Table 1: Mode of Injury among study participants

Blunt Trauma (405)		Penetrating trauma (95)	
Road side accidents	301	Stab	84
Fall from height	35		
Assault	55	Gun shot	11
Animal related causes	14		

Table 2: Treatment profile of study participants

Treatment Profile	No of patients (500)
No Active Treatment	135
Intercostal drainage	330
Thoracotomy	35

Table 3: Indications of thoracotomy among study participants

Treatment Profile	No of patients
Massive Bleeding	16
Ruptured Bronchus	6
Cardiac Tamponade	3
Diphragmatic hernia	6
Others	4

Discussion

Trauma is the leading cause of mortality and morbidity during the first four decades of life, and one of the commonest causes of death. Blunt or a penetrating injury can traumatize any one or multiple components of the thoracic cage or internal organs at a time. Overall prognosis of all the injuries will depend upon various factors like age of the patient, severity, time interval between trauma and treatment, severity of associated injuries etc.

More than half of the patients were in the 3rd and 4th decades of life and the incidence was low in very young and very old patients. The higher incidence in young age was due to the fact that this is the most active period of life. The higher percentage of younger age group patients in the present study is comparable to studies of Muckart and Locurto et al, [6,7] M. Mohta et al, [8] reported 49.55% patients in their study of 105 in the same age group (21-40 years). Massaga et al, [9] had 43.75% patients from age group of 30 to 49 years. The highest incidence in this age group can be attributed to the active lifestyle with exposure to factors like use of automobiles, working with machinery, assaults and contact sports.

Males outnumbered females by a huge margin because of their greater exposure to outdoor activities like drivers, industrial workers and labourers etc. These findings were comparable to findings of other studies. Other studies have shown similar findings. Monafishha et al, [10] reported male incidence of 79.35 in the study of 150 cases. In the study by M. Mohta et al, [8] 95 out of 105 patients of chest trauma were males.

Motor vehicle accidents accounted for more than half of all the injuries. F. A. Massaga et al. reported that 72.3% cases were due to vehicular accidents. [9] In a study of 1164 patients of chest trauma by Veysi et al, [11] 57.01% cases were due to automobile accidents. Automobile accidents are major causes of polytrauma. Most of the victims suffer chest injuries when they are involved in polytrauma, rapid industrialization, higher rates of economic growth and better living standards have increased the use of high speed automobiles in our country. Our roads are not so good for such vehicles. Rules and regulations regarding safety are not followed stringently. Morbidity and mortality is going to increase in coming days which will be a serious medical and socioeconomical problem. Ibrahim et al, [12] have reported incidence of 41% (365 out of 888) cases due to assault. Probably the study was conducted in a troubled area as no other study has similarly higher incidence.

Blunt trauma, mainly road-side accidents formed the most common cause of chest injury, followed by blunt assault, stab by knives and falls etc. Increased automobile traffic and ever increasing population together with intentional or unintentional ignorance of traffic rules account for the predominance of road-side accidents producing chest trauma.

These findings were in accordance with the studies of Helling and Mattox, in which road accidents constituted.

The right side of the chest was involved commonly after blunt injury while left side involvement was more common after penetrating injuries, which is consistent with assault by a right-handed assailant. Muckart et al. have observed a similar finding in which 61% of stab wounds occurred in the left pleural cavity. [6] In our study, the majority of patients had fractures of more than two ribs. With single or two rib fractures the incidence of pneumothorax/haemothorax is not as high but there is increasing likelihood of this complication as the number of fractured ribs increases. [13]

Regarding treatment profile, intercostal drainage was required in 330 patients and thoracotomy was needed in 35 patients only. Although chest drain insertion is a quite common procedure, a correct training is required before being able to do it properly and safely. [14] As a matter of fact; complication rates are strictly related to the experience of the operator. Earlier we were carrying out chest drainage by simple underwater seal drainage but recently we have started applying negative suction to the pleural drainage system. Time taken for full expansion of the lung and removal of the chest tube was 2-9 days in Group A and 2-6 days in Group B. So the chest tube was required for a lesser duration in Group B patients. In a study by Locurto, the chest tube was kept for an average 4.5 days with simple underwater seal drainage. [14]

Residual haemothorax was the commonest complication in our series, 25 of which were treated by simple aspiration while the remaining required repeat ICD. Drummond observed residual haemothorax in about 15% of patients with haemopneumothorax where simple ICD was done. [15]

Empyema was seen in 25 patients, 18 of which were treated by prolonged ICD and the remaining 7 developed chronic empyema with thickened pleura requiring thoracotomy and decortication later on. S. Dalal et al. [16] reported that 90% of patients with thoracic injuries could be managed by tube thoracostomy. Many other studies have shown similar results. F.A.Massaga et al, [9] reported 56.3% of cases had tube thoracostomy done in their study.

Conclusion

Outcome of a victim of chest trauma depends on various factors. Morbidity and mortality varies with age of the patient and force and location of trauma. Associated injuries increase the risk of complications in patients with chest trauma. Delay in diagnosis and treatment and respiratory complications increase the mortality. Early recognition and management of associated injuries and complications is of paramount importance in reducing the morbidity and mortality. The majority of these patients can be managed by

simple intervention i.e., intercostal drainage and only less than 10% require thoracotomy. For ICD, results of negative suction pleural drainage are better as compared to simple underwater seal drainage.

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How to cite this article: Tolia J, Bhatt A. Prevalence of Chest Trauma at Tertiary Care Institute: A Cross Sectional Study. *Acad. J Surg*. 2020;3(1):48-51.

DOI: dx.doi.org/10.47008/ajs/2020.3.1.10

Source of Support: Nil, **Conflict of Interest:** None declared.