



Assessment of Injuries Caused by Penetrating Chest Traumas in Patients Referred to Gujarat Adani Institute of Medical Science, Bhuj, Kutch, Gujarat- A Retrospective Study

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ABSTRACT

The aim of the study was to determine the frequency of different injuries caused by penetrating chest traumas, and also the cause and type of trauma and its accompanying injuries. The study was carried out retrospectively. All patients with chest trauma with or without accompanying injury who referred to the Gujarat Adani institute of medical science, Bhuj, Kutch, Gujarat, between March 2012 and March 2014 were entered the study. The required information including age, sex, cause of trauma, type and site of injury, and accompanying injury was obtained and used to fill out a questionnaire and then was analyzed. 828 patients were included in the study; most of them were in the age range of 20–29. Of the patients, 97.6 % were males. The most frequent cause of trauma was stabbing, and the most frequent injuries following the trauma were pneumothorax and hemothorax. Orthopedic trauma was the most frequent accompanying injury. The most commonly used diagnostic method was plain chest radiography. In 93 % of the patients, the chest tube was placed and thoracotomy was performed for 97 % of the patients. Most patients need only chest tube placement as a definitive treatment.

KEYWORDS : Chest trauma, injury, Kutch, Stabbing

Introduction

Trauma is considered the first cause of mortality, morbidity, and hospitalization in the age range of 1–40 in today's world. Perhaps, it can be mentioned that trauma has the greatest social and economical effect on all causes of disease. Thus, in current years a major part of the studies on diseases is performed on victims of traumas. According to the findings of the previous studies, chest trauma solely causes 45 % of deaths following trauma, 50 % of which happens after fatal accidents¹, and 75 % of the deaths occur after reaching emergency rooms. In 20 % of traumatized patients, chest trauma is observed isolated or accompanied with other injuries and approximately 25 % of all deaths caused by trauma occur due to chest injuries^{1,2}. In spite of these findings, emergency surgery is required in only 10–15 % of patients with chest trauma. Today, improvement of emergency services and faster transportation of patients to hospitals have increased the number of survivors. Moreover, the emergency physician should rapidly manage the patients with understanding of the trend of chest trauma pathophysiology³. Thus, appropriate and timely diagnosis of chest traumas is of great importance and correct diagnosis of the chest injury can decrease the mortality and morbidity^{3,4}.

In the USA, each year due to various injuries 160,000 deaths occurs¹. Also, 50,000 people are affected with some degrees of permanent disabilities. Hemothorax, pneumothorax, and a combination of these two injuries are the most common fatal complications of penetrating and blunt chest traumas. Since chest trauma can affect a large portion of the world population, it can lead to the highest amount of working year loss and almost 40 % of all deaths caused by it can be prevented by preventive procedures and establishment of regional trauma systems^{5,6}. The key point in diagnosis of chest trauma is having a high suspicion of the probability of chest trauma presence in an injured patient. A high portion of the injuries can be diagnosed by simple paraclinical evaluations, such as plain chest radiography⁷. In general, the appropriate understanding of problems caused by chest trauma can lead to prevention of complications caused by delay in the treatment. Also, this will decrease the mortality and bed occupancy rates, and consumption of medicines. Besides, this can prevent undue surgeries. Some measures have been carried out in Iran to reduce the mortality of accidents. Considering these and also the worldwide statistics of injuries, as well as the possible differences in the epidemiology and prevalence of chest trauma in different regions, we carried out the current study. The aim of the study was to determine the frequency of different injuries caused by penetrating chest traumas, and also the cause and type of trauma and accompanying injuries in patients referred to Gujarat Adani institute of medical science, Bhuj, Kutch, Gujarat, between March 2012 and March 2016.

Materials and methods

The study was carried out retrospectively. All patients with chest trauma with or without accompanying injury who referred to the Gujarat Adani institute of medical science, Bhuj, Kutch, Gujarat, between

March 2012 and March 2014 were entered the study. To this end, 828 files were reviewed. The required information including age, sex, cause of trauma, type and site of injury, and accompanying injuries were extracted and used to fill in the questionnaire. Ethical clearance was taken from the institutional ethics board and informed consent was obtained from all the participants. The data were analyzed using SPSS software, version 15, and chi-square was used for comparison of complications between the two groups.

Results

From March 2012 and March 2014, there were 828 cases of chest trauma. Out of which 811 patients were males (97.6 %). With respect to the age range, the patients were in the age range of 9–84 years. The highest and lowest number of patients were observed in the age ranges of 20–29 (442 patients, 53.3 %) and 50–59 (11 patients, 13.2 %), respectively. The mean age of patients was 24 years. With respect to the underlying cause of the trauma, stabbing (776 patients, 93.7 %) and cow butting (3 patients, 0.36 %) were the most and the least prevalent causes (Table 1). Regarding the site of trauma, in 481 patients (58 %) the site of trauma was the left side and in 328 patients (39 %) the site of trauma was the right side of the chest, while 19 patients (2.2 %) experienced the trauma bilaterally. Head and neck, orthopedic, and abdominal injuries were the accompanying injuries in 22 (26 %), 116 (14 %), and 40 (4.8 %) patients, respectively. Thus, orthopedic injuries were the most frequent accompanying injuries. Of 116 orthopedic injuries, 18 were fractures, which were treated, and others were soft tissue injuries.

Duration of hospital stay was in the range of 1–13 days. The final diagnosis, clinical course, and surgical operations were based upon the radiological findings. The most commonly used diagnostic method was plain chest radiography, followed by plain radiography of extremities, which was carried out in 14 % of patients. The different types of injuries caused by the trauma in order of the frequency were: pneumothorax 308 patients (37 %), hemothorax 290 patients (35 %), hemopneumothorax 219 patients (26 %), tamponade 16 patients (1.9 %), cardiac rupture 12 patients (1.4 %), pleural effusion two patients (1.5 %), and pericardial effusion two patients (1.5 %).

Of 828 patients studied, 821 were treated and survived; of them in 813 (93 %) patients chest tubes were placed and eight patients (0.97 %) underwent thoracotomy. Out of the 828 evaluated patients, seven patients died; two patients due to thoracic aorta rupture and five patients due to cardiac rupture or hemopericardium.

Discussion

Chest trauma was observed to be more frequent in men in the study (97.6 % in males versus 2.4 % in females), which is consistent with the findings of other studies. In different studies, the rate was reported to be 79–98; 7 % in male and 1.25–24.6 % in female patients^{8–10}. The age ranges of 20–29 and 50–59 showed to have the highest and lowest frequencies of chest trauma, respectively, with the average age

of 24 years for the patients. In similar studies, the average age of patients was 34 years⁹⁻¹³. These indicate that trauma in general is more prevalent in young people, who have the highest productivity in the society.

In the current study, the most common cause of trauma for all ages (particularly for the age range of 20–30) was stabbing similar to the Onat et al. study in Turkey¹⁴. This shows that young men who are more active in social affairs are more susceptible to such social injuries. It seems that further studies are required for prevention of potential complications of such injuries in young people as well as for different evaluations of social and economical aspects. The most common site for chest trauma was left side of the chest.

The most frequent accompanying injury was orthopedic. In other studies, rib fracture was the most frequent accompanying injury^{9,12,13}. The mortality rate in our study was 0.84 %, which is less than the Onat et al. study (i.e. 10.8 %) ¹⁴. The overall mortality rate in the Clarke et al. study in South Africa was reported as 33 % for penetrating chest trauma for stab wounds and 52 % for gunshot wounds, which is significantly more than our study¹⁵. This difference may be due to the difference in the mechanism of injury; in their study gunshot injury was prevalent and in our study there was no gunshot injury and gunshot wounds of the chest are more lethal than stab wounds^{14,15}.

It is obvious that in each traumatized patient, particularly patients with chest trauma, the general and all system examination should be carefully carried out. In the current study, the final diagnosis, which was obtained on the basis of radiological finding or surgical operation, were pneumothorax, hemothorax, hemopneumothorax, tamponade, emphysema, cardiac rupture, pericardial effusion, and pleural effusion in the order of frequency. Thus, pneumothorax was the most frequent diagnosis, which is consistent with that of some other studies¹⁶. This shows that among the different types of chest traumas, the most common injuries were chest wall injuries, which were mostly superficial. In the present study, with respect to the type of treatment, the chest tube was placed for most patients (93 %), and thoracotomy and opening of chest were required in eight patients (0.97 %). In other studies, less than 10 % of patients required thoracotomy surgery, and supportive treatments and placement of chest tubes were adequate for treatment of 90–95 % of patients¹³.

In the current study, the main indications for surgical operation were severe hemorrhage and continued bleeding after placement of the chest tube. This is in agreement with those of all the previous studies. The most frequently observed finding after thoracotomy was pulmonary rupture, followed by injury of intercostal vessels, which is consistent with the findings of some other studies⁴. Considering this, providing more care for these patients in emergency rooms of therapeutic centers and performing immediate and life-saving procedures are necessary in all these patients. The most commonly used diagnostic method was plain chest radiography, which was carried out for all patients. Chest radiography has been indicated also in other studies as an affordable tool for diagnosis of chest injuries¹⁷. A recent study has recommended that patients with penetrating chest trauma and normal screening CXR should be controlled with a 3-hour delayed CXR, serial physical examinations, and focused assessment with sonography, and CT scan should be applied as a diagnostic modality only in selected cases¹⁸.

Conclusion

As our hospital is a trauma referral center, it can be concluded that men in the age range of 20–29 are the main susceptible group for this type of injury and stabbing is the most common cause of penetrating chest injury. Due to the high frequency of chest traumas in injured patients, placement of the chest tube is the definite treatment in most patients. Regarding the type of resulted complications, this method can be considered the most appropriate treatment in chest traumas.

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