

THORACIC TRAUMA: ONE YEAR SURGICAL AUDIT AT ARAR CENTRAL HOSPITAL, SAUDI ARABIA

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ABSTRACT

Background: Thoracic trauma is increasingly encountered now a days in emergency room. **Objective:** To determine the pattern and management outcome of thoracic trauma patients at area central Hospital Saudi Arabia. **Methodology:** Study Design: Cross-sectional study. Place & Duration of Study: This study was conducted on 104 patients at the ER, ICU and Surgical floor of Arar Central Hospital, Northern Border Region, Saudi Arabia from 1st January to 31st December 2015. Information consisting of patients particulars, pattern and modes of injuries and hospital stay were recorded. Complications and deaths were analyzed by database to determine the morbidity and mortality. Patients irrespective of their age and gender were included in our study. The data was entered and analyzed by using SPSS version 11. **Results:** Sample size of 104 patients was included. Male to female ratio was 4:1. Patients age raised from 4 years to 82 years, mean age was 29.6 years. Blunt Trauma was most prevalent (72.11%), followed by Penetrating injuries (19.23%) and combined injuries (8.65%). Extra thoracic injuries included orthopedic injuries in 35(33.65%) patients, 28(26.92%) patients has neurological injuries whereas in 23(22.11%) patients blunt abdominal trauma was noted. Most frequent injury pattern seen was Fracture Ribs 70 (67.30%) patients with underlying haemothorax in 27(25.96%)patients. Most of the patients treated either conservatively or with tube thoracostomy 53.84% and 43.27% respectively. Complications were encountered in 35 (33.65%) patients. 10 (9%)patients has Chest tube site infection whereas 7(6.73%) developed atelectasis treated successfully by Bronchoscopy. Overall 6 (5.76%) deaths were recorded during study duration. **Conclusion:** Thoracic injuries remain major trauma related issues in this part of country. Highest priority must be given to the chest injured patients in order to decrease the morbidity and mortality. Moreover surgical audit should be expanded to other facilities also in order to improve the health care facilities provided to patients.

Keyword: Thoracic, Injury, Pattern, Outcome, Mortality

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INTRODUCTION

Chest injuries are one of the leading cause of deaths in acute trauma settings both in developed and developing countries.¹ Globally 10% of hospital admissions occur due to chest trauma. In USA 16000 deaths occur per year due to chest injuries.¹ In Europe and America the mortality in patients with blunt chest trauma is up to 60%.² Broadly speaking thoracic injuries can be categorized as blunt and penetrating. Blunt chest injuries out number the penetrating ones and road traffic accidents (RTA) are the major cause of such injuries.³ Followed by RTA, fall from height, injuries inflicted by heavy objects and physical assault constitute major portion of blunt thoracic trauma(BTT). Penetrating injuries, though seen less frequently, can be lethal if not treated in time.^{4,5} Assessment of these lethal conditions is mainly clinical often aided by X-rays chest and ultrasonogram. CT Scan chest can be very helpful in doubtful cases but warrants hemodynamic stability of the patient.⁶ Under special circumstances specific investigations like

esophagoscopy, bronchoscopy and angiography can be done to rule out specific organ related injuries.⁷⁻¹⁰

Fortunately most of thoracic trauma patients can either be managed conservatively or by a tube thoracostomy.¹¹⁻¹⁶ All that is needed in most instances is a good analgesia, adequate antibiotic coverage and liberal pulmonary toilet.¹⁷⁻²⁵ On rare occasions thoracotomy has to be performed as a life saving procedure indications for it include significant hemothorax with continued internal bleeding, diaphragmatic and cardiovascular injuries. Major tracheobronchial and pulmonary lacerations may also warrant this modality of treatment.^{11,26,27}

We decided to conduct an audit of thoracic surgical trauma patients at our setup to describe our own experience in terms of pattern and outcome among thoracic trauma patients.

METHODOLOGY

The data for this clinical audit, cross-sectional study was taken from 1st January to 31st December 2015. One hundred and four patients were enrolled with thoracic injuries at Arar Central Hospital, Saudi

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Arabia. Approval was sought from hospital ethical committee.

This study included all chest injury patients irrespective of their age and gender. All patients were managed according to ATLS protocol. The patients were initially managed in ER and then were shifted to the respective facility according to their hemodynamic status. Data collection was done by means of a detailed questionnaire/protocol, from records of hospital. Data was then fed to the computer and was analyzed using SPSS version 11. Help of a medical statistician was sought and variables were expressed in terms of mean, mode, median and standard deviation. Chi Square test and Student t test were applied and significant p values were shown to be less than 0.05.

RESULTS

A total number of 104 patients were included. 84 (80.77%) patients were male and 20 (19.23%) patients were female. Ages of the patients ranged from 4 years to 82 years. 75 (72.11%) patients sustained blunt trauma thoracic trauma, 20(19.23%) patients has penetrating trauma, whereas 9(8.65%) patients has combined injury. Age distribution is shown in Table I.

Table I: Age distribution

Age in Years	Number of Patients	Percentage
4 - 20	16	16.64%
21 - 40	64	66.56%
41 - 60	20	20.08%
61 - 82	04	4.16%

The highest incidence of extra thoracic associated injuries was of orthopedic trauma 35(33.65%) patients. (Table II).

Out of these 35 patients, 16(15.38%) patients underwent open reduction and internal fixation for bony fractures. 28(26.92%) patients sustained head injuries. Base of skull fracture was found in 8(7.69%) patients and 6 (5.7%) patients has brain contusions these were treated conservatively. 2(1.92%) patients has extradural hematomas, requiring evacuation. Spine injuries were detected in 12 (11.53%) patients. In 23(22.11%) patients blunt abdominal trauma was present. After

exploratory laparotomy 3 patients has splenectomy and in 2 patients liver injury leading to hemoperitoneum was found. 1 patient has bowel injury for which resection and anastomosis of intestine was done.

Table II: Distribution of Extrathoracic injuries

System Involved	Number of Patients	Percentage
Orthopedics	35	33.65%
Neurosurgery	28	26.92%
General Surgery	23	22.11%
Plastic Surgery	16	15.38%
Urology	02	2.08%

Table III: Modes of treatment

Treatment	Number of Patients	Percentage
Conservative Tube	56	53.84%
Thoracostomy	45	43.27%
Thoracotomy	03	2.88%

Table IV: Pattern of injuries

Injury	Number of Patients	Percentage
Chest wall contusion	31	29.80%
Hemothorax	27	25.96%
Pneumothorax	18	17.30%
Pulmonary Contusion	16	15.38%
Flail Chest	11	10.57%
Ruptured Diaphragm	01	0.96%
Rib Fractures with associated injuries	70	67.30%

Table III shows treatment offered to these patients; 56 (53.84%) patients were successfully managed conservatively. Adequate analgesia, appropriate antibiotics and local wound management was done in these patients. In 45 (43.26%) patients tube thoracostomy with underwater seal was performed. Out of these patients 32(30.76%) patients were having penetrating trauma while 13(12.5%) patients has blunt trauma. In 3 patients (2.88%) emergency thoracotomy was performed for massive hemothorax, diaphragmatic rupture and empyema

Pattern of injury is shown in table IV, mainly consisted of haemothorax 27(25.96%) patients. 18(17.30%) patients has pneumothorax. Pulmonary contusions were found in 16 (15.38%) patients. Chest wall contusion and traumatic wounds were found in 31 and 11 patients respectively. 1 patient has ruptured left dome of diaphragm. Patients blunt trauma has fracture ribs in the presence of underlying pathologies. Overall 70 (67.30%) patients has associated rib fractures. Complications noted are shown in table V.

Table V: Complication among patients

Complication	Number of Patients	Percentage
Wound sepsis	10	9.6%
Atelectasis	07	6.73%
Empyema	04	3.8%
Complications of long Bone fractures	03	2.88%
ARDS	02	1.92%
Pulmonary Embolism	01	0.96%
Overall Complication Rate	35	33.65%

DISCUSSION

Chest injuries are responsible for a large number of deaths worldwide most of these victims are males in their youth. In our study more than $\frac{3}{4}$ of chest injury patients were male. Similar gender predominance has been shown in different studies.^{12,13,14} 2/3 rd of these male victims were having ages between 21 to 40 years. It is in accordance with results shown by vasquez TC and coworkers.²⁵ The reason for this young male predominance could be due to their active and thrilling life style. Law prohibits females to drive vehicles in this geographical area and this could be the reason for decrease incidence of BTT in ladies in our study. Blunt thoracic trauma is more common but the incidence of penetrating injuries is increasing nowadays globally due to increased urbanization.¹⁰ Our study showed 76.92% blunt trauma versus 19% penetrating injuries. Similar observation was noted by Al Badani MN and Al Absi NA.¹⁵ Farooq and colleagues reported higher incidence for penetrating than blunt injuries.¹⁶ Less incidence of penetrating trauma in our incidence is due to the strict laws which prohibit the civilians to keep firearms. Almost all the penetrating injuries inflicted to our patients

were due to stabs. However increased incidence is observed for BTT due to RTA in our study and is clearly due to over speeding and violation of traffic laws.

The most common extra thoracic injuries in our patients were of neurological in origin these were followed by orthopedics and abdominal injuries. These findings were in agreement to other studies.^{13,17,10} The concomitant presence of these associated injuries are major determinants of patients outcome. It is vital not only to recognize these associated injuries in time but to address them promptly as well in order to reduce the mortality and morbidity associated with thoracic trauma. Most common injury pattern seen in our patients was rib fractures i.e, 67.30% patients. Rib fractures were mostly associated with underlying hemothorax and pulmonary contusions. Similar prevalence of bony rib cage trauma is seen by Shorr and others.¹⁸ Increased frequency of rib fractures and less incidence of penetrating trauma, once again, is due to RTA related BTT. As firearm injuries are seen on extremely rare occasions, penetrating trauma almost always is due to stab wounds or other low velocity shrapnel.

Detailed history and thorough examination was carried out and all patients were managed according to ATLS protocol. Every patient was screened with chest X-ray. Haemodynamically stable patients with complex injuries were investigated with CT scan Chest. Same protocol was followed in other studies as well.^{13,14} Instead of USG, we performed CT scan chest in doubtful cases as USG is observer based investigation moreover, pneumothorax cannot be detected by this diagnostic modality. CT Scan on the other hand is very sensitive in determining the qualitative as well as quantitative assessment of hemothoraces.²⁶

We managed more than half of the patients conservatively. These patients were offered strong analgesia adequate antibiotics and liberal pulmonary toilet. Incentive spirometry and chest physiotherapy was instituted to avoid sequel of chest trauma specially atelectasis and chest infections. Batos and Baisden also had the same observation.¹⁹ It is now globally accepted that most of the chest trauma can either be managed conservatively or by inserting a chest drain. We managed 45 patients with tube thoracostomy this figure is in accordance with Inci et al.¹⁰ Chest tube insertion is a simple procedure and can be mastered in a short period of time. Yet it is a life saving procedure that can be performed under

local anesthesia. It can be done at rural and peripheral hospitals where thoracic surgical facilities are not available. During our study period we performed emergency thoracotomy in 3 patients. Indications were massive haemothorax and diaphragmatic rupture in 2 patients. The third patient developed empyema due to prolonged retention of chest tube so we had to do thoracotomy and decortication. The incidence of exploration in our study is less than others.^{15,20} The one less no of thoracotomies in our study mainly due to the decreased incidence of penetrating trauma at our setup. Recent trend is to have emergency exploration mainly reserved for penetrating injuries.²¹ Overall complication rate in our study was 33% slightly higher as shown by Chan et al.²² chest wall infections had highest incidence and responded well to systemic antibiotics and local wound care. 7 patients developed atelectasis while in ICU on mechanical ventilation. Flexible bronchoscopy was done, mucus plug was removed and full expansion of lungs was achieved. These patients did fine on incentive spirometry and chest physiotherapy after weaning off from ventilator. 6 patients (5.76%) were expired during our study period. This mortality rate is in agreement to other studies.^{23,24,25} Out of these 5 expiries were having polytrauma of severe intensity. These patients has BTT along with involvement of other systems as well. 1 patient died during hospital stay due to sudden cardiopulmonary arrest as a result of suspected pulmonary embolism.

CONCLUSION

Thoracic trauma is a major health issue that account for a substantial number of deaths in this part of country. Blunt thoracic trauma is the prevalent pattern and is attributed to high speeding and violation of traffic laws. Strict implementation of traffic rules is highly desirable in order to prevent road traffic accident related blunt thoracic trauma in this region of country.

Conflict of interest

The authors have declared no conflict of interest.

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