

CLINICAL PROFILE, MANAGEMENT AND OUTCOME OF CHEST TRAUMA PATIENTS AT A TERTIARY CARE CENTRE IN NORTH-EAST INDIA

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Abstract

Background: Chest trauma constitutes 10% of all trauma case with a significant morbidity especially in North East India with unique geographical, infrastructure and socio economic challenges. The present study was conducted with an aim to determine the clinical profile, management and outcome of chest trauma patients. **Materials and Methods:** This prospective study was conducted in Assam Medical College and Hospital, Dibrugarh from December 2022 to November 2023. Various parameters including clinical features, mode of injury, associated injuries, treatment and outcome was studied after initial stabilization of the patient. **Results:** A total of 729 chest trauma patients were examined during the study period of which 605 (82.9%) were male and 124 were female (17.1%). Majority of patients presented with chest pain (53.09%) and the commonest mode of injury was road traffic accidents (71.95%). 69.55% of cases were treated conservatively, 26.34% cases required intercostal chest tube drainage and only 3.84% cases required thoracotomy. The mortality rate was 1.65%. **Conclusion:** Majority of chest trauma can be prevented by adequate awareness on road traffic accidents. A huge number of cases are treated conservatively or by intercostal chest tube drainage and rarely by thoracotomy.

Keywords: Chest Trauma, North east India, Road Traffic Accidents

Introduction

Every year 5.8 million deaths occur due to traumatic injuries in the world. Every 1.9 minutes, a trauma related death is reported in India^[1]. Nearly 20 million are hospitalized every year due to injuries, out of which 1 million die due to trauma related injuries^[2]. In India, approximately 16,000 deaths occur due to chest trauma in a year^[3].

Chest trauma encompasses various injuries to the thorax region, which can be classified broadly into blunt and penetrating trauma. The most common cause of chest injury is road traffic accidents. The other causes of chest trauma include physical assaults, fall from height, gunshot injuries. In a vast and densely populated country like India, particularly in regions such as North East India with unique geographical, infrastructural, and socio-economic challenges, the incidence and patterns of chest trauma can be quite distinct. While specific statistics for chest trauma in North East India might not be readily available in the sources provided, it is known from general health care assessments that trauma represents a significant challenge worldwide and that care capabilities can vary greatly, including access to necessary equipment and timely availability of trauma-related skills ^[4].

Specific challenges such as logistical difficulties due to the terrain, possible lack of dedicated trauma centers, or variances in the presence of qualified health care professionals plays a major role in the management of chest trauma patients in North East India. Solutions may include enhancing existing health care facilities, improving training in trauma care, or using technology to bridge the gap between remote areas and urban health care services.

Effective analgesia, intercostal water seal chest tube drainage, surgical fixation, respiratory care and early mobilization is the mainstay of treatment ^{[5] [6]}. A prospective study is conducted on all chest trauma patients presented to our hospital between December 2022 to November 2023 to look for the clinical profile, management and outcome.

Materials and Methods

The present study was a prospective study conducted at the Department of General Surgery, Assam Medical College and Hospital, Dibrugarh, Assam after taking the ethical committee approval. The time period of study was from December 2022 to November 2023. A written consent was obtained from all the subjects in their local language.

Inclusion criteria

1. Patients who had given informed consent to participate in this study.
2. All the patients presenting to the casualty with chest injuries (blunt and penetrating chest trauma) irrespective of age and sex

Exclusion Criteria

1. Patients who did not give informed consent to participate in this study.
2. Patients who had benign or malignant lesions of the lung or chest wall.
3. Patients brought dead to Casualty/ Emergency room.

Methodology

The patients with chest trauma (polytrauma and isolated chest injuries) were managed according to the Advanced Trauma Life Support (ATLS) guidelines using integrated management by a team of specialist doctors including a general surgeon, orthopaedician, cardiothoracic vascular surgeon, neurosurgeon, physician and anesthetist. Primary survey was done with assessment of the airway, breathing, and circulation of the patient. The cases were triaged and resuscitation of the patient was done simultaneously. A detailed history with all vital parameters, mode of injury, associated injuries was recorded. Information was directly obtained from the patient whenever possible and from the witness to the trauma if available.

After resuscitation and hemodynamic stability, the patient was shifted for necessary radiological investigations and later on admitted to the ward or ICU depending upon the condition of the patient.

Observation and Results

A total of 729 patients presented to the Casualty/ Emergency room during the time period of November 2022 to December 2023 in our hospital. Table 1 show that the highest number of cases was seen during the month of November 2023. Out of the 729 cases, 605 (82.9%) cases were male and the rest 124 (17.1%) cases were female.

Table 1: Month wise distribution of chest trauma patients

Month and year	Male	Female	Total
December 2022	64	10	74
January 2023	32	6	38
February 2023	46	13	59
March 2023	51	11	62
April 2023	55	12	67
May 2023	32	9	41
June 2023	38	13	51
July 2023	50	11	61
August 2023	58	12	70
September 2023	48	6	54
October 2023	57	7	64
November 2023	74	14	88
Total	605	124	729

Table 2: Clinical presentations of chest trauma patients

Clinical features	Number of patients	Percentage
Respiratory distress	54	7.41%
Chest pain	387	53.09%
Shock	38	5.21%
Decreased breath sounds	294	40.33%
Surgical emphysema	268	36.76%
Paradoxical chest movements	8	1.10%
Hemoptysis	0	0.00%

Table 2 show that majority of the patients presented with chest pain (53.09%) followed by decreased breath sounds (40.33%). 54 patients presented with respiratory distress and 38 patients presented in shock.

Table 3: Mode of injury in chest trauma patients

Mode of injury	Male		Female		Total	
	No. of patients	Percent age	No. of patients	Percent age	No. of patients	Percent age
Road Traffic Accidents	412	68.10%	94	75.81%	506	71.95%
Physical Assault	152	25.12%	22	17.74%	174	21.43%
Fall from height	24	3.97%	6	4.84%	30	4.40%
Animal Attack	15	2.48%	2	1.61%	17	2.05%
Gun shot injury	2	0.33%	0	0.00%	2	0.17%
Total	605	100.00%	124	100.00%	729	100.00%

Table 3 show that most of the injuries in this study were from road traffic accidents in both the sex (71.95%) followed by physical assault (21.43%).gunshot injuries and animal attack contributed the least to chest trauma with 0.17% and 2.05% respectively.

Table 4: Types of injuries seen in chest trauma patients

Type of injury	Number	Percentage
Hemothorax	278	38.13%
Pneumothorax	233	31.96%
hemopneumothorax	185	25.38%
Rib fracture	325	44.58%
Clavicle fracture	265	36.35%
Sternal Fracture	4	0.55%
Lung contusion	102	13.99%
Flial Chest	8	1.10%
Diaphragmatic injury	2	0.27%

Table 4 show that the majority of patients presented with rib fracture (44.58%) followed by hemothorax (38.13%). Many patients presented with multiple injuries. The other injuries seen are enlisted in Table 4

Table 5: Associated injuries seen in chest trauma patients

Associated injuries	Number of patients	Percentage
Head injury	485	66.53%
Abdominal injury	56	7.68%
Musculoskeletal injury	398	54.60%
Spinal injury	2	0.27%
No associated injury	114	15.64%

Table 5 show the associated injuries of which the most commonly associated injury was head injury followed by musculoskeletal injury. Isolated chest injury was seen only in 15.64% of the patients.

Table 6: Treatment given to chest trauma patients

Management/ Outcome	Number of patients	Percentage
Conservative	507	69.55%
Inetercoastal chest tube drainage	192	26.34%
Thoracotomy	28	3.84%
Laparotomy for diaphragmatic injury	2	0.27%
Total	729	100.00%

Table 6 shows the treatment given to chest injury patients. Majority of the patients were treated conservatively and only 26.34% of subjects required intercostal chest tube drainage. Only a small section of patients (3.84%) required thoracotomy.

Table 7: Outcome of chest trauma patients

outcome	Number of patients	Percentage
Discharged after conservative treatment	449	61.59%
Discharged after ICWSD removal	174	23.87%
Discharged after operative treatment	26	3.57%
Expired	12	1.65%
Referred	0	0.00%
Discharge against Medical Advise	68	9.33%
	729	100.00%

Table 7 shows the outcome of chest trauma patients. Majority of the patients were discharged after conservative treatment (61.59%). Only 1.65% of the patients expired due to chest trauma.

9.33% of the patients took discharge against medical advice.

Discussion

Chest trauma contributes to 10-15% of all trauma cases making it a significant challenge ^[7]. Our hospital being a tertiary center caters to chest trauma patients in the north east part of Assam, Arunachal Pradesh and other surrounding areas with the aid of a Cardio thoracic vascular department. Male population is most commonly affected in our study with a male to female ratio of 4.8:1. It was consistent with the study conducted by Ekpe *et al.* where male to female ratio was 4:1 ^[8]. Male tend to consume more alcohol and are more engaged in external activities, this might be the reason for the higher incidence of male involved in chest trauma. In our study road traffic accidents (71.95%) was found to be the most common cause of chest trauma followed by physical assault (21.43%). This was in accordance with the studies done by Gupta *et al.* ^[9] Lema *et al.* ^[10], Sikander *et al.* ^[11], and Dehgan *et al.* ^[12]. This was in consistent with the prospective study conducted by Gupta *et al.* at a tertiary care center in north India in which road traffic accident was found to be the most common cause of chest trauma (61%) ^[9]. The study also revealed that rib fracture was seen in 44.58% of patients, hemopneumothorax seen in 31.5%, hemothorax seen in 25%, and pneumothorax in seen in 8.5% of patients. In our study rib fracture was seen in 78% of patients, hemopneumothorax

seen in 25.38%, hemothorax seen in 38.13%, and pneumothorax in seen in 31.96% of patients.

A majority of patients had associated head injuries (66.53%) in the present study with exclusive chest injuries seen in 15.64% patients only. Anisuzzaman *et al.* reported the most common associated injury was of the extremity followed by abdominal injury ^[13]. Mathangasinghe *et al.* also reported extremity injury as most common associated injury followed by head injury ^[14]. These findings were not in accordance with our study.

In the present study, a conservative line of management was observed in 69.55% of patients and operative management was done in 30.18% of patients. Among the operative treatment, the majority of the patients required ICD insertion (26.34%), while thoracotomy was done in 3.84% of the patient during the present study. Kant *et al.* reported similar findings with 82% patients managed conservatively and 15% required chest tube drainage ^[3]. Kulshrestha *et al.* in their study concluded that most of chest trauma patients can be managed conservatively. In their study, only 18.32% patients required intercostal chest tube drainage and 2.6% required thoracotomy ^[15].

The mortality rate in our study was only 1.65% which is comparable to the study of Kant *et al.* in which the mortality rate is 2% ^[1]. Ekpe *et al.* reported that mortality in chest trauma is determined by associated extra thoracic organ injury, late presentation (beyond 24 hour), and severe chest injury with bilateral chest involvement ^[8].

Conclusion

The present study was to highlight the fact that road traffic accidents play are the most common cause of chest trauma. Early diagnosis and treatment of chest trauma has helped to decrease the morbidity and mortality of patients. Majority of the cases are treated conservatively or by the use of intercostal chest tube drainage which is a simple procedure that can be done by a trained professional. Awareness about road traffic accidents and strict enforcement of traffic rules can help in preventing serious and life threatening injuries.

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