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A study of clinical profile of chest injury: A prospective observational study

Dr. Ankit Srivastava[1], Dr. Ravindra Kumar[2], Dr. Bhaskar Kumar[3]
[1]*Senior Resident, Department of General Surgery, Patna Medical College*
[2]*Associate Professor, Department of General Surgery, Patna Medical College*
[3]*Junior Resident, Department of General Surgery, Patna Medical College*
Corresponding Author:*Dr. Ankit Srivastava, Senior Resident, Department of General Surgery, Patna Medical College, near Patna market, Patna, Bihar,*

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ABSTRACT

Background: Despite advances in trauma management and critical care, chest trauma still continues to be a significantsource of morbidity, mortality and hospitalization especially in otherwise healthy young adults. The mortality and morbidity depends on factors such as severity of chest injury, condition of the underlying lungs, associated extra-thoracic injuries especially to head, abdomen and long bones. **Aims and Objectives:** To study the incidence, different types of chest trauma, modalities of investigation, management, morbidity and mortality of chest trauma. **Material and Methods:**Prospective Observational Study was conducted at Department of General Surgery, Patna Medical College, Patna during July 2014 to June 2016. Sample size was 150 cases of chest trauma. **Results and Observations:** The overallincidence of chest trauma in our hospital is 17.14. Blunt trauma is more common than penetrating trauma leading to chest injury in our study. Road traffic accident is the commonest mechanism of injury in blunt trauma group, while stab injury is the commonest mechanism of injury in penetrating trauma group. Fracture ribs is the most common type of chest injury detected in our study followed by pneumothorax. CT scan thorax has a definite role in the diagnosis. The average duration of hospital stay in our patient is 8.97 days. The mortality rate in our study is 11.33%. **Conclusion:** Prompt diagnosis and treatment, judicious use of radiological investigations and timely surgical intervention improves the final outcome in chest trauma patients.

Key Word: Chest injury, blunt trauma, pneumothorax.

I. INTRODUCTION:

Chest trauma (or thoracic trauma) is one of the most serious injuries of the chest and also a common cause of significant disability and mortality. It is also the leading cause of death from physical trauma after head and spinal cord injury. Despite advances in trauma management and critical care, chest trauma still continues to be a significant source of morbidity, mortality and hospitalization especially in otherwise healthy young adults [1-3]. The mortality and morbidity depends on factors such as severity of chest injury, condition of the underlying lungs, associated extra-thoracic injuries especially to head, abdomen and long bones [4-5]. Road traffic accidents (RTAs), firearm injuries (FAIs), falls from heights, blasts, stabs andother acts of violence are the causative mechanismsinvolved [1,4-6]. The clinical presentation varies from case tocase, however there is more frequent involvement of the relatively young males, which further amplifies the grave implications of this serious problem [1, 7-9]. Death and complications due to chest injury can be minimized by improved resuscitation, evaluation and treatment. Most preventable deaths due to trauma are the result ofinadequately treated chest injuries. The most avoidable deaths result from delayed presentation of patients to hospital, failure to resuscitate and operate on surgically corrected injuries. The new surgical techniques and diagnostic tools like CT-scan, MRI are important in the management of chest injury. The concept of present study is to study various etiological factors, type of chest injury,various investigations and their significance in chest injury, morbidity and mortality in chest injury.

II. AIMS AND OBJECTIVES:

1. To study the incidence of chest trauma in patients admitted in our department of general surgery.
2. Study different types of chest trauma patients presenting to our district general hospital.
3. Different modalities of investigation for chest trauma and their significance and importance.
4. Different modalities of management of chest trauma.

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5. To study the morbidity and mortality of chest trauma.

III. MATERIAL AND METHODS:

This present prospective study was conducted in thedepartment of general surgery (District hospital). Thestudy was conducted from July 2014 to June 2016.During study period, total 150 patients of chest traumawere studied. Patients who met inclusion criteria wererequested to sign a written informed consent form beforebeing enrolled into the study.**Inclusion Criteria:** All the patients of chest injuryirrespective of their age and sex requiring admission wereincluded in study.**Exclusion Criteria:** Severely traumatized patients whoexpired before investigation for chest trauma, and patientsnot requiring admission were excluded from the study.

IV. RESULTS AND OBSERVATIONS:

Overall incidence of chest trauma in our hospital: Overall trauma related admissions in our hospital during the periodof study were 5040 out of which 864 were of thoracic trauma, therefore the overall incidence of chest trauma in our hospitalis 17.14.

Table 1: Type of chest injury

Type of injury	Number of patients	Percentage
Blunt	142	94.67%
Penetrating	08	05.33%
Total	150	100%

From above table it is clearly evident that blunt trauma to the chest is more common than penetrating chest injury.

Table 2: Mechanism of blunt chest injury

Cause	Blunt	
	Number of patients	Percentage
Road Traffic Accidents (RTA)	85	59.86%
Assault	31	21.83%
Fall from height	18	12.00%
Hit by bull	04	02.82%
Fall of object on chest	04	02.82%

From above table it is evident that RTA is the commonest mechanism of blunt chest trauma followed by assault.

Table 3: Mechanism of Penetrating chest injury.

Mechanism of injury	Number of patients
Stab	06
Bull horn injury	02
Gunshot injury	00

From above table it is evident that Stab injury is the commonest mechanism of penetrating chest injury.

Table 4: Types of chest injuries detected in our study

Type of chest injuries	Number of patients	Percentage (n=150)
Rib fracture	132	88.00%
Pneumothorax	93	62.00%
Hemothorax	86	57.33%
Hemopneumothorax	70	46.67%
Lung contusion	64	42.67%
Subcutaneous emphysema	35	23.33%
Flail chest	23	15.33%
Fracture sternum	13	08.67%

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From above table it is evident rib fracture is the most common type of injury seen in our study which is followed by pneumothorax. Out of 132 patients having ribsfracture 23 patients had flail chest i.e.15.33%.

Table 5: Chest trauma and the associated injuries

Associated injuries	Number of patients	Percentage (n=150)
Head injury	84	56.00%
Abdominal injury	20	13.33%
Spine injury	13	08.67%
Extremity injury (skeletal injury)	55	36.67%

Head injury is the commonest associated injury detected in our patients of chest trauma. Skeletal injury is the second most common associate injury detected in our patients. Spinal injury is the least common associated injury seen in our study.

Table 6: Modality of treatment

Treatment	Number of patients
Conservative	50 (33.33%)
Operative	100 (66.67%)
Total	150 (100.00%)

In our present prospective study majority of patients were treated operatively, (66.67%), while conservative line oftreatment was observed in 33.33% of patients.

Table 7: Operative procedures done.

Operative procedure done	Number of patients	Percentage
Tube thoracostomy	100	66.67%
Thoracotomy	00	00.00%

From above table it is evident that tube thoracostomy is the commonest procedure performed in our chest trauma patients, not a single patient needed thoracotomy.

Table 8: Various investigations done in chest trauma patients.

Various investigations	Number of patients	Percentage
Chest radiograph	150	100.00%
USG Thorax	45	30.00%
CT-scan Thorax	118	78.67%

From above table it is evident that chest radiograph is the most commonly done investigation in our study. USG thorax was done in 45patients and CT-scan thorax was done in 118 patients.

Table 9: Comparison of radiological investigations done in chest trauma patients.

Radiological	Total	Pathology detected		
Investigations	Patients	Rib fracture (no. of patients)	Hemothorax (no. of patients)	Pneumothorax (no. of patients)
Chest radiograph	150	98	54	53
USG Thorax	45	108	84	88
CT-scan Thorax	118	--	07	--

In our present prospective study chest radiograph was done in all the patients, rib fracture was detected in 98 patients,Hemothorax in 54 patients, and pneumothorax in 53 patients. CT-scan thorax was performed in 118 patients rib fracture was detected in 108 patients, Hemothorax in 84 patients and pneumothorax in 88 patients. USG thorax was performed in 45 patients, which helped in detection of Hemothorax in only 7 patients. In the patients in whom chest radiograph was normal but thoracic injury was suspected were subjected to CT- scan thorax. CT scan thorax was performed in 118 patients in this study and rib fracture was detected in 108 patients. There were some patients

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in whom chest radiograph was normal but CT-scan thorax showed intrathoracic pathology. This indicates that chest radiograph is not useful to detect thoracic injury in all the patients of chest trauma. It was noted that fracture to the lower ribs i.e. below 5th /6th rib are masked due to domes of diaphragm, but are visualised in CT-scan. USG is operator dependent and alone not useful for detection of thoracic injury in all the patients, and is usually combined with other investigations for detection of thoracic injury. In some patients more than one pathology (viz. fracture rib, Hemothorax, pneumothorax etc.) was detected.

Table 10: Duration of hospital stay for chest injury.

Duration of hospital stay for chest injury (days)	**Number of patients**	**Average hospital stay**
1-5	43	8.97 days (SD = 4.89days)
6-10	53	
11-15	39	
16-20	12	
21-25	02	
Total	149	

From above table it is evident that the average duration of hospital stay is 8.97days with standard deviation of 4.89 days.

Table 11: Mortality in chest trauma patients.

Type of chest trauma	Total Patients	Death	Percentage
Blunt	142	17	11.97%
Penetrating	08	00	00.00%

Out of 142 patients of blunt chest injuries 17 patients succumbed to death, there was not a single death detected in penetrating chest injury group in our study.

V. DISCUSSION:

Chest injury is one of the most important aspect of polytrauma. It can also occur solely. Its proper diagnosis and management may influence the prognosis in multisystem multi organ injuries. Various aspects of chest injuries as observed in this study are discussed with comparative series from literature in the following paragraphs. Out 5040 trauma related patients who were admitted in hospital 864 patients were cases of chest trauma giving incidence of 17.14% in a trauma related conditions. In our study blunt trauma is more common than penetrating trauma. Similar findingsare also observed in Lemaet al [11], Mohan Atriet al [12], and Okugbo SU et al [14]studies. It has been observed that the mechanism of chest injuries varies from one country to country, also varies within the same country. RTA is the commonest mechanism of chest injury noted in our study which is in accordance with various other studies. In our study headinjury is the commonest associated injury detected. Similar findings are also note in AnupamChoudharyet al16 study and Lemaet al [11] study. In Ibrahim Al-Koudmaniet al [15] and MehboobAlam Pasha et al [17] study skeletal injuries are themost common associated injuries detected.The average duration of hospital stay in our study is 8.97 days. The average duration of hospital stay in ST Liman etal19, Lemaet al[11] and Iv. Novakovet al[18]studies were 4.5 days, 13.7 days, 8.7days respectively. As compared to, Lemaet al[11] and Iv. Novakovet al[18]studies the average duration of hospital stay is statistically not significant. As per the statistical test of significance, 'Z' test for mean, 'p'- value is more than 0.05 i.e. not significant. In our studyconservative line of management was observed in 33.33% of patients and operative management was done in 66.67% patients. Majority of the patients required operative treatment. Similar findings were also observed in Muhammad Laiquz Zaman Khan et al [13]study and Mohan Atriet al[12] study. In Mohan Atriet al[12]study 9% of patients required thoracotomy, while thoracotomy was not detectedin our study this may be because of small sample size in our study. In our study the mortality rate is 11.33%. The mortality rate in Mohan Atriet al [12]study and Muhammad Laiquz Zaman Khan et al [13]study was 12.1% and 8% respectively.

VI. SUMMARY AND CONCLUSION:

In our present prospective study 150 Patients of chestinjury were studied. Blunt trauma is more common than penetrating trauma leading to chest injury in our study. Road traffic accident is the commonest mechanism of injury in blunt trauma group, while stab injury is the commonest mechanism of injury in penetrating trauma group. Fracture ribs is the most common type of chest injury detected in our study followed by pneumothorax. The average duration of hospital stay in our patient is 8.97 days. The mortality rate in our study is 11.33%. Among the various radiological investigations (chest radiograph, USG thorax, CT-scan thorax) CT scan thorax has a definite role in the diagnosis and management of chest trauma patients. In our study RTA is the commonest mechanism of injury. So, strictly following traffic rules, education of the people about the traffic rules may decrease the incidence of RTA and consequently the incidence of chest trauma. Now a days due to urbanisation and industrialisation there is a rise in urban violence and assault leading to increased incidence of chest injuries. Prompt diagnosis and treatment, judicious use of radiological investigations and timely surgical intervention improves the final outcome in chest trauma patients.

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