

A CLINICO-EPIDEMIOLOGICAL STUDY OF TRAUMATIC CHEST INJURIES IN A TERTIARY CARE CENTRE

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ABSTRACT

Aim: The aim of the present study was to assess various epidemiological factors and various clinical presentations of traumatic chest injuries in a tertiary care centre.

Methods: This study was conducted in the Department of Surgery, Nehru Hospital, BRD Medical College, over a period of 12 months. All patients admitted with traumatic chest injury were included. 70 patients were included in the study.

Results: Majority of the patients were males (81.4%), while 18.6% were females. Road traffic accident was reported among 70% of the patients, followed by fall from height (17.1%) and the assault (12.9%). Chest pain was the most common presenting complaint reported by 94.3% of the patients, while dyspnoea was reported by 48.6%. Among them 42.9% reported chest pain and dyspnoea. In inspection, abrasion was present in 41.4%, followed by contusion (7.1%) and flail segment (2.8%). In palpation, tenderness was present in 40%. On percussion, resonant note was observed in majority of the patients (61.4%), followed by dull note on the right side (11.5%) and left side (8.5%). 9.9% had hyper-resonant note. On auscultation, majority had equal air entry B/L (58.5%). 15.7% each showed decreased air entry in left and right side. 10% showed bilateral decrease in the air entry. HRCT was done among 21.4% of the patients. After tube thoracotomy majority were found to have hemothorax (65.5%), while 41.3% had pneumothorax. Among them, 17.2% had both hemothorax and pneumothorax. Among the patients, majority had conservative management (68.6%) while 31.4% had operative management. The mortality rate was 5.7%, while 87.1% were discharged and 7.1% were referred on the patient request.

Conclusion: Overall, a male pre-ponderance was found in the patients with trauma related thoracic injuries. Road traffic accident was the most common mode of injury. Chest pain was

the most common clinical feature and hemothorax was the most common operative findings. Mortality rate among the patients in the present setting was 5.7%.

Keywords: trauma, chest injuries, epidemiological factors, clinical presentations

1. INTRODUCTION

Trauma poses a serious threat to global public health since it is linked to high rates of morbidity and mortality in both industrialized and developing nations, with an estimated 5.8 million fatalities globally. In the first forty years of life, trauma has also reportedly been linked to the majority of fatalities, hospitalizations, and long-term problems.¹ Trauma to the thorax is a major cause of death. After being admitted to the hospital, many people with serious injuries are fatal. Nevertheless, a lot of these fatalities might be avoided with early detection and care. In reality, the majority of patients with thoracic trauma may be treated in the emergency department (ER) using straightforward techniques that are doable by the majority of ER medical staff.² Chest injuries are the second most common cause of mortality in paediatric trauma, accounting for 10 percent of all trauma-related fatalities and 15 percent of DALYS (Disability Adjusted Life Years) lost.³

Accidents, which are unplanned and unanticipated occurrences, are the main pandemic of the twenty-first century. India has an even greater rate of unintentional fatalities than the developed world.⁴ The literature is beginning to more widely acknowledge the challenges associated with treating patients who have suffered traumatic chest-wall injuries.^{5,6} The blunt chest-wall trauma patient often arrives in the emergency department without any respiratory problems at first, but they may get respiratory problems 48 to 72 hours later. Life-threatening complications such as major hemothorax, tension pneumothorax, and damage to bigger arteries are brought on by chest trauma.⁷ A variety of environmental and socio-political variables are thought to be responsible for the heterogeneity in the etiological pattern of chest trauma around the globe.⁸ Significant mortality has been linked to chest injuries.

Thoracic trauma may affect everything from the internal organs in the thoracic cavity to the chest wall. Thoracic injuries may be mild or penetrating, and treatment options range from cautious to aggressive.⁸ Following score and protocol-based therapies, trauma patients reported better results and shorter hospital stays.^{9,10} It is essential to develop a standardised system for thoracic trauma in order to recognize important variables, forecast patient outcomes, identify patients who urgently need treatment, determine which patients need intensive care, and communicate with families.

The aim of the present study was to assess various epidemiological factors and various clinical presentations of traumatic chest injuries in a tertiary care centre.

2. MATERIALS AND METHODS

This study was conducted in the Department of Surgery, Nehru Hospital, BRD Medical College, over a period of 12 months. All patients admitted with traumatic chest injury were included. 70 patients were included in the study.

Inclusion Criteria

- All patients with blunt trauma chest were included in the study.

Exclusion Criteria

- Penetrating chest injury
- Pathological lung conditions eg. Tuberculosis, COPD, etc

Methodology

The study was conducted over the patients admitted from casualty, outpatient department and those who was transferred from other wards. After eliciting the proper history and mode of trauma, vitals were regarded and initial airway, breathing, circulation, and deformities was assessed without any delay. After stabilizing vitals, the patients who were diagnosed as blunt trauma chest were assessed properly and sent for lab investigations and X-ray done. Those who were in need of inter-costal drain (ICD) such as tension pneumothorax, hemothorax, and flail chest was underwent procedure after proper written consent. The patients were then sent for X-ray/CT chest. The reports of X-ray/CT chest and X-ray/CT chest was analyzed and recorded in pro forma. Those patients who were diagnosed with associated injuries such as head injury, blunt trauma abdomen, and long bone fracture was also included for the study, but after stabilizing from these associated injuries, if needed CT chest was Those patients who was undergo for ICD insertion was followed up properly by doing repeat X-ray immediately after ICD insertion and on the 3rd day or as when needed and after removal of ICD once patient condition was improved. The patients were advised for vigorous chest physiotherapy and their improvement was recorded properly. All these data was recorded meticulously in proforma.

All the patients were thoroughly examined and the investigations were analyzed and the data was entered in the proforma. After the surgical procedure the patients was included according to the CDC criteria and only those belonging to CDC I and II was further evaluated.

A detailed pre-operative clinical examination of all the patients were carried out to assess the nature and degree of the disease condition and to determine the course of treatment required.

Constants employed in all patients

1. Skin preparation was done by removing the hairs by shaving by razor immediately before the operation in emergency cases.
2. All patients were given preoperative intravenous antimicrobial prophylaxis. A third generation Cephalosporin was usually employed.
3. Pre-operative skin preparation was done with savlon, alcohol, and Povidone-iodine.

At the end of the study the findings were entered on a Master Chart and data was analyzed statistically with the help of Biostatician. Observations in our study were discussed with the similar studies in the available literature. The identity of an individual patient was not disclosed at any stage of description in the study.

3. RESULTS

Table 1: Gender distribution, mode of injury

	Frequency	Percent
Sex		
Male	57	81.4
Female	13	18.6

Total	70	100.0
MODE OF INJURY		
Assault	9	12.9
Fall From Height	12	17.1
RTA	49	70.0
PRESENTING COMPLAINT		
Chest Pain	36	51.4
Dyspnoea	4	5.7
Chest Pain+ Dyspnoea	30	42.9
Total	70	100.0
INSPECTION		
Abrasion	28	40.0
Abrasion+Flail Segment	1	1.4
Flail Segment	1	1.4
Contusion	5	7.1
None	35	50.0
Total	70	100.0
PALPATION		
Tenderness	28	40.0
Crepitations	1	1.4
Tenderness+Crepitations	1	1.4
None	5	7.1
Total	35	50.0

Majority of the patients were males (81.4%), while 18.6% were females. Road traffic accident was reported among 70% of the patients, followed by fall from height (17.1%) and the assault (12.9%). Chest pain was the most common presenting complaint reported by 94.3% of the patients, while dyspnoea was reported by 48.6%. Among them 42.9% reported chest pain and dyspnoea. In inspection, abrasion was present in 41.4%, followed by contusion (7.1%) and flail segment (2.8%). In palpation, tenderness was present in 40%.

Table 2: Other details

	Frequency	Percent
PERCUSSION		
Bilateral Dull	4	5.7
Bilateral Hyper-resonant	5	7.1
Left side Dull	6	8.5
Left side Hyper-resonant	2	2.9
Bilateral Resonant	43	61.4
Right side Dull	8	11.4
Right side Hyper-resonant	2	2.9

Total	70	100.0	
AUSCULTATION			
B/L Decrease	7	10.0	
B/L Equal	41	58.5	
Left Decrease	11	15.7	
Right Decrease	11	15.7	
Total	70	100.0	
HRCT Thorax			
Yes	15	21.4	
No	55	78.6	
Total	70	100.0	
OPERATIVE FINDING			
Haemot horax	Mild	10	38.46
	Massive	4	15.38
Pneumothorax	7	26.9	
haemothorax+ pneumothorax	5	19.23	
Total	26	100.0	

On percussion, resonant note was observed in majority of the patients (61.4%), followed by dull note on the right side (11.5%) and left side (8.5%). 9.9% had hyper-resonant note. On auscultation, majority had equal air entry B/L (58.5%). 15.7% each showed decreased air entry in left and right side. 10% showed bilateral decrease in the air entry. HRCT was done among 21.4% of the patients. After tube thoracotomy majority were found to have hemothorax (65.5%), while 41.3% had pneumothorax. Among them, 17.2% had both hemothorax and pneumothorax.

Table 3: Management and Outcome

	Frequency	Percent
MANAGEMENT		
Conservative	48	68.6
Tube Thoracostomy	22	31.4
Thoracostomy	0	0
Total	70	100.0
OUTCOME		
Discharged	61	87.1
Refer on patient request	5	7.1
Expired	4	5.7
Total	70	100.0

Among the patients, majority had conservative management (68.6%) while 31.4% had operative management. The mortality rate was 5.7%, while 87.1% were discharged and 7.1% were referred on the patient request.

4. DISCUSSION

Thoracic injuries and chest trauma are a major cause of morbidity and mortality across the world. The epidemiology of the injuries is studied across the world to assess the impact, monitor the trends, etiology and outcomes of the chest trauma. This in turn will enable us to devise primary, secondary and tertiary level preventive measures at the community and the hospital level. Gupta et al described the epidemiology of the chest trauma patients from Jodhpur, India.¹¹ Walia et al in their hospital based retrospective study, analysed and presented the epidemiology and outcomes of the patients with Chest trauma at Amritsar, India.¹²

In the present study, majority of the patients were males (81.4%). Majority of the previous studies reporting the chest trauma had reported a male preponderance in the patients. Gupta et al, reported a male proportion of 82.5%.¹¹ Walia et al also reported males as majority (130/184) in their study.⁴ Such a high proportion of males might be due to them involving in high-risk behaviour leading to trauma and hence the chest injury. Majority of the previous studies reported road traffic accident (RTA) as the most common mode of injury in the chest trauma patients. As the number of incidents involving high-speed vehicles rises, chest trauma continues to be a severe concern. In the present study also, we found that 70% of the patients had RTA. The second most common mode was fall from height (17.1%) and thirdly it was by assault (12.9%). Similar to our study, Gupta et al also reported 61% of the patients with RTA and 23% of them due to the fall from height.¹¹

Chest pain was the most common presenting complaint reported by 94.3% of the patients, while dyspnoea was reported by 48.6%. Among them 42.9% reported chest pain and dyspnoea. The median SBP and DBP were 112 mm and 62 mm Hg among the patients in our study. Chest trauma contributes 10–15% of all trauma cases and is the root of 25–30% of all deaths due to trauma, making it an important health condition.¹³ Most of the times, chest trauma is managed by general surgeons and thoracic surgeons are rarely a part of the team managing chest trauma.¹⁴ During a chest injury, the two organs that are most likely to sustain damage are the lungs and the pleura. Operatively, majority were found to have hemothorax (65.5%), while 41.3% had pneumothorax. Hemothorax was related to more adverse outcomes such as MV ($p=0.001$) and mortality ($p=0.005$) also reported in other studies.¹⁵

Among the patients included in our study, majority had conservative management (68.6%) while 31.4% had operative management. In Walia et al, 55.43% were given conservative management.¹² Kant et al. reported similar findings with 82% patients managed conservatively and 15% required chest tube drainage.¹⁶ 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 chest tube drainage and 2.6% required thoracotomy.¹⁷ Liman reported that 25.7% patients required needle decompression out of which 2 patients required mediastinotomy. All patients of flail chest were managed in the intensive-care unit.¹⁸

Among the patients, majority had conservative management (68.6%) while 31.4% had operative management. The mortality rate was 5.7%, while 87.1% were discharged and 7.1% were referred on the patient request. Mortality reported by Kulshreshtha et al¹⁷ and Ibrahim et al¹³ was 9.41% and 18%, respectively. Ekpe et al¹⁹ reported that mortality in chest trauma is determined by associated extra-thoracic organ injury, late presentation beyond 24-hour post-trauma, and severe chest injury with bilateral chest involvement. Road traffic accidents are one of the increasing health problems in India and are becoming epidemic. Younger age groups are more commonly injured in traffic accidents. The causes are driving under the influence of alcohol and overspeeding.²⁰ Evidence-based interventions are required to improve road safety, enhance the involvement of the health system to deal with road injuries, and improve availability of quality actionable data. An improved plan for targeted interventions is required to achieve the Sustainable Development Goal (SDG) target by 2030.²¹

5. CONCLUSION

Overall, a male pre-ponderance was found in the patients with trauma related thoracic injuries. Road traffic accident was the most common mode of injury. Chest pain was the most common clinical feature and hemothorax was the most common operative findings. Mortality rate among the patients in the present setting was 5.7%. Further, multi-centric studies with adequate sample size must be conducted to improve the generalizability of our study findings. In future, analytical prospective studies must be planned to assess the predictors of the outcomes in chest injury patients and the prognostic factors, in the present settings.

6. REFERENCES

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