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## **A Clinico - Epidemiological Study of Traumatic Chest Injuries in a Rural Tertiary Care Centre in India: Our Experience**

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E-mail: [dranupamchoudhary86@gmail.com](mailto:dranupamchoudhary86@gmail.com)**Abstract**

**Introduction:** Traumatic chest injuries are on the rise mainly due to increased frequency of road traffic accidents (RTAs) and rise in community disharmony. Chest injuries are one of the common causes of major mortality and morbidity. The management of traumatic chest injuries depends on the severity of injury, patient accessibility to nearby hospital and availability of resources at tertiary care Centre.

**Materials and Methods:** It is a retrospective study of total 52 patients presenting to the emergency department with chest injuries of varying severity at SDUMC, Kolar from Jan 2013 to Dec 2013. Data collected regarding common injury modes, age and gender distribution, pre-hospitalization practices, clinical presentations, associated injuries, severity of injuries and management options from the hospital record section and these data were analyzed with descriptive statistics.

**Results:** Chest trauma is most common in males in their thirties with mean age of presentation 39 years. The most common mode of injury was RTAs (67.3%) followed by fall from height (15.3%). Most of the patients were brought by patient's attenders (46.1%). Most common presentation was chest pain and clinical sign was positive chest compression. Soft tissue injury to chest in the form of abrasions was most common injury type. About 21.1% of patients were presented with some form of pleural space collection, most common being combined Haemo-pneumothorax. Most of the patients treated symptomatically and in 10 patients (19.2%) Intercostal drain was placed.

**Conclusions:** Chest injury is seen commonly in RTA patients. Most of the patients of chest injury had soft tissue trauma over chest in the form of abrasions and majority of these patients can be managed by symptomatic care and simple life saving intervention i.e., intercostal drainage. With increased RTAs it is needed to have public awareness regarding road safety measures and educating them about the first aid measures for trauma patients.

**Keywords:** Trauma, Chest injury, Rural tertiary care

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### **1.Introduction**

Traumatic chest injuries are on the rise mainly due to increased frequency of road traffic accidents (RTAs) and rise in community disharmony. RTAs dominate among all traumatic injuries and is in the rising trend in India including rural population[1]. Trauma is the leading cause of mortality and disability, especially during the productive age, and is the third most common cause of death[2]. Accidents which are unexpected and

unplanned events are becoming the major epidemic of the present century. The number of accidental deaths in India is even higher than in the Western World[1]. Thoracic trauma contributes heavily to these figures besides head injury, abdominal injury and orthopedic injuries. Approximately one quarter of civilian trauma deaths are caused by thoracic trauma and many of these deaths can be prevented by prompt diagnosis and correct management[3].

Management of traumatic injury depends on the severity of injury, patient accessibility to nearby hospital and availability of resources at tertiary care Centre's. In spite of the high mortality rates, about 90% of the patients with life-threatening thoracic injuries can be managed by a simple intervention like drainage of the pleural space by tube thoracostomy[4].

Here we have carried out a retrospective study to see the incidence of chest injury in the emergency department, mode and severity of injury, their management strategy at a tertiary health center at SDUMC, Kolar.

### 1.1 Objectives

- To identify the incidence and epidemiology of traumatic chest injuries among the rural population.
- To identify pre-hospitalization practices and first aid measures.
- To recognize the common modes of traumatic chest injuries and their presentations to a tertiary care center.
- To assess the mode of management with the available facility.
- To assess the level of knowledge of the rural population about chest injuries and to create awareness among them regarding safe driving practices.

## 2. Materials and Methods

This was a retrospective study conducted at Sri Devaraj Urs Medical College, Kolar, Karnataka, which is a tertiary rural health care center in India. Patients who presented to the emergency department with chest injuries with or without other injuries, which were admitted and treated in the concerned department during period from January 2013 to December 2013 were included in the study. Study sample comprised of 52 patients. Data on demographic and patient transport source, mode of injury and presentation, type of injury, clinical signs, associated injuries, and management modality were analyzed. Institutional ethical committee approval was obtained. Patients treated on outpatient basis or referred to higher centers without admission were excluded from the study. Patients with associated other body injuries were included and related data was collected. The data was collected from emergency department register and individual inpatient files from hospital record section. A detailed proforma was used to collect the data needed. Descriptive statistics were used to compute age, gender, mode of injury and presentation, type of injury, clinical signs, associated injuries and management modality were analyzed.

## 3. Results

The retrospective study included total of 52 patients of which 44(84.6%) were male patients and only 8(15.3%) were female patients (Table 1).

**Table 1: Distribution of patients according to gender in the study**

Sl. No	Sex	No. of patients
1	Male	44(84.6%)
2	Female	8(15.3%)
3	Total	52(100%)

In this study chest injury was highest in the 3<sup>rd</sup> decade of life, accounting to 40.3%. Lowest incidence was observed in 10-20 age group, i.e. only 3.8%. Mean age was 39 years (Table 2).

**Table 2: Distribution of patients according to age group**

S. No	Age group (in years)	No. of patients
1	10 - 20	2(3.8%)
2	21 - 30	21(40.3%)
3	31 - 40	9(17.3%)
4	41 - 50	7(13.4%)
5	51 - 60	7(13.4%)
6	61 - 70	6(11.5%)

Mean=39

The most common mode of injury was Road Traffic Accident (RTA), accounting as high as 35(67.3%) of the total 52 patients. There were 6 (11.5%) patients with chest injuries due to assault, of these only one had assault with sharp object (knife). 8 patients sustained injuries due to fall from height, out of which 3 patients fell down from building and 5 patients from the tree. Due to falling of heavy objects 2 patients (3.8%) sustained chest injuries whereas none of the patients had chest injuries due to self-fall. One patient had bull gore injury leading to Haemothorax (Table 3).

**Table 3: Distribution of patients according to mode of chest injury in the study**

Sl. No	Cause	No. of patients	%
1	RTA	35	67.3
2	Assault	6 (1 knife stab)	11.5
3	Fall from height	8	15.3
3.1	-building	(3)	
3.2	-tree	(5)	
4	Self-fall	0	0
5	Fall of heavy object	2	3.8
6	Others	1(bull gore injury)	1.9
	Total	52	100

In the study most of the patients were brought by patient's attenders. 24 (46.15%) patients were brought to the emergency department by patient's attenders, whereas 21 (40.38%) patients were brought by ambulance. For 7 patients the details were not known. None of the patients were brought by general public (Table 4).

**Table 4: Distribution of patients according to the source of patient transport**

Sl.No	Patient brought by	No. of patients
1	Ambulance	21(40.38%)
2	Attendees	24(46.15%)
3	Public	0
4	Not-known	7(13.46%)

Most of the patients had multiple presentations, but on consideration individual presentation most common complaint was chest pain (36 patients) followed by external wound (32 patients). Least presentation was unconsciousness, which was seen in only 3 patients. 12 patients presented with breathlessness and 9 patients were asymptomatic (Table 5).

**Table 5: Distribution of patients according to mode of presentation of patients in the emergency department**

Sl.No	Mode of presentation	No. of patients
1	Non- symptomatic	9
2	Chest pain	36
3	Breathlessness	12
4	External wound/ deformity	32
5	Unconscious	3

In the study all injury type data was collected and it includes small chest abrasion to complex chest injuries. Soft tissue injury was the most common type seen in 28 patients, which included abrasion in 22 patients, cut wound in 3 patients, penetrating wound in 2 patients and only 1 patient had lacerated wound. Rib fractures were seen in 15 patients, among which only one patient had complicated rib fractures i.e. flail chest. Other bony fractures in the nearby chest region were seen in 11 patients which includes clavicle, scapula, sternum in 8, 2, 1 patients respectively. Pleural space collection of air or blood was seen in total of 11 patients. None of the patients had major injuries which includes structures like major vessels, heart and exposed chest wall (table & chart 6).

**Table 6: Distribution of patients according to the type of injury sustained**

Sl. No	Injury type	No. of patients
<b>1</b>	<b>Soft tissue injury</b>	<b>28</b>
1.1	Cut wound	3
1.2	Lacerated wound	1
1.3	Abrasion	22
1.4	Penetrating wound	2
<b>2</b>	<b>Rib fracture</b>	<b>15</b>
2.1	Simple	14
2.2	Flail chest	1
<b>3</b>	<b>Other fractures</b>	<b>11</b>
3.1	Clavicle	8
3.2	Scapula	2
3.3	Sternum	1
<b>4</b>	<b>Haemo/ Pnemo/ Haemo-Pnemo/ Tension pneumothorax</b>	<b>11</b>
<b>5</b>	<b>Other injuries(major vessel, cardiac effusion, exposed chest wall)</b>	<b>0</b>

In the study totally 11 (21.1%) patients developed some type of pleural collection. Most commonly patients had combined Haemo-pneumothorax, 5 out of 11 patients. 4 patients had isolated Haemothorax whereas only 1 patient had isolated pneumothorax and also only 1 patient had Tension pneumothorax. Most of these cases were managed with intercostal drainage tube (Table 7).

**Table 7: Distribution of patients according to the type of pleural collection in the study**

Sl. No	Pleural collection type	No. of patients
1	Haemothorax	4
2	Pneumothorax	1
3	Haemo-pneumothorax	5
4	Tension pneumothorax	1

In the study most common clinical sign in the emergency department was positive chest compression seen in 34 (65.3%) patients, followed by reduced breath sounds in 20 (38.4%) patients. Least common sign was tracheal deviation and paradoxical breathing in 1 patient each. 6 patients showed subcutaneous emphysema and 15 (28.8%) patients had lung crepitations on auscultation showing that these patients already had aspiration of some secretion or blood (table & chart 8).

**Table 8: Distribution of patients according to clinical signs in the study**

Sl. No	Clinical signs	No. of patients
1	Reduced breath sounds	20
2	Lung crepitation	15
3	Tracheal deviation	1
4	Paradoxical breathing	1
5	Chest compression positive	34
6	Subcutaneous emphysema	6

The collected data showed that most of the patients (48 patients) had associated other structure or organ injury, most common being head injury. 20 patients had head injury followed by abdominal, spinal and long bones of 8 patients each. Least common associated injury was pelvic fracture, seen in 4 patients (table & chart 9).

**Table 9: Distribution of patients according to other associated injuries in the study**

Sl. No	Associated injury	No. Of patients
1	Head/ Neck/ Facio-maxillary	20
2	Abdominal	8
3	Spinal	8
4	Pelvis	4
5	Long bones	8

In the management strategy majority of patients i.e. 40 (76.9%) patients were treated symptomatically without any surgical intervention. For 10 (19.2%) patients intercostal drainage tube was placed and followed up in the wards. For 5 patients tracheal intubation was placed in emergency department itself, none of the ward patients required tracheal intubation. For 3 patients the external

wounds were sutured. There were 5 patients who got discharged against medical advice after admission in the ward (table& chart 10).

**Table 10: Distribution of patients according to management strategy of patients in the study**

Sl. No	Management strategy	No. of patients
1	Symptomatic	40
2	Suturing	3
3	Intubation	5
4	Chest drainage	10
5	Referred	0
6	Discharge against advise	5

#### 4. Discussion

Chest injury is one of the leading cause of mortality and morbidity including the rural population. This retrospective study of 1 year duration included 52 patients with traumatic chest injuries, which included only the admitted cases. In the study chest injuries were predominantly seen in male sex as they are more involved in public activity and vehicle driving. Chest injury was seen to be more in the 3<sup>rd</sup> decade of life as it is the more active and adventuress period of life. Mean age of presentation was 39 years of age.

As with other studies, in our study also RTA was the most common mode of injury [1]. More of industrialization and urbanization with non-strict laws leading to more RTAs and chest injuries. Next common mode was fall from height followed by assault. This suggests that the government has to come up with more safety measures for construction workers.

The most of the injured patients were brought to hospital by the patient's attenders with their own vehicles. The remaining most of patients were brought by the ambulance, which suggests for need of more ambulance services from government. Surprisingly none of the patients were brought by public, may be in view that they may get involved in the police inquiry or police harassment.

In the emergency department chest pain was the most common presentation in chest injury patients followed by some form of external injury on the chest, most of the patients it was abrasion over the chest. These suggest that patients with chest pain should be given importance even if there is no external injury or breathlessness. Only 3 patients were unconscious, due to associated head injury. 9 patients didn't have any symptoms and these patients didn't had any serious injury. 12 patients presented with breathlessness that had serious injury underneath.

Most common clinical sign was positive chest compression, therefore any patient with positive

chest compression chest injury should be ruled out. Only 6 patients had subcutaneous emphysema but all these patients were treated with intercostal drainage procedure which makes it very important sign in chest injury indicating underlying serious injury. Tracheal deviation and paradoxical breathing was seen only in one patient each.

Most of the patients had combination of different types of chest injuries. Most common was soft tissue injury in the form of abrasions. Rib fractures were next common injuries, among which only one patient had flail chest injury and among simple rib fractures none of the patients had 1<sup>st</sup>, 10<sup>th</sup>, 11<sup>th</sup>, or 12<sup>th</sup> rib fractures. There were also associated other bone fractures, mainly clavicle fracture followed by scapula and sternum. All these fractures were treated conservatively, but the rib fracture patients usually had pleural space collections of air or blood, most common being combined Haemo-pneumothorax suggesting that isolated Haemothorax or Pneumothorax is uncommon in chest injuries. Only one patient presented with tension pneumothorax. Most of these patients were treated with standard Intercostal Drainage procedure, which indicates that these surgical emergencies usually doesn't require higher sophisticated hospital referral and can be treated with simple standard Intercostal Drainage procedure. The life threatening severe injuries like major vessel injuries, cardiac injury or open thorax were referred to higher center for further management.

Most of the patients were poly-trauma cases and were associated with other body injuries, most common being head injury followed by abdominal, spinal and long bone injuries with equal incidence each and least was pelvic bone fractures.

#### 5. Conclusion

- Chest injury occurs most common in RTA patients and commonly affected are males in their 3<sup>rd</sup> decade of life.
- Public awareness regarding road safety measures and educating about the first aid measures for trauma patients is needed.
- Most common mode of presentation was chest pain and most common clinical sign was positive chest compression.
- Most of the patients of chest injury had soft tissue trauma over chest in the form of abrasions.
- The majority of these patients can be managed by symptomatic care and simple life saving intervention like intercostal drainage tube/ tube thoracostomy.

## References

- [1] Girish P, Murthy P, Janhavi V. A clinico - epidemiological study of traumatic spine injuries in a rural tertiary care centre in India: Our experience. *Int J Bio & Adv Res* 2013; 04(08):514-522. doi: 10.7439/ijbar.v4i8.443.
- [2] Park K. Accidents. In: Park K, ed. *Textbook of Social and Preventive Medicine*. 17<sup>th</sup> ed. Jabalpur: Banarsidas Co., 2002: p.304-5.
- [3] Dalal S, Nityasha, Vashisht M, Dahiya R. Prevalence of Chest Trauma at an Apex Institute of North India: A Retrospective Study. *ISPUB.com / IJS/18/1/5111*
- [4] Marya SKS, Singla SL. Management of chest injuries by a general surgeon. *Ind J Surg* 1987; 49: 235-8
- [5] Radjou AN, Balliga DK, Pal R, Mahajan P. Injury-related mortality audit in a regional trauma center at Puducherry, *India. J Emerg Trauma Shock*. 2012 Jan-Mar; 5(1): 42-48.
- [6] NIHFWS, Munirka, New Delhi, India: 2006. Oct 27th, [Last accessed on 2011 May 26]. Recommendations for Pre-hospital trauma care in India. Report of a 2 day National consultation on Pre Hospital Trauma Care in India on 26<sup>th</sup>. Available from: [http://www.whoindia.org/LinkFiles/Disability,\\_Injury\\_Prevention\\_and\\_\\_Rehabilitation\\_Pre\\_hospital\\_trauma\\_care.pdf](http://www.whoindia.org/LinkFiles/Disability,_Injury_Prevention_and__Rehabilitation_Pre_hospital_trauma_care.pdf).
- [7] Singh Ranjana, Singh Hemant Kumar, Gupta S C, Kumar Yogesh. Pattern, Severity and Circumstances of Injuries Sustained in Road Traffic Accidents: A Tertiary Care Hospital-Based Study. *IJCM* 2014 Jan; 39(1).
- [8] Hemmati H et al. Evaluation of Chest and Abdominal Trauma in Trauma Patients Hospitalized in the Surgery Ward of Poursina Teaching Hospital. *Arch Trauma Res*. 2013;1(4): 161-5. DOI: 10.5812/atr.7672
- [9] Tchorz KM, Thomas N, Jesudassan S, Kumar R, Chinnadurai R, Thomas A et al. Teaching trauma care in India: An educational pilot study from Bangalore. *J Surg Res*. 2007; 142: 373–7.
- [10] Avila Martinez R. J et al. Evolution and Complications of Chest Trauma. *Arch Bronconeumol*. 2013; 49(5):177–180. DOI: 10.1016/j.arbr.2012.12.001