Original Research Paper　　　**General Surgery**

PREDICTING OUTCOME IN PATIENTS WITH CHEST TRAUMA USING CHEST TRAUMA SCORE(CTS)

Dr Rushabh Shah	PG Resident, Department Of General Surgery, mahatma Gandhi Medical College And Hospital, jaipur.
Dr Rajkamal Kanojiya	Professor And Unit Head, Department Of General Surgery, Mahatma Gandhi Medical College And Hospital ,jaipur.
Dr Rajat Goyal*	PG Resident, Department Of General Surgery, Mahatma Gandhi Medical College And Hospital, jaipur. *Corresponding Author
Dr Rishideep Jain	PG Resident, Department Of General Surgery, Mahatma Gandhi Medical College And Hospital ,jaipur.

ABSTRACT　**Introduction:-** Trauma is the most common cause for deaths in India . Chest trauma being the third the most common cause. Rib fractures (RIBFX) are a common injury and are associated with substantial morbidity and mortality. **Aim:-** To predict outcomes in patients with blunt trauma chest using chest trauma scoring system (CTS). A total of 40 patients taken into study having history of trauma and presented In emergency department of our hospital. **Material And Methods:** To study the outcomes of patients with chest trauma using chest trauma scoring system (CTS) at Mahatma Gandhi Hospital . A total of 40 patients were taken in study . Number of rib fractures and pulmonary contusion were noted from chest X-ray and Computed Tomography (CT). Each parameter has been assigned specific score and final score was calculated by adding scores of each parameter. Final CTS was then calculated which ranges from 2 to 12. On the basis of final CTS, patients were divided into 2 groups with CTS <5 and ≥ 5. **Conclusion** This study concludes that a CTS ≥5 is associated with poor outcomes.

KEYWORDS : Chest trauma ,scoring system, rib fracture

INTRODUCTION

Trauma is one of the most major cause of death in India. Chest trauma being third most common traumatic death, after head and spinal cord injury. The incidence of chest trauma is 10% and mortality rate ranging from 10% to 60%. (1-5) Thoracic injuries can be penetrating or blunt and management differ from conservative to invasive interventions (4). Though multiple studies have been done in thoracic trauma, and few scoring system have been develop like Injury Severity Score (ISS) or the Trauma Injury Severity Score (TRISS) which force outcome in case of poly-trauma but in case of isolated thoracic trauma the score may not predict the outcome correctly (6). The most common thoracic trauma scores are Abbreviated Injury Scale chest (AIS), Lung Injury Scale, Pulmonary Contusion score (PCS). Studies done on scoring systems for thoracic trauma recognise age, rib fractures, pulmonary contusions and bilateral injury as the most important factors affecting prognosis of chest trauma patients. The Chest Trauma Score (CTS) was derived from number of above factors, devised by Pressley et al. and validated by Chen. Chen et al. found that this simple score can predict the possibility of poor outcome like complications and mortality in thoracic trauma patients if CTS ≥5 (7). We evaluated CTS to predict mortality as primary objective and development of complications like pneumonia and need for ventilator support as secondary objective.

MATERIAL AND METHODS

To study the outcomes in chest trauma patients using chest trauma scoring system (CTS) in Mahatma Gandhi Hospital . A total of 40 patients were taken in study .

Inclusion criteria:-
Patient presenting to emergency with chest trauma .

Exclusion criteria:- Flail chest ,-Polytrauma (with head injury and abdominal injury)

Number of rib fractures and pulmonary contusion were noted from chest X-ray and Computed Tomography (CT). Each parameter has been assigned specific score and final score was calculated by adding scores of each parameter. Final CTS was then calculated which ranges from 2 to 12. On the basis of final CTS, patients were divided into 2 groups with CTS <5 and ≥ 5.

Age score	Score	Rib score	Score
<45 y	1	<3 RIBFX	1
45-65 y	2	3-5 RIBFX	2
>65 y	3	>5 RIBFX	3
Pulmonary contusion score		**Bilateral RIBFX**	
None	0	No	0
Unilateral minor	1	Yes	2
Bilateral minor	2		
Unilateral major	3		
Bilateral major	4		

(Final score 2-12, Patients grouped as <5 and ≥5). RIBFX – Rib fractures

Chest Trauma Scoring System

AGE	PATIENT
<45	20
45-65	8
>65	12

GENDER	PATIENT
MALE	32
FEMALE	8

CTS SCORE	PATIENT
<5	14
5	26

	GROUP A	GROUP B
PNEUMONIA	2	8
MECHANICAL VENTILATION	0	14
MORTALITY	0	6

Out of 40 patients 20 patients were under 45 years of age, 8 were between 45 and 65 years and remaining 12 patients were older than 65 years.

Out of 40 patients 32 patients were males and 8 were females. Total CTS was calculated by adding scores of each parameter and patient were divided into 2 groups(GROUP A:-<5 and GROUP B :- ≥ 5)

As per the study we found that patients under group B develop pneumonia , required ventilation and has increase rate of

mortality in comparison with group A. Development of pneumonia, need of mechanical ventilation and mortality were associated with increasing number of Rib fractures (>3), high pulmonary contusion and bilateral injury individually.

DISCUSSION

The CTS was evaluated for outcome in 40 patients admitted with chest trauma in our hospital. Immediate and accurate assessment of the severity in chest injuries is essential for rapid and correct treatment, for predicting the outcome, complications and need for intensive care, as well as for explaining the prognosis to patients and relatives. If the grading of chest injury severity is consistent and uniform based on a standard scoring system, classification and triage can be done quickly and treatment protocols will be implemented immediately in the emergency room. Joshipura et al. mentioned the lack of organized trauma care and the wide disparity between trauma services available in different parts of India (8). A simple universal scoring system like CTS to assess trauma severity and prognosis can help standardize trauma care in India.

In this study, the recorded CTS ranged from 2 to 12. chest injuries with high CTS prevent deep breathing and expectoration of secretions, leading to secondary respiratory complications, development of pneumonia, and the need for mechanical ventilation. This was demonstrated in our study, as a high CTS ≥5 was significantly associated with a high incidence of pneumonia and an increased requirement for mechanical ventilation (in chest trauma. In a study by Pressley et al., high CTS scores were associated with pulmonary complications and are more likely to require intubation [7].Chen et al demonstrated that patients with CTS ≥5 had a higher prevalence of pneumonia and mechanical ventilation.
In the current study, high Chest trauma score in total is significantly associated with mortality. Early mortality was observed in bilateral multiple internal injuries with a large vessel, and refractory respiratory failure was the most common cause of late mortality. Studies by both Pressley et al. and Chen et al. show that a high CTS score has a higher prevalence of mortality. Chen further emphasizes that CTS ≥5 is an important independent predictor for all three outcomes separately, i.e., mortality, pneumonia, and acute respiratory failure. Chen et al. also compared CTS with chest ISS and AIS and found them to be nonsignificant in predicting all three outcomes in the same patients.[6] This scoring system can help with triage, utilization of resources such as an ICU bed and ventilator. Also, in patients with high CTS on admission, earlier implementation of treatment strategies such as, but not limited to, epidural analgesia, supportive ventilation, and intercostal drainage (ICD) can be used to reduce morbidity and mortality.

This CTS system can provide better predictive value of outcome than an single parameter.

Blunt chest trauma, if not treated promptly with adequate pain medication, physiotherapy, and respiratory support, often results in complications resulting in pneumonia, respiratory failure, and death.

CONCLUSION

Thus, from the present study we conclude that CTS is a good predictor of outcome in chest trauma patients. This scoring system may be used to identify patients at risk of complications and institute early intensive focussed care.

REFERENCES

1. Mommsen P, Zeckey C, Andruszkow H, Weidemann J, Frömke C, Puljic P, et al. Comparison of different thoracic trauma scoring systems in regards to prediction of post-traumatic complications and outcome in blunt chest trauma. J Surg Res 2012; 176:239-47.
2. Ekpe EE, Eyo C. Determinants of mortality in chest trauma patients. Niger J Surg2014; 20:30-4.
3. Grubmüller M, Kerschbaum M, Diepold E, Angerpointner K, Nerlich M, Ernstberger A. Severe thoracic trauma – Still an independent predictor for death in multiple injured patients? Scand J Trauma Resusc Emerg Med2018;26:6.
4. Veysi VT, Nikolaou VS, Paliobeis C, Efstathopoulos N, Giannoudis PV. Prevalence of chest trauma, associated injuries and mortality: A level I trauma centre experience. IntOrthop2009; 33:1425-33.
5. Dave S, Harde M, Gupta B. Thoracic trauma and anesthetist. In: Gupta B, editor. Essentials of Trauma Anesthesia and Intensive Care. 1st ed. New Delhi: PeePee publishers; 2014.p. 186-222.
6. Valderrama-Molina CO, Giraldo N, Constain A, Puerta A, Restrepo C, León A, et al. Validation of trauma scales: ISS, NISS, TRS and TRISS for predicting mortality in a Colombian population. Eur J OrthopSurg Traumatol 2017; 27:213-20
7. Perna V, Morera R. Prognostic factors in chest traumas: A prospective study of 500 patients. Cir Esp2010;87:145-70.
8. Joshipura MK, Shah HS, Patel PR, Divatia PA, Desai PM. Trauma care systems in India. Injury 2003;34: 686-92
9. Chen J, Jeremitsky E, Philp F, Fry W, Smith RS. A chest trauma scoring system to predict outcomes. Surgery 2014; 156:988-94