



A CLINICAL STUDY OF BLUNT CHEST TRAUMA

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ABSTRACT

Trauma to the chest is considered as one of the most serious injuries of the chest and it is also a common cause of mortality and morbidity. It is also the leading cause of death from physical trauma after head and spinal cord injury. Chest trauma is the primary or a contributing factor in approximately 1/4th of all trauma related deaths. Chest trauma accounts for 20-25% of deaths due to trauma. Approximately, 16,000 deaths per year in India alone are a result of chest trauma. The study was conducted on 25 patients of blunt chest trauma admitted in a G.G. Hospital affiliated to M.P. Shah Govt. Medical College during the years 2016- 2018. Detailed clinical history was recorded including age, sex, symptoms, mode of injury, associated injuries, external bleeding and mental status. Out of 25 patients having blunt chest trauma most common age group was 31-40 years, road traffic accident being the most common mode of injury in 60%, 64% having less than 4 ribs fractured, 60% having hemothorax and 54% having pneumothorax and 60% patients were treated with intercostal tube drainage. The study revealed that road traffic accident was the most common cause of blunt chest trauma. Majority of the patients with blunt chest trauma can be managed conservatively with pain management. Few required intercostal tube drain without the need of other invasive therapy.

KEYWORDS : Chest trauma, fracture, pain

INTRODUCTION:

Trauma or injury has been defined as damage to the body caused by an exchange with environmental energy that is beyond the body's resilience. Trauma remains the most common cause of death for all individuals between the ages of 1 and 44 years and is the third most common cause of death regardless of age.^[1] Chest 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. Chest trauma is the primary or a contributing factor in approximately 1/4th of all trauma related deaths. The mortality rate in these cases is about 10%.^[2] Chest injuries account for 20-25% of deaths due to trauma. Approximately, 16,000 deaths per year in India alone are a result of chest trauma.^[3] Chest trauma contributes to major accidental injuries in India, due to increased incidence of vehicular accidents (6% of global vehicular accidents) due to increased road traffic, availability of new high-speed vehicles and ignorance or unawareness of traffic rules.^[3,4] With growth of cities and increasing in the high-speed traffic there will be increase incidence of road traffic accident and also the chest injury. There will be difficulty in deciding the priority in treating as more than one body system has been injured. Head injury, compound limb fracture and chest injury competes for that. Chest injury is potentially the most dangerous of all and its management should be a matter of the most extreme urgency. The particular danger of the chest injury is that it threatens the vital transport of oxygen to the tissue by two ways: By hypovolemia from severe bleeding and by trauma to the lung itself. Even this hypoxia is danger to life; it can adversely influence the outcome of associated brain trauma.^[5-7] Blood transfusion services, volume-cycled and pressure cycled respirators, antibiotics, X-rays, ultrasonography, computed tomography, radionuclide lung scan, underwater seal intercostal drainage, tracheostomy, blood gas analysis, spirometry, oesophagoscopy, bronchoscopy have remarkably improved the results of critically ill-patients. Physiotherapy, rehabilitation is also helpful in management of chest injuries. In thoracic trauma, primary care is directed to the rapid evaluation of extent of injury, estimation of volume of blood loss and its rapid replacement by intravenous transfusion, the

recognition of hypoxia and respiratory distress and its correction by assurance of a clear airway, full pulmonary expansion and mechanical support of ventilation when necessary. The vast majorities of chest trauma patients are successfully managed by intercostal tube drainage, pain management and do not require thoracotomy.^[8-11] The organization of trauma systems has had a significant favorable impact on patient outcome.^[12-13]

MATERIALS AND METHODS:

The study was conducted on 25 patients of blunt chest trauma admitted in a G.G. Hospital affiliated to M.P. Shah Govt. Medical College during the years 2016- 2018. The cases were followed for at least 3-6 months according to the necessity. *Inclusion criteria:* All patients with blunt chest trauma, Patients of all age groups except pediatric patients. *Exclusion Criteria:* Penetrating chest injury, all deaths on arrival, pregnant females, Pediatric age group. Selection of cases was done as above and study was conducted based on the following criteria. Detailed clinical history was recorded including age, sex, symptoms, mode of injury, associated injuries, external bleeding and mental status. Patients were admitted in trauma ward, surgical ward and in surgical intensive care according to the need. Thorough physical examination was carried out to assess hemodynamic stability, vitals, systemic examination, severity of injury and other associated injuries. Detailed examination of the chest along with the neurological status also, was done. Baseline investigations like blood investigations, chest x-ray, and x-ray abdomen were carried out. Special investigations like Ultrasonography, Computed Tomography, were done as per the hemodynamic stability of the patient and according to the suspicion of the organ/viscera/vessels involved. Intravenous fluids, blood transfusions were given based on monitoring of urine output and blood pressure. Patient's vitals, urine output, abdominal girth, arterial oxygen saturation, respiratory rate- rhythm were also measured and monitored. Patients were prepared for emergency intercostal drain insertion as per their hemodynamic stability, nature of injury and findings of USG and other investigations. Patients who required airway secure and respiratory support were intubated and kept on mechanical

ventilation with intensive care monitoring. Once patient is stabilized and no more requires ventilator support, were shifted to ward and managed further. Post procedure patients were managed with IV antibiotics, IV fluids, analgesics and blood transfusion as per requirement. Complications, if any were recorded and dealt with accordingly. Discharge was given on complete recovery and follow up was advised in outpatient department.

RESULTS:

Results of this study is shown in tables and with comparison to other study is discussed.

DISCUSSION:

With urbanization of cities there is increase in daily traffic, more of high speed traffic, there is increase in trauma incidents, requiring functioning trauma care, trained personnel and sophisticated equipments for saving the life of patients. The chest trauma is potentially the most dangerous of all and its management is of extreme urgency where life saving measures can be practical at road side. So each polytrauma patient has to be thoroughly investigated in addition to clinical examination. In our study evaluation of 25 cases of blunt abdominal trauma was done. Age of patient varies from 21 to 70 years. Majority of patients (28%) were in age group of 31-40 years. Whereas about (20%) of patients were in age group 21-30 years. Surprisingly 61-70 years of age group also shares the same 20% of incident. Blunt chest trauma due to road traffic accidents were seen in 60% (most common), fall down in 24%, hit by animals in 8% and by assault in 8%. 48% of cases had trauma to the right side of the chest, 36% had trauma on the left side and 16% had injury on both sides of the chest. Here, 60% of patients required intercostal drain tube insertion. Rest of the patients were managed conservatively. It can be consistently seen from the foregoing discussion that blunt chest traumas are definitely commoner than their penetrating counterpart. However, D'abreve has stated that the type of injury encountered within a geographical area depend upon the civilization of the society, culture, and industrialization. Thus in several African tribes penetrating injuries are common up to the ratio of 3:1. Incidence of penetrating injuries in the present study was low. Though, a higher incidence rate (43%), was reported by Beg *et al.*, in India, which could have been due to a higher prevalence of violence in the study area. In our study most of the patients of blunt chest trauma were managed conservatively which includes good analgesics, chest strapping, intercostal nerve block, sedation. Associated hemodynamic instability was treated by intravenous fluids, blood transfusions. Oxygen support and endotracheal intubation for maintenance of airway patency and blood oxygenation. Mechanical ventilation helps in decompressing the pleural space and helps in lung expansion. Surgeon should cautiously look for other sites of trauma to rule out extra-thoracic injuries. In our study, blunt chest injuries were associated with various extra-thoracic injuries. Mortality rate in our study was 4% i.e. 1 patient. The major cause of mortality was delayed presentation of the patients and poor general condition of the patients. The earliest presentation was at 30 min with one case presenting as late as 4 days after the injury. The early presentation of our patients helped us to start appropriate resuscitation at time and save their lives.

CONCLUSION:

Chest trauma is a major health problem since it has high morbidity and mortality rate. Road safety and strict traffic laws contribute to the reduction of the incidence of chest trauma. According to our analysis; outcome predictors were: Road traffic accidents, hemodynamic status upon arrival, GCS upon arrival, ICU admission, ventilator use, and complications of therapy. As concepts of treatment is becoming sound, morbidity and mortality after blunt chest

trauma can be reduced. Simple rib fracture can be best managed by analgesics and chest strapping with chest physiotherapy. Whereas multiple rib fractures with pneumothorax/ hemothorax can be effectively treated with intercostal tube drainage along with intercostal nerve block. With blunt chest trauma there are very less chances of cardiac chamber rupture, thoracic aortic rupture, injuries of the intrathoracic inferior and superior vena cava and delayed esophageal rupture. If happens it is having high mortality rates. Each and every patient with chest trauma is to be checked for respiratory distress and airway patency. Considering associated abdominal injury as well as head injury and long bones injury primary resuscitation and definitive treatment are the goals of the surgeon for treating blunt chest trauma victims with important being the initiation of management within the golden hour. Hemodynamic stability and maintenance of airway patency forms the mainstay of patient's outcome. A combined evaluation comprising of physical examination, imaging techniques, hemodynamic assessment and monitoring the patients have increased the non-operative management of solid organ injuries. In short, morbidity and mortality can be prevented by timely initial resuscitation and correct diagnosis as well as management.

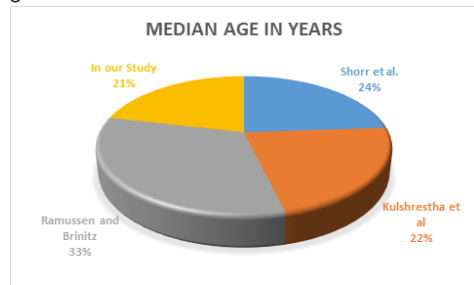


Figure 1: Comparison Of Median Age

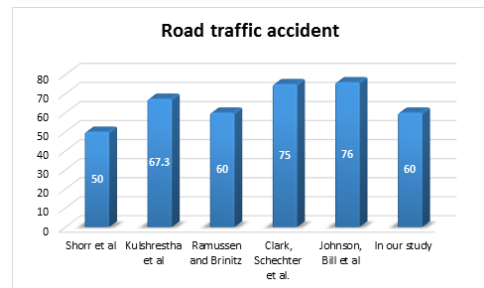


Figure 2: Comparison Of Mode Of Injury

Table 1: Comparison Of Associated Injuries In Blunt Chest Trauma Patients

Series	Head injury	Abdominal injury	Other injury
Shorr <i>et al</i>	43	28.5	40
Kulshrestha <i>et al</i>	33	16.4	-
Ramussen	18.3	5.4	18.3
Our study	16	32	20

Table 2: Comparison Of Different Injuries In Blunt Chest Trauma

Series	Sternal fracture	Clavicular fracture	Scapular fracture	Flail chest
Kulshrestha <i>et al</i>	2.10	14.1	6.7	-
Ramussen <i>et al</i>	2.15	-	-	10.7
Shorr <i>et al</i>	4.95	8.3	4.85	10.3
Our study	-	28	16	8

Table 3: ICD In Chest Trauma Patients

Series	Intercostal drainage
Kulshrestha <i>et al</i>	57%
Ramussen <i>et al</i>	60%

Shorr <i>et al</i>	55.72%
Our study	60%

REFERENCES

1. Minino AM, Heron MP, Murphy SL, et al. Deaths: final data for 2004. *Natl vital Stat Rep.* 55, August 21, 2007; 55(19):1-120.
2. Wilson RF, Murray Antonio DR. Non penetrating thoracic injury. *Surg Clin North Am* 2000-2001; 57:17-36.
3. Locicero J, Mantox KL. Epidemiology of chest trauma. *Surg Clin North Am* 1989; 69:5-16.
4. Sawyer MA. Division of cardiothoracic Surgery university of California 30-10-2006, Editor Emedicine.
5. Richardson JD, Adams L, Flint LM. Selective management of flail chest and pulmonary contusion. *Ann Surg* 1982; 196:481-7.
6. Sanchez-Lloret J, Letang E, Mateu M, Callejas MA, Catalán M, Canalis E, et al. Indications and surgical treatment of the traumatic flail chest syndrome. An original technique. *Thorac Cardiovasc Surg* 1982; 30:294-7
7. Thomas AN, Blaisdell fw, Lewis FR Jr, Scholobohm RM. Operative stabilization of flail chest after blunt trauma. *J Thoracic cardiovasc surg* 1978; 75:793-801
8. Blair E, Mills E, Rationale of stabilization of flail chest with intermittent positive pressure breathing. *Am surg* 1968; 34:860-8.
9. Cullen P, Model JH, Kirby RR. Treatment of flail chest: use of mechanical ventilation and positive end expiratory pressure. *Arch surg* 1975; 110:1099-103.
10. Shackford SR, Smith DE, Zarins CK, Rice CL, Virgilio RW. The management of flail chest. A comparison of ventilatory and non ventilatory treatment. *Am J Surg* 1976; 132:759-62.
11. Esposito TJ and Brasel KJ. Epidemiology. *Mattox KL, Moore EE, Feliciano DV (eds); Trauma, 7th ed. New York: McGraw Hill, 2013*
12. Eastman AB. Whatever the dart lands: toward the ideal trauma system. *J Am Coll Surg.* 2010; 211(2):153-168.
13. MacKenzie EJ, Rivara FP, Jurkovich GJ, et al. A national evaluation of the effect of trauma-center care on mortality. *N Engl J Med.* 2006; 354(4):366-378.
14. Shorr RM, Crittenden M, Indeck M, Hartunian SL, Rodriguez A. Blunt thoracic trauma. Analysis of 515 patients. *Ann Surg* 1987; 206:200-5.
15. Kulshrestha P, Iyer KS, Das B, Balram A, Kumar AS, Sharma ML, et al. Chest injuries: A clinical and autopsy profile. *J Trauma* 1988; 28:844-7
16. Rasmussen OV, Brynitz S, Struve-Christensen E. Thoracic injuries a review of 93 cases. *Scand J Thorac Cardiovasc Surg* 1986; 20:71-4.