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Various causes of chest injuries and their management: A study in a tertiary health care centre

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ABSTRACT : Chest injuries are one of the most common cause of morbidity and mortality in trauma patients. Heart, lungs, major vessels and oesophagus are protected by rib cage. Patients with chest trauma usually manage by simple conservative supports. The aim of this study was to know the various causes of chest trauma, treatment and outcome of treatment in terms of morbidity and mortality of patients. This study was done on 200 patients of chest trauma, who were admitted in our hospital. Inclusion criteria was having chest injury with or without rib fractures, lung injury or other organs injury. Chest injury was diagnosed on basis of X-ray chest, CT scan chest. Treatment and management of patients was done and followed with regarding in term of morbidity and mortality. In our study 162 patients were male. Most common cause of chest trauma was road traffic accident, causing injury in 114 patients. Associated Musculoskelatal injuries of upper and lower limb in 46(23%) patients and abdominal injury in 30 (15%) of cases were present. Only 4 (2%) out of 200 patients required thoracotomy and 122 (61%) were treated with inter coastal tubal drainage. We concluded that RTA is most common cause of chest injury. We can manage chest trauma with simple conservative procedures like antibodies, analgesics, breathing exercise, oxygen support and ICTD in most of cases. These measures can decrease morbidity and mortality in chest injury patients.

Keywords : Chest trauma, rib fractures, intercostal tube drainage.

I. INTRODUCTION :

Trauma to any part of body of a person leads to discomfort, disability and loss of daily routine work, may lead to death. Injury to head, chest and abdomen are more serious than upper limbs and lower limb injuries because these cavities contain vital organs. Chest injury due to any type of trauma constitutes about 10-15% of all traumatic cases and causes about 25% of deaths in these cases. Most of deaths occur in early post injury period in cases of chest injuries .There are various causes that may lead to chest injuries viz. road traffic accidents, hit by animal, fall from height, assault, penetrating injury, crush injury. Chest injuries become serious because chest cavity contains heart, lung, aorta, venacava, oesophagus like vital organs. Chest trauma can cause simple injuries like chest skin bruise, muscle haematoma to serious ones like fracture of ribs, pneumothorax, haemothorax, flial chest, lung and heart injuries.

Pulmonary injuries includes lung contusion, laceration, bracheopleural fistula, haemothroax, pneumothorax etc. There may be injury to heart leads to cardiac temponade, pneuoperidordium. Chest injuries may cause injury to oesophagus, diaphragm also. Trauma may cause isolated chest injury or with injury to other parts of body like brain injury, Liver injury, orthopaedic fracture injury, vascular injury.

Management of chest trauma includes supportive pain management primarily, because most of the cases, patient cannot able to take respiration due to severe pain ,so analgesia is given, others are antibiotic supports, oxygen therapy, ICTD insertion, ventilatory support if needed and thoracotomy when required.

Pain management is crucial in chest trauma, which may be NSAIDs, opioids infusion, intercostal nerve block or epidural anesthesia. Chest injury may lead to pneumonia so chest physiotherapy and proper ventilation of lungs are needed. The ARDS is one of the complications during chest trauma treatment. The aim of this study is to know the prevalence of causes of chest trauma, management strategies and outcome of chest trauma.

II. MATERIAL AND METHODS :

This study was done on 200 patients who were admitted in J.L.N. Medical College, Ajmer, in emergency department under CTVS Department from 1st January 2019 to 31st December 2020 having chest injuries. Data including age, sex, cause of injury, treatment and outcome of patients were recorded and analysed. All the patients of chest injuries of age >15 year, who required hospitalization on the basis of having chest injury with or without rib fracture, surgical emphysema,

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pneumothorax, haemothorax were included in study. Patients having injuries to abdomen and brain with chest injuries were also included in this study.

For diagnosis and evaluation of chest injury, clinical examination and chest X-ray was done as initial radiological investigation in all patients. CT scan of chest was performed in those cases where suspection of lung injury was present. Patients were treated according to nature of injury.

Detail of all the patients were entered in study from records with inclusion of age, sex, mode of injury, severity of injury, side of chest injury, rib fracture or not, type of lung injury (Contusion, laceration), diaphragm injury (side right or left), cardiovascular injury, associated abdominal or other organ injury and final outcome of patient in term of morbidity, deformity or mortality was noted.

Haemothorax, pneumothorax, haemopneumothorax were managed by putting intercostal tube drainage. Tube was removed after lung expansion and drain was minimal. Operative thoracotomy done when indication of thoracotomy was present.

III. OBSERVATIONS :

1. **Sex Ratio** : In our study 162 patient were male and 38 patients were female.

Table 1 : Sex Ratio

Total patients	Male (%)	Female (%)
200	162 (81%)	38 (19%)

2. **Age** : In our study out of 200 patients maximum number of patients were between 26-45 years of age group, 102 (51%) patients.

Table 2 : Age Group (years)

Age Group (years)	No. of cases (%)
16-25	20 (10%)
26-35	46 (23%)
36-45	56 (28%)
46-55	36 (18%)
56-65	24 (12%)
66-75	12 (6%)
>75	6 (3%)

3. **Causes of injury :** Table 3 shows various causes of chest injury in our study. Most common cause of injury was road traffic accident 114 (57%) patients, followed by fall from height, other causes were hit by animal, assault, fall of a heavy object, fire arm injury.

Table 3 : Causes of Injury

Cause of Injury	No. of cases (%)
Road Traffic accident	114 (57%)

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Fall from height	46 (23%)
Fall of a heavy object	18 (9%)
Hit by an animal	10 (5%)
Assault	9 (4.5%)
Fire arm injury	3 (1.5%)

4. **Distribution of chest injury according to chest X-ray** :

Table 4 : Distribution of chest injury according to chest X-ray :

X-ray findings	No. of cases (%)
Rib fracture	136 (68%)
Pneumothorax	88 (44%)
Pleural effusion	32 (16%)
Pulmonary contusion	80 (40%)
Surgical emphysema	16 (8%)
Diaphragm injury	2 (1%)

5. **Table 5 : Associated injury with chest injury**

Associated Injury	No. of cases (%)
Head injury	36 (18%)
Facial injury	22 (11%)
Abdominal injury	30 (15%)
Upper and lower limb bone injury	46 (23%)

6. **Table 6 : Treatment given to patients**

Treatment	No. of cases (%)
Analgesic, antibiotics, breathing exercise	200 (100%)
Oxygen therapy	168 (84%)
Blood transfusion	36 (18%)
Intercostal tube drainage	122 (61%)

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Thoractotomy	4 (2%)

In this study treatment was given to the patients according to their need. All patients were given analgesic and antibiotic support and breathing exercises. Interostal tube drainage was done in 122 cases. Blood transfusion was done in 36 patients. Thoractomy was done in four cases, having diaphragmatic injury with abdominal injury in two patients and one having penetrating injury by road and one was having excessive bleeding (haemothorax).

IV. DISCUSSION :

This study was done to find out various causes of chest injury and management with the aim to improve patient management of chest injury.

In our study male to female ratio was 81 : 19. The reason of male predominance is may be due to males are more involved in outdoor activities, driving and doing more risk prone work in comparison to females. The male predominance in our study is also similar with other studies conducted.

In our study age distributing of chest cases were maximum in age group 26-45 years of age. 3rd and 4th decade of life are more productive age group of life so person has to go outside home in search of work and duties. Similar results were also shown in other studies. Trauma is a leading cause of mortality and morbidity in first four decade of life.

In this study, we found that road traffic accident was the most common cause of chest injury. This is due to increase in numbers of people and vehicles on roads. There is ignorance of traffic rules and high speed are also present. Other causes are fall from height, fall of a heavy object, assult, animal bite, also play a major role in chest injury. Other actions have also some results.

In this study we found that ribs fracture are most common chest injury whether unilateral or bilateral. Followed by pneumothorax, pulmonary, contusion, haemothorax, surgical emphysema and flail chest. Almost similar results were noted by Albadani et al[5] and Dalal et al[1], pneumothorax and haemothorax was present in our study when more numbers of ribs get fracture.

Chest injury was associated with abdominal organ injuries. Skeletal injury and brain injury in our study. 46 patients were having musculoskeletal injury of upper and lower limbs with chest injury, followed by 40 patients of abdominal injury in our study.

In this study we gave patients analgesia, antibiotics, pulmonary toilet and breathing exercise to every patient. We gave oxygen to 168 (84%) cases by nasal cannula or venti mask. Inter costal tubal drainage was done in 122 (61%) of cases whether unilateral or bilateral. Blood transfusion was needed in 36 (18%) of cases. We did thoracotomy in 4 (2%) cases. Other studies also show that ICTD being most common treatment for chest injury. Majority of patients even penetrating injury in chest can be managed by intercostal tubal drainage only.

Mainstay of therapy for rib fractures is analgesic support. It can be given in the form of NSAIDs, opioid infusion, epidural infusion of local anaesthesia. The main aim of treatment is to achieve normal level of oxygen in lungs and to prevent lung from further damage. In our study we discharged our patients on oral antibiotic and analgesic support. The long term follow up of the patients was not done. Patients were advised to attend CTVSOPD if required. We found pain management and timely insertion of ICTD may decrease morbidity and mortality in chest trauma patients.

V. CONCLUSION:

In our study we concluded that chest injury may occur by various causes but road traffic accidents are the commonest ones. Most of chest injuries can be managed by simple supportive conservative management like analgesia, antibiotics, breathing exercise, pulmonary toilet, oxygen therapy and ICDT insertion. Morbidity and mortality rate in chest trauma patients can be reduced significantly by timely intervention. Thoracotomy is needed in very less cases of chest injury practically.

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