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A clinical study of chest injuries and their management strategies

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Abstract

Background: A clinical study of chest injuries and their management strategie.

Methods: This observational study was conducted in Ravindra Nath Tagore medical college and attached hospital, Udaipur, which has a tertiary care hospital catering to the north Central India. Study was approved by the Institutional Ethics and Research committee. Study period was two and a quater years between august 2017 to September 2019 and 50 patients of chest injuries were included.

Results: Pain and tenderness of the chest wall (92%) was the commonest finding which is seen in cases of fractures of ribs. Difficulty in breathing due to severe pain in chest wall or respiratory distress (88%) due to a pneumo or hemothorax was the second most common finding. In our study five out of 50 (10%) needed only conservative management whereas in forty five patients, operative treatment was needed. The most common procedure in the management of chest injuries was intercostal chest tube drainage in 39 (78%) patients.

Conclusion: Delay in diagnosis and treatment and respiratory complications increase the mortality. Early recognition and management of associated injuries and complications is of paramount importance in reducing the morbidity and mortality

Keywords: Chest Trauma, Mortality, Morbidity

Introduction

The earliest recorded reference to thoracic trauma is found in the Edwin Smith Surgical Papyrus written around 3000, B.C. In this report of 58 cases, three were related to the chest: a penetrating injury to the cervical esophagus, a stab wound to the sternum, and blunt trauma resulting in rib fractures (Breasted, 1930).[1] One of the most recognized event was the assassination attempt of President Ronald Reagan by John Hinkley in 1981 a bullet struck the president in his left chest, causing a nonfatal hemothorax (Rockoff and Aaron, 1995).[2]

Thoracic trauma accounts for 25% of all trauma deaths, representing approximately 160,000 deaths annually. Over 70% of thoracic. Injuries result from blunt trauma, and most occur in automobile accidents. One in four patients with cardiothoracic trauma regardless of etiology requires hospital admission (Sabiston, 2012).[3]

A chest injury is any form of physical injury to the chest including the ribs, heart, major vessels, trachea, esophagus and lungs etc. Chest injuries account for 25% of all deaths from traumatic injuries. Chest injuries can be classified as blunt or penetrating. Blunt and penetrating injuries have different pathophysiologies and clinical courses.

Injuries to the chest wall include chest wall contusions or hematomas, rib fractures, flail chest, sternal fractures and fractures of the shoulder girdle and clavicle. Most thoracic injuries can be identified with a physical examination and plain chest radiography. Physical examination will reveal superficial injuries, including chest wall defects and penetrating wounds (Sabiston, 2012).[3]Up to 85% of all thoracic injuries can be managed with nothing more than a tube thoracostomy. In most cases, the placement of a chest tube is urgent but may still be performed in a controlled manner that includes strict sterile preparation and excellent surgical technique Tube thoracostomies that drain large amounts of blood on initial placement or demonstrate ongoing output may indicate active intrathoracic bleeding that requires thoracotomy (Sabiston, 2012).[3]

Material and methods

This observational study was conducted in Ravindra Nath Tagore medical college and attached hospital, Udaipur, which has a tertiary care hospital catering to the north Central India. Study was approved by the Institutional Ethics and Research committee. Study period was two and a quater year between august 2017 to September 2019 and 50 patients of chest injuries were included. All patients of chest trauma who were admitted in the hospital were included in this study. The patients discharged against the medical advice were not included. All chest trauma patients were evaluated for conservative, tube thoracostomy and operative management.

Observation

In our study maximum number of patients belonged to the age group of 21 to 30, which comprised of 13 (26 %) followed by 31 to 40, which was 11 (22%). We found that 44 males and 6 females suffered chest trauma in this study. Majority of cases who suffered chest trauma were males 44 (88%). In table 1, we indicated various modes of trauma. The commonest mode of injury was RTA in 23 (46%) , followed by fall in 11(22%) , assault 9 (18%) , bull horn injury 4(8%) , gunshot 2 (4%) and blast injury in 1(2%).

Table 1: Mode of Injury in Patients of Chest Trauma (N=50)

Mechanism of injury	No. of patient	%
Road traffic accident	23	46
fall	11	22
Assault	9	18
Bull horn injury	4	8
Gun shot	2	4
Blast injury	1	2
Total	50	100

We found that blunt chest trauma is far more common 43(86%) than the penetrating trauma 7 (14%). In table 2, we found that rib fractures are the commonest type of chest injuries which was present in 37 patients (74%) .out of these 1st and 2nd rib # present in 4 patient (8%), multiple rib # (more than 6 ribs) present in 4 patients

(8%), lower rib # present in 9 patients (18%), flail chest present in 1 patient (2%) and other rib # present in 19 patients (38%). Out of the internal thoracic organs lung was injured in significant number of cases leading to only pneumothrax in 18%, hemopneumothorax in 18% and lung contusions in 2 patients (4%). Nineteen patients out of 50 (38%) had a hemothorax probably due to chest wall injury with a tear of vessel, one out of fifty patient affected with vascular injury only and diaphragmatic injuries were uncommon and only present in 2 patient (4%). Out of the pneumothorax patient one patient (2%) was diagnosed with tension pneumothorax. Seventeen patients (34%) were diagnosed with subcutaneous emphysema.

Table 2: Various Clinical Types in Chest Trauma Victims (N=50)

Type of injury		No. of patients	%
Rib # 37 (74%)	1ST and 2ND	4	8
	Multiple ribs #	4	8
	Lower ribs #	9	18
	Flail chest	1	2
	Other rib #	19	38
Hemothorax		19	38
Subcutaneous emphysema		17	34
Pneumothorax		9	18
Hemopneumothorax		9	18
Tension pneumothorax		1	2
Lung contusion		2	4
Diaphragmatic injury		2	4
Vascular injury		2	4

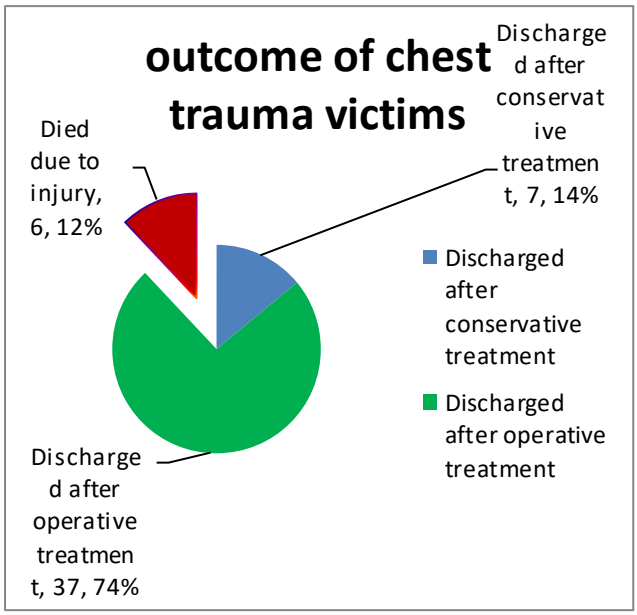
In graph 1, we found that the number of associated injuries in 50 patients of chest trauma in the study. 30 associated injuries were present in 50 patients. ten patients had musculoskeletal injuries, mostly fractures of long bones and 9 had head injury. Abdominal and pelvic trauma was associated with chest trauma in 9 patients out of 50. Commonest associated injury was musculoskeletal injuries present in 10 patients out of 30 associated injuries.

Graph 1: Associated Injuries (N=30)

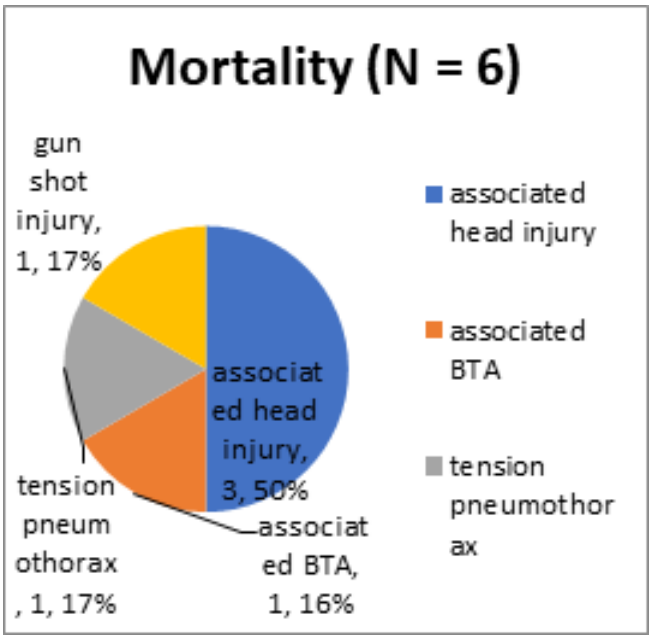
We found that the common symptoms and signs on clinical evaluation of the patients of chest trauma in this study. Pain and tenderness of the chest wall (92%) was the commonest finding which is seen in cases of fractures of ribs. Difficulty in breathing due to severe pain in chest wall or respiratory distress (88%) due to a pneumo or hemothorax was the second most common finding. In our study five out of 50 (10%) needed only conservative management whereas in fourty five patients, operative treatment was needed. The most common procedure in the management of chest injuries was intercostal chest tube drainage in 39 (78%) patients. In graph 2, we found that six (12%) patients died due to their injuries. In which three patients (50%) were associated with head injury and one patient (17%) with abdominal injuries, gunshot injury and tension pneumothorax. Fourty four patients were discharged in a satisfactory condition either after a conservative treatment (7) and operative treatment (37). 44 (88%)

were discharged after satisfactory recovery while 6(12%) cases didn't survive.

Graph 2 a: Outcome of chest trauma victims



Graph 2 b: Mortality



Discussion

Trauma has been described to have notorious tendency to affect young males in the productive period of life. Young males are more prone to chest trauma because of the greater exposure to external environmental forces in their daily activities. In this study, it was found that 26% patients of chest trauma were between 21 to 30 years. nearly half of the patients (48%) were between 21 to 40 years.

M. Mohta et al[4]., reported 49.55% patients in their study of 105 in the same age group (21-40 years). Similar results were obtained by sanjaydatey et al.[5] (2015), which comprised of 31.95 % (69 out of 216) patients belonged to the age group of 21 to 30 , second highest was between 31 to 40, which was 51 (23.6%) and about 55% patients in their study were in the age group of 21 to 40 yrs of age.

Male preponderance was noted in our study with incidence of 88% patients, the relatively low incidence of females (6 out of 50) can be explained on the basis that females are less exposed to external factors. Monafishha et al[6]. reported male incidence of 79.35 in the study of 150 cases. In the study by M. Mohta et al.[4], 95 out of 105 patients of chest trauma were males.

In this study Motor vehicle accidents accounted for about half (46%) of all the injuries. In a study of 1164 patients of chest trauma by Veysi et al.[7], 57.01% cases were due to automobile accidents. Automobile accidents are major causes of polytrauma. Most of the victims suffer chest injuries when they are involved in polytrauma, Rapid industrialization, higher rates of economic growth and better living standards have increased the use of high speed automobiles in our country.

Most of the patients (86%) suffered blunt injuries, similar to many other studies. M. Mohta et al.[4], reported 785 of the patients out of 105 suffered blunt injuries in their study. Few studies have shown penetrating injuries to be the commonest cause of chest trauma. In a study by Maxwell[8], penetrating injuries accounted for 77% of cases. Over 70% of thoracic

injuries result from blunt trauma, and most occur in automobile accidents. Symptomatology of chest trauma varies. Although it becomes easier to diagnose and manage a case of isolated chest trauma than in a patient who is unconscious due to head injury. In our study pain in chest (92%) and respiratory distress (88%) were the commonest clinical features. Monafisha et al[6]. had 33.3% cases of head injury and 26.7% cases of musculoskeletal injuries in their study of 105 cases. The associated injuries are related to the cause of injury as road traffic accidents always lead to multiple injuries whereas assault lead to isolated injuries mostly (Ali and Gali et al.).[9]

Conclusion

Outcome of a victim of chest trauma depends on various factors. Morbidity and mortality varies with age of the patient and force and location of trauma. Associated injuries increase the risk of complications in patients with chest trauma. Total 6 patients died in this series of 50. All patients were of polytrauma with different injuries, chest injury was present in all. Head injury is the commonest in the mortality cases. Delay in diagnosis and treatment and respiratory complications increase the mortality. Early recognition and management of associated injuries and complications is of paramount importance in reducing the morbidity and mortality.

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