

A Review of 277 Cases of Patients with Chest Trauma in the Medical city Teaching Complex

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ABSTRACT:

BACKGROUND:

Thoracic trauma is one of the leading causes of morbidity and mortality in developing countries. It represents 50% of all traumas. They are the cause of 25% of trauma deaths.

OBJECTIVE:

Describing the incidence, association with other injuries, understand the mechanism of common fatal injuries in chest trauma, diagnosis and operative morbidity and mortality.

PATIENTS AND METHODS:

A retrospective study of 277 patients, victims of chest trauma between August 2009 and August 2011 in Ghazi Al-hariri teaching surgical specialties hospital – Department of thoracic and vascular surgery/ medical city teaching complex. The records of all patients were reviewed and data were collected retrospectively. Management and follow up of the patients during hospitalization were evaluated. According to management patients were divided into two groups (conservative and surgical).

RESULTS:

Of 277 patients involved in this study 244(88.08%) of them were male and 33(11.91%) were female, with female /male ratio: (1/7.33). The majority of patients were in their third decade of life 100(36.10%) from 21-30 years. Penetrating chest trauma was seen in 262 (94.58%) of the total number, 11(3.97%) had blunt chest trauma and 4(1.44%) had blunt and penetrating chest trauma. Bullets or shells in 205(74%), were the commonest penetrating injury, and commonest blunt trauma cause was blunt object in 8(2.88%) patients whereas 3(1.08%) patients due to RTA. The associated traumas were seen in 40.4% and the commonest one was limbs trauma in 57(20.57%) patients. The majority of the patients 219(79.06%) arrived to the hospital within hours of the injury mainly the first 4 hours. 190(68.59%) patients were treated as emergency cases and 87(31.40%) as cold cases. Chest x-ray performed to the all patients and the main radiological findings were haemothorax in 172 (62.1%). Conservative treatment in 37 (13.35%) patients and surgical treatment in 240 (86.64%) patients. The main Indication for thoracotomy was an initial drain more than 1500ml in 17(6.13%) patients, lung injuries were the commonest operative finding 29(10.46%). Hospital stay ranges from 1 day to 1 month and most of the patients 187(67.5%) discharged within the first 5 days of admission. Morbidity was seen in 19(6.85%) patients, wound infection was the commonest seen in 6(2.16%) patients, wound infection in 6(2.16%) patients, atelectasis in 5(1.8%) patients, respiratory distress syndrome in 4(1.44%) patients, CVA in 1(0.36%) patients, stress ulcer in 1(0.36%) patients, postoperative bleeding in 1(0.36%) patients and post intubation tracheal stenosis in 1(0.36%) patient. The overall mortality were 10(3.61%) patients, 2(0.72%) of them died perioperative were both of them they had associated injuries namely cardiac and central vessel injury respectively. All the 10 patients were male and the type of injury was penetrating in all. 8 out of 10 died had associated injuries.

CONCLUSION:

Penetrating chest injuries resulting from violence are the major public health problem in Iraq and bullets or shells are the commonest cause. Chest X-ray is diagnostic in most of cases. Associated injury should be carefully considered in the medical response strategies. The majority of patients with simple chest injuries can be managed by tube thoracostomy. Mortality is common with penetrating chest injuries.

KEY WORDS: chest injuries, blunt trauma, penetrating injury and thoracotomy.

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INTRODUCTION:

Reports of chest injuries appeared as early as 3000 BC, in the Edwin Smith Surgical Papyrus

⁽¹⁾. Chest trauma (or thoracic trauma) is a serious injury of the chest; it is a common cause of significant disability and mortality, the leading cause of death from physical trauma after head and spinal cord injury ⁽²⁾. Thoracic trauma comprises 10–15% of all traumas and represents 25% of all fatalities due to trauma ⁽³⁾. Chest trauma can be managed with simple procedures such as a tube thoracostomy; however, 10–15% of patients who present with thoracic trauma require definitive operative repair ⁽⁴⁾. A thoracotomy may be performed within the first few hours of injury is considered an urgent thoracotomy; Indications for urgent thoracotomy include the presence of cardiac tamponade, high chest tube output, persistent air leak and injury to the diaphragm ⁽⁵⁾.

PATIENTS AND METHODS:

A retrospective study of 277 patients, victims of chest trauma between August 2009 and August 2011 in Ghazi Al-hariri teaching surgical specialties hospital – Department of thoracic and vascular surgery. The records of all patients were reviewed and data were collected retrospectively. A specially made data collection sheet used to record Patients age, gender, the type cause, site and severity of the accident, associated injuries, time of arrival, clinical and radiological findings, management of the pathologies, surgical interventions, postoperative period, hospital stay, morbidity and mortality rates were evaluated in terms.

Patients were referred to the Thoracic Surgery Department soon after resuscitation in the emergency ward. Thoracic injuries requiring a chest tube insertion were diagnosed on physical examination; usually chest X-rays were taken on admission and chest CT imaging was performed for patients who are hemodynamically stable, or in the late course of patient follow up. Chest-tube insertion was performed in patients with pleural complications and in those with severe dyspnea and clinical diagnosis of tension pneumothorax, without losing time waiting for chest X-ray. Patient's management divided to two groups conservative and surgical management according to the clinical and radiological findings, and those patients who were surgically treated divided to two groups emergency cases and elective cases. Some of Patients with associated

injuries managed by a team work with other specialties according to the type of injury.

RESULTS:

- Of 277 patients involved in our study 244(88.08%) were male and 33(11.91%) were female with female /male ratio: (1/7.33).
- The majority of patients were in their third decade of life 100(36.10%) from 21-30 years. Only 4(1.44%) was below 10 years and 2(72%) in the 7th decade.
- The distribution of patients according to the type of injuries were 262(94.58%) of Our patients sustained penetrating chest trauma, while 11(3.97%) had blunt chest trauma and 4(1.44%) had both types of chest trauma.
- Bullets or shells were seen in 205(74%), shrapnel in 54(19.49%) and stab wound in 3(1.08%) patients. In blunt trauma patients, 8(2.88%) patients of them were injured by blunt object and 3(1.08%) patients due to RTA.
- Regarding the side of chest trauma, in 159(57.4%) patients, trauma was to the right side, in 104(37.54%) to the left side, in 13(4.69%) patients trauma was imposed to both sides of the chest and in 1(0.36%) patient the injury was to the sternum.
- Associated injuries with chest trauma, limbs trauma in 57(20.57%) patients, 28 (10.10%) patients were associated with abdominal injury, and 18(6.49%) patients with head and neck injury and in 2 (0.72%) patients were associated with spinal cord injury.
- The majority of the patients 219(79.06%) arrived to the hospital within hours of the injury mainly the first 4 hours, while 55(19.85%) patients were arrived within days and 3(1.08%) patients arrived after one month.
- The presenting symptoms and signs of chest trauma were variable, commonly shortness of breath was seen in 226(81.58%) patients, bruising and abrasion in 63(22.74%) patients, hemoptysis in 41(14.80%) patients, open chest wounds in 32(11.55%) patients, chest wall wounds in 29(10.46%) patients, Intrathoracic foreign bodies in 6(2.16%) late presenting patients, flail chest in 3(1.08%) patients, surgical emphysema in 2(0.72%) patients and in 1(0.36%) patient empyema, as shown in table (1).

Table 1: Symptoms and signs.

Symptoms and sign	No.
Shortness of breath	226
Bruising and abrasions	63
Hemoptysis	41
Open chest wounds	32
Chest wall wounds	29
Intrathoracic F.B.	6
Flail chest	3
Surgical emphysema	2
Empyema	1

- The radiological findings were, haemothorax in 172(62.1%), pneumothorax in 60(21.66%) patients, hemopneumothorax in 30(10.83%), fractured ribs in 8(2.88%) patients, foreign body in 6(2.16%) patients, pulmonary contusion in 5(1.8%) patients, widen mediastinum in 1(0.36%) patient and in 1 patients fractured sternum.
- As regard treatment 190(68.59%) patients were treated as emergency cases, 41(14.8%) of them need urgent thoracotomy while 87(31.40%) treated as cold cases.
- Conservative treatment in 37(13.35%) patients and surgical treatment in 240(86.64%) patients which was as follow: only tube thoracostomy in 186(67.14%) patients and in 54(19.49%) patients it was tube thoracostomy plus other procedure , 26(9.38%) patients of them under went Rt. Thoracotomy, in 18(6.49%) patients Lt. thoracotomy, while 6(2.16%) patients infraclavicular inscions, 2 (0.72%)patients neck exploration, 1(0.36%) patient sternotomy and 1 patient thoracoabdominal inscion.
- Indications for thoracotomy were, an initial drain more than 1500ml in 17(6.13%) patients, 11(3.97%) hemodynamically unstable patients, 6(2.16%) patients due to foreign bodies, 4(1.44%) patients due to clotted haemothorax, 2(0.72%) patients due to esophageal injuries, 2 (0.72%)patients due to massive air leak, 2 (0.72%)patients due to massive hemoptysis, 1(0.36%) patient for thoracoabdominal injury and 1 patient for wide mediastinum, as shown in table (2).

Table 2: Indications for thoracotomy.

Indication	No.
Drain>1500ml	17
Hemodynamically unstable	11
Intrathoracic FB	6
Clotted haemothorax	4
Massive air leak	2
Massive hemoptysis	2
Esophageal injury	2
Thoracoabdominal injury	1
Widened mediastinum	1

- Operative findings in patients with thoracotomy were as follow: lung injury was seen in 29(10.46%) patients, intercostal artery injury in 9(3.24%) patients, chest wall injury in 9(3.24%) patients, foreign body in 6 patients (2.16%), esophageal injury in 2(0.72%) patients, central vessel injury in 1(0.36%) patient, cardiac injury in 1 (0.36%) patient, diaphragmatic injury in 1 (0.36%) patient, and Axillary artery and vein injury in 1 (0.36%) patient as shown in table (3).

Table 3: Operative findings.

Operative findings	No.
Lung injury	29
Intercostal artery injury	9
Chest wall injury	9
F.B.	6
Esophageal injury	2
Central vessel injury	1
Axillary artery and vein injury	1
Cardiac injury	1
Diaphragmatic injury	1

- Lobectomy was needed in 3(1.08%) patients and splenectomy in 1(0.36%) patient.
- Hospital stay ranges from 1 day to 1 month and most of the patients 187(67.5%) discharged within the first 5 days of admission.
- The overall morbidity rate in the management of chest trauma in the current study was seen in 19(6.85%) patients, wound infection in 6(2.16%) patients, atelectasis in 5(1.8%) patients, respiratory distress syndrome in 4(1.44%) patients, CVA in 1(0.36%) patients, stress ulcer in 1(0.36%) patients, postoperative bleeding in 1(0.36%) patients and post intubation tracheal stenosis in 1(0.36%) patient.
- Morbidity 10(3.61%) patients, 2(0.72%) of them died perioperative due to associated cardiac and central vessel injury respectively. One patient died preoperatively and had associated femoral artery injury. All the 10 patients were male and all sustained penetrating injury, 8(2.88%) of them bullet injury and 2(0.72%) of them stab wound. 8 out of 10 had associated injuries, as shown in table (4).

Table 4: Mortality.

	Blunt	Penetrating	isolated	Associated	Total
Mortality	0.00	10	2	8	10
Perioperative mortality	0.00	2	0.00	2	2
Preoperative mortality	0.00	1	0.00	1	1

DISCUSSION:

Chest Trauma is common in Iraq, due to increased civilian violence and political instability. And it is reported to be the leading cause of death, hospitalization, and long-term disabilities in their first four decades of life.6 Trauma has the tendency to affect young males in the productive period of life. (7,8, 9) In this study, chest trauma is mostly observed in men 244 (88.08%) and 33 (11.91%) in women with female /male ratio 1/7.33, and the most common age group is 21-30 years of age 100(36.10%) patients and the least common age group is >70 years which is consistent with the findings of other studies. (7, 8,9,10,11,12) but the age group was different from that seen in Hadi Ahmadi Amoli et.al, were commonest age group was 30-35years. (13). Trauma in general, is mostly common in young people who have the highest

performance in the community and exposure to violence. The progress of chest trauma depends more on the severity and mechanism of the trauma than on the age of the patient (14), in the current study the mechanisms and causes of trauma were 262(94.58%) of the total number had penetrating chest trauma which is different from Canadian study in which the reported frequency of blunt thoracic trauma as 96.3%, also we notice blunt trauma more common in the other studies. (15,16,17,18,19,20,21,22). We believe that different results are associated with different socio-economic status, security issue, violence developmental levels, and nature of people work. In our study, the most common cause of penetrating injury group were bullets or shells in 205(74%) out of 262 patients with penetrating

injuries which is higher than other study were 60% in Thomas MO study⁽²³⁾, and differ from the study done by Recep Demirhana et al⁽¹⁵⁾, where the bullet was not the most common cause of penetrating injury group. This is may be due to the violence and terrorism in our country. While in blunt trauma group (11 patients): 8(2.88%) patients were injured by blunt object and 3(1.08%) patients due to road traffic accident which was different from other study were the traffic accident was the commonest cause^(20,24,25,26,27,28,29). And combined injury was seen in 4(1.44%) patients.

Thoracic trauma produces some of the most challenging and potentially devastating injuries seen in the Emergency Department. Unrecognized or untreated injuries to the chest and its contents may produce death within minutes from shock or hypoxia if they are not promptly recognized and treated.⁽³⁰⁾ The most common diagnostic method used was chest x-ray performed to the all patients and simple imaging of other parts of the body when there is need for that. This is also consistent with other similar studies.^(12,20,31,32) We believe that computed tomography should be used if further examination and evaluation is needed.

Provided that the patient is hemodynamically stable, Conservative treatment was used in 37(13.35%) patients and surgical treatment in 240(86.64%) which is lower than other study were 60.4% of the cases treated as outpatients⁽²⁰⁾. And this may reflect the severity and nature of our patient's injuries. Only tube thoracostomy used in 186(67.14%) patients and in 54(19.49%) patients it was tube thoracostomy plus other procedure, while only tube thoracostomy was used for 778 (93%) patients in Aghaei- Afshar M et. al , (73.2 %) in Suresh Kumar et.al, and (46%) in Recep Demirhana et al study.^(28, 16, 33)

46(16.6%) of our patients underwent thoracotomy which is higher than that seen by Aghaei-Afshar. et al study, in which (5%) underwent thoracotomy, and Recep Demirhana et al study, in which 6 %. 15,28 underwent thoracotomy. The higher percentage of thoracotomy in current study may be due type and cause of injuries, because of bullet and blast injuries were the commonest type.

The main surgical indication in current study was severe bleeding or bleeding continuance after chest tube insertion were seen in 17(6.13%) patients, which is also consistent with all other similar studies^(26,34,35). The most common finding

during thoracotomy was lung injury 29 (10.46%) and the damage to intercostal vessels is ranked second 9(3.24%). This result is also consistent with other studies.^(36,37) Thoracotomy was an early procedure performed primarily in 14.8% of patients in this study which is higher than that seen in Demirhana et.al which was 4.97 %.⁽¹⁵⁾

The associated Extrathoracic injuries complicate the presentation and management of the victims, resulting in increased mortality and hospital stay. The ratio of associated injuries in our study was (40.4%) which is higher than other study.⁽¹⁵⁾

The commonest associated trauma was limbs trauma seen in 57(20.57%) patients in this study, which differ from Aghaei-Afshar M et al study in which The most common associated trauma was orthopedic trauma, and it differ from that seen by Varela A, Gámez P et.al were Fractures of ribs are considered the most common injury associated with chest trauma (35-40%), and In Valerio Perna et.al the incidence was over 90%.^(28,38,39) and in Recep Demirhana et.al it was (36.1%) and in Yalçinkaya et.al study was (36.2%).^(15,37) While fractured rib in the current study was seen in 8(2.88%) patients only.

Hospital stay ranges from 1 day to 1 month and 187 patients (67.5%) discharged well within the first 5 days of admission, long hospital stay was more when complication of treatment occurred. The most common complications in the management of chest trauma in current study was wound infection in 6(2.16%) patients, atelectasis in 5(1.8%) patients, which differ from that seen by Ibrahim Al-Koudmani study, were prolonged air leak (4.39%), followed by clotted haemothorax⁽³⁵⁾

Other complications was respiratory distress syndrome in 4(1.44%) patients, CVA in 1(0.36%) patients, stress ulcer in 1(0.36%) patients, postoperative bleeding in 1(0.36%) patients post intubation tracheal stenosis in 1(0.36%) patient. Hospital stay and mortality increased in the presence of associated injuries as compared to isolated thoracic injuries. The mortality rate for isolated chest injuries has been reported to range from 4 to 8%; this value increases to 13–15% when another organ system is involved and to 30–35% when more than one organ system is involved.⁽³⁵⁾ In our study mortality was 10(3.61%) and only in patients with penetrating chest trauma(8 due to bullets and 2 due to shells injuries) which is different from that seen by Recep Demirhana et.al were mortality was higher in patients with blunt chest trauma

(9.3%),(and (11.6 %) patients in Suresh Kumar et.al study.^(15,33) 8 out of 10 patients who died were having associated injuries and most of them have more than one organ injury and this result is similar to other studies.^(15,40) Two of ten patients were died perioperative due to great vessel and cardiac injury and one died preoperative due to multiple chest and peripheral vascular injuries. This result was similar to other studies.^(33,41) thoracotomies were unwillingly performed in operating room. We lost a resuscitative time, which is important for the patients, so we think that emergency bedside thoracotomy (resuscitative thoracotomy) may be a life-saving procedure in these patients. Mortality rate depends mainly on the nature of the injury and the hemodynamic status upon arrival.^(41,42)

CONCLUSION:

- 1- Penetrating chest injuries resulting from violence are the major public health problem in Iraq and bullets or shells are the commonest cause.
- 2- Chest X-ray is diagnostic in most of cases.
- 3- Associated injury should be carefully considered in the medical response strategies.
- 4- The majority of patients with simple chest injuries can be managed by tube thoracostomy.
- 5- Mortality is common with penetrating chest injuries.

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