

# Gunshot injuries of chest : analysis of 32 patients

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## Abstract

**Background:** Penetrating injuries to the chest present a frequent and challenging problem. The majority of these injuries can be managed non-operatively. The selection of patients for operation or observation can be made by clinical examination and appropriate investigations. This study is conducted to present our experience in management of the chest gunshot during Libyan revolution and in a situation where the basic diagnostic tool (X-ray) was unavailable.

**Methods:** we retrospectively reviewed 32 patients seen at our hospital over a 6-day period during revolution (16-21 Feb). The data evaluated and analysed.

**Results:** The group comprised 32 male patients, with a mean age of 29 years (17-58). Of these patients, 17 (53.2%) had left-sided, 15 (46.8%) had right-sided, 19 (59.4%) had isolated chest injury and 13 (40.6%) patients had associated other injuries.. Thoracostomy tube was the only therapy required in 19 patients (59.4%), whereas 13 patients (40.6%) underwent thoracotomy and exploration. Mean hospitalization period for patients with thoracostomy tube was 6 days whereas median hospitalization duration in the exploration group was 9 days. Complications recorded in 2 cases.

**Conclusion:** In this study we emphasize that in the situation where x-ray is not available , the clinical examination, pleural aspiration and the thoracostomy tube are the appropriate methods of managing penetrating chest injuries.

**Keywords:** Penetrating thoracic trauma, tube thoracostomy, thoracotomy

## Introduction

The history of trauma is as old as medicine itself. One of the earliest writings on thoracic injury was found in the Edwin Smith Surgical Papyrus, written in 3000 BC, which describes cases of penetrating thoracic trauma <sup>(1)</sup>.

Penetrating thoracic trauma is mostly attributed to violence. It is more common in men due to their propensity to violence, the mechanism of injury is usually a gunshot wound or stab wound <sup>(2)</sup> . The selection of patients for operation or

observation can be made by clinical examination and appropriate investigations. A standard posteroanterior chest X-ray is the most frequently used diagnostic modality in patients who sustain chest injury. This study is conducted to present our experience in management of chest gunshot injuries during Libyan revolution in a difficult situations where the basic diagnostic tool (X-ray) was unavailable.

## Patients and methods

This is a retrospective study that covered a 6-day period during revolution (16-21 Feb 2011). Because X-ray was not available, all patients underwent pleural aspiration and followed by chest tube. Immediate thoracotomy was performed if more than 1000 cm<sup>3</sup> of blood had drained with insertion of a chest tube, if drainage

exceeded 200 cm<sup>3</sup>/h for 3 h, or if there was a major air leak. All patients received appropriate antibiotic and analgesics. Removal of chest tubes depended on air leakage and drainage of the chest tube. If air leakage ceased and drainage of the chest was less than 100 cm<sup>3</sup>/day, then chest tubes were removed.

## Results

The group comprised 32 male patients, with a mean age of 29 years (17-58 y). The left -to-right injury ratio was 1.1:1 (**figure 1**). In terms of management, 19 patients (59.4%) were treated with only tube thoracostomy, and 13 patients (40.6%) had thoracotomy and exploration.

Mean duration until removal of chest was 9 days (range:6-15 days) in the exploration group and 6 days (range: 5-8 days) in the tube thoracostomy group. Thirteen patients (40.6%) had accompanying penetrating injuries (**figure 2**). Complications (pleural effusion) recorded in 2 cases.

Injries	Patients no	Thoracotomy	Chest tube	Complications
Lt chest	17 (53.2 %)	8 (47.1 %)	9 (52.9 %)	1 (5.9 %)
Rt chest	16 (46.8 %)	5 (31.3 %)	10 (76.7 %)	1 (6.3 %)

**Figure 1: Site of chest injuries**

Site of inj	Patients no	Thoracotomy	Chest tube	Complications
Chest + Abdomin	7 (21.9 %)	6 (85.7 %)	1 (14.3 %)	1 (16.7 %)
Chest + pelvis	1 (3.1 %)	1 (100 %)	0	0
Isolated chest	19 (59.4 %)	4 (21.1 %)	15 (78.9 %)	1 (5.3 %)
Chest + extremities	5 (15.6 %)	2 (40 %)	3(60 %)	0

**Figure 2: Accompanying penetrating injuries**

## Discussion

Penetrating thoracic trauma is mostly attributed to violence and has a higher mortality rate than blunt trauma <sup>(2-3)</sup>. It is more common in men due to their propensity to violence and the mechanism of injury is usually a gunshot wound or stab wound. Early recognition and timely treatment of life threatening injuries, better resuscitative techniques, preoperative care, and effective surgical procedures can significantly affect outcomes in these patients <sup>(2)</sup>.

Gunshot injuries to the chest are associated in 34% to 36% with haemato- or haematopneumothorax. The high degree of energy in projectiles causes a high prevalence of lung contusion around the trajectory (43%) <sup>(4)</sup> and associated diaphragmatic injuries occur in 59% <sup>(5)</sup>. Cardiac injuries are rare in patients who reach the hospital because these injuries are often lethal at the scene <sup>(4)</sup>. The most common life threatening injuries of the thorax are haemato- or haematopneumothorax, tension pneumothorax and pericardial tamponade. They should be diagnosed within the first physical examination and be treated immediately. If the patient is in a stable condition a chest X-ray is helpful to show the expansion of the lung and mediastinum <sup>(6)</sup>. The most important therapeutic

intervention is the insertion of a chest tube which is indicated in all cases of pneumothoraces larger than 2 cm and haematothoraces extending over the seventh rib<sup>(7-9)</sup>. In our study all the patients underwent thoracostomy tube because X-ray was unavailable and the indications for thoracotomy were a chest tube delivering more than 1 to 1.5 liters of blood immediately after the insertion or continued bleeding of more than 200 ml/h for 3 hours <sup>(4)</sup>. The management algorithms for gunshot injuries to the chest are very similar in most trauma centers indicating that most gunshot injuries can be managed successfully without explorative thoracotomy <sup>(10-11)</sup>. In our study, 19 patients (59.4%) were treated by only tube thoracostomy, oxygen inhalation therapy (2 L/min), appropriate analgesics, and pulmonary toilet, while 13 patients (40.6%) had thoracotomy which is consistent with other studies <sup>(12-14)</sup>. The overall mortality rate reported in the literature for patients with traumatic pulmonary injuries ranges from 1.7% to 37% <sup>(15-17)</sup>. In our series only one patient died, because of massive hemorrhage before thoracotomy was performed which was excluded from the study and complications (pleural effusion) were encountered in two cases.

## Conclusion

In this study we emphasize that in the situation where x-ray is not available, the clinical examination, pleural aspiration

and the thoracostomy tube were the appropriate methods of managing chest gunshot injuries.

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