



PENETRATING CHEST TRAUMA, ASSOCIATED INJURIES AND COMPLICATIONS

Mohd Altaf Wani¹, Dr. Showkat Hussain Tali*², Mohd Ashraf Bhat², Gazi Shakeel² and Ashiq Hussain Naqshbandi³

¹Senior Consultant District Hospital Anantnag,

²Consultant MCCH Anantnag.

³Professor Surgery GMC Srinagar.

*Corresponding Author: Dr. Showkat Hussain Tali

Consultant MCCH Anantnag.

Article Received on 12/08/2018

Article Revised on 02/09/2018

Article Accepted on 23/09/2018

ABSTRACT

Introduction: Associated injuries in penetrating chest trauma contribute significantly to mortality and mortality. Complications can arise due to penetrating chest trauma itself and/or during or following management. **Material and Methods:** One hundred and twenty five patients with penetrating chest trauma were enrolled in the study. Associated injuries and complications were noted and recorded on a predesigned proforma. **Observations and Results:** Most common associated injury was abdominal trauma (14.8%) followed by skeletal injuries (7.2%) and facial trauma (3.2%). Liver and diaphragmatic injuries were observed in 3.2 % each. Lung laceration was the most common complication (26.4%) followed by left internal mammary artery injury (1.6%). Pleural effusion was the most common complication (5.6%) closely followed by atelectasis (4%) and thrombophilic (4%). Septicemia was the most common cause of death (2.4%). **Conclusion:** In penetrating chest trauma the most common associated injury was abdominal trauma. Lung laceration was the most common complication. Pleural effusion was the most common complication and septicemia the most common cause of death.

KEYWORDS: Penetrating chest trauma, associated injury, complications.

INTRODUCTION

Thoracic injuries account for 20-25% of deaths due to trauma and contribute to 25-50% of the remaining deaths. Approximately 16,000 deaths per year in the United States alone are attributable to chest trauma.^[1] Penetrating chest trauma may be in isolation or may be associated with trauma to other organ systems. When associated with other injuries, morbidity and mortality increases significantly. One more important contributor to increased morbidity and mortality is complications that may occur during or after treatment. This study was designed to look for the frequency and nature of associated injuries in penetrating chest trauma and complication that may arise during or after the treatment.

MATERIAL AND METHODS

This cross sectional observational study was conducted at the department of surgery, Government Medical College Srinagar, which is a tertiary care centre for surgical patients in the state of Jammu and Kashmir, India. Study was commenced after taking written informed consent from subjects or their parents/guardians in cases where the patient was a minor or unable to give consent. A total of 125 cases with penetrating chest trauma injuries were enrolled in the

study. Associated injuries and complications were noted and were recorded on a predesigned proforma.

OBSERVATION AND RESULTS

Table 1 depicts associated injury in penetrating chest trauma. **Table 2** depicts organ injury associated with penetrating chest trauma. **Table 3** shows the complications of penetrating chest trauma. **Table 4** depicts the causes of mortality in patients with chest trauma.

Table 1: Associated injury in penetrating chest trauma.

Associated injury	No./ % age
Abdominal injury	18 (14.8)
Skeletal injury	9 (7.2)
Facial injury	4 (3.2)
Peripheral nerve	3 (2.4)
Peripheral vascular Injury	1 (0.8)
Head injury	2 (1.6)
Spinal-cord injury	1 (0.8)

DISCUSSION

The most common associated injury in penetrating chest trauma was abdominal injury (14.8%). The other

associated injuries were skeletal injury (7.2%), Facial injury (3.2%), peripheral nerve injury (2.4%), head injury (1.6%), peripheral vascular injury (0.8%) and spinal cord injury (table 1). Left lung laceration (18) was the most common injury reported followed by right lung

injury (15) and left internal mammary artery (2). Right and left ventricular perforation was reported in 1 patient each. Left subclavian artery, right brachiocephalic vein, innominate vein and left main pulmonary artery were involved in 0.8% each (table 2).

Table 2: Organ injury associated with penetrating chest trauma.

Organ involved/findings		No./ %age
Cardiac injury	Pericardial tear with left ventricular perforation	1 (0.8)
	Pericardial tear with right ventricular perforation	1(0.8)
	Pericardial tear	1(0.8)
Vessel injury	Left subclavian artery	1(0.8)
	Right brachiocephalic vein	1(0.8)
	Innominate vein	1(0.8)
	left Main Pulmonary artery	1(0.8)
	Right intercostal artery	1(0.8)
	Left internal mammary artery	2 (1.6)
Lung injury	Right Lung lacerations	15 (12)
	Left Lung laceration	18 (14.4)
Isolated liver injuries		4 (3.2)
Isolated splenic injury		3 (2.4)
Isolated stomach injury		3 (2.4)
Isolated small gut injury		3 (2.4)
Isolated large gut injury		3 (2.4)
Diaphragmatic tear with herniation		4 (3.2)

Most common individual organs involved were liver and diaphragm (3.2% each). Other organs involved were spleen, small gut, large gut and stomach {(2.4% each); table 2}.

Most common thoracic complication was pleural infusion (5.6%) and Atelectasis (4%) closely followed by pneumonia (3.2%), haemothorax and empyema (2.4 each). Most common extra thoracic complication were thrombophlebitis (4%) and wound infection (2.4%) followed by upper GI bleed (2.4%) closely followed by upper GI bleed and septicemia {(1.6% each) table}.

Table 3: Complications of penetrating chest trauma.

Complication		No./%age
Thoracic	Pleural effusion	7 (5.6)
	Pneumonia	4 (3.2)
	Atelectasis	5 (4)
	Haemothorax	3 (2.4)
	Pneumothorax	1 (0.8)
	Empyema	3 (2.4)
	Stitch granuloma	2 (1.6)
Extra thoracic	Wound infection	3 (2.4)
	Wound dehiscence	1 (0.8)
	Upper G.I bleed	2 (1.6)
	Incisional hernia	1 (0.8)
	Pancreatic fistula	1 (0.8)
	Pelvic abscess	1 (0.8)
	Thrombophlebitis	5 (4)
	Septicemia	2 (1.6)
	ARDS	1 (0.8)

The most common cause of mortality was septicemia (2.4%). Ventricular fibrillation, hemorrhage from main pulmonary artery tear, head injury and ARDS were responsible for mortality in 0.8% patient each. Table 4.

Table 4: Cause of death in penetrating chest trauma.

Cause of death	No. of cases/ %age
Ventricular fibrillation	1 (0.8)
Hemorrhage from main pulmonary artery tear	1 (0.8)
Septicemia	3 (2.4)
Head injury	1 (0.8)
ARDS	1 (0.8)

Most penetrating injuries are chest wounds and have a mortality rate (death rate) of under 10%.^[2] Penetrating chest trauma can injure vital organs such as the heart and lungs and can interfere with breathing and circulation. When the heart is punctured, it may bleed profusely into the chest cavity or it may cause pericardial tamponade if the pericardium is not disrupted.^[3]

Evidence has shown that poly traumatized have shown significant differences in mortality and morbidity between two separate groups of patients treated in Germany and the United Kingdom, respectively.^[4]

Penetrating abdominal chest trauma when associated with abdominal trauma greatly increases mortality and morbidity. Even in isolation, penetrating abdominal trauma can be life-threatening because abdominal

organs, especially those in the retroperitoneal space, can bleed profusely, and the space can hold a large volume of blood.^[5] Pancreas injury may lead to auto-digestion. Liver injury can be fatal as it poses a serious risk for shock as it is delicate and has a large blood supply and capacity.^[5] The intestines, taking a large part of the lower abdomen, are also at risk of perforation.

Associated brain injury is a serious issues and increases mortality exponentially. Penetrating head trauma is associated with a high mortality rate, and only a third of people with penetrating head trauma survive long enough to arrive at a hospital.^[6] Penetrating facial trauma can pose a risk to the airway and breathing; airway obstruction can occur later due to swelling or bleeding.^[7] Penetrating eye trauma can cause the globe of the eye to rupture or vitreous humor to leak from it, and presents a serious threat to eyesight.^[8]

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