Hemothorax following a gunshot wound: Case report with review of literature

ABSTRACT:

(a)Introducction:

Rapid and accurate diagnostic work-up and surgical management is important for retained Foreign Bodies (FB) in the chest wall following a penetrating chest trauma. While hemothorax is very common due to traumatic injuries, not much has been discussed about presenting hemothorax following a case of gunshot wound.

(b)Epidemiology:

Blunt chest trauma is more common than penetrating trauma and directly comprises 20 to 25% of trauma deaths(1). Despite its higher incidence, less than 10% of patients suffering blunt trauma to the thorax require operative intervention, whereas 15 to 30% of patients sustaining penetrating chest injuries will need operative intervention (1).The mortality rate for gunshot wound of the chest varies from 14.3 to 36.8% (2).

(c) Purpose:

The purpose of this report is to emphasize the characteristics of penetrating thoracic trauma with special reference to gunshot wounds as well as their early intervention with the review of literature.

KEYWORDS:

Hemothorax,Gunshot wound(GSW),Foreign body(FB),Thoracotomy

INTRODUCTION:

The collection of blood in the space between the chest wall and the lung (within the pleural cavity) is termed as the hemothorax. Out and away the foremost common reason for hemothorax is trauma. Penetrating injuries of the lungs, heart, great vessels, or chest wall are obvious causes of hemothorax; they may be accidental, deliberate or iatrogenic in origin. Thoracic trauma occurs frequently but requires surgery in 10-20%[2]. Gunshot wounds are a public health concern all round the world. The incidence of gunshot wound deaths is quite high in a country like India, where it sees the third-highest firearm-related deaths in the world [3].

CASE PRESENTATION:

A 30-year-old man with a penetrating chest injury from a gunshot wound from the back while riding a bike is presented to us in a causality. A sutured 2 x 1 cm sized entry wound at the right post-axillary line at the 4th intercostal space (ICS) was seen. Examination revealed tachycardia with spo2 of 90% and tenderness in the right upper chest; air entry decreased in the right side of lung fields. With the consideration of presence of bullet (retained FB) in situ HRCT (High-resolution computed tomography) of chest was done. HRCT scan showed the presence of a right moderate hemothorax with linear consolidation of size 7.5 x 1.5 cm in the right lower lobe and collapse of the underlying lung. A 1.8 x 1.4

cm sized metallic FB was noted in the anterior chest wall, 4 cm away from the midline, suggesting a bullet pellet (image 1,2).The bullet had crossed the posterior thoracic wall, penetrating the lungs and its visceral and parietal pleura and was stuck in the anterior chest wall. The figures for 3D-CT Chest are represented below. In the Operating room, an intercostal drainage (ICD) tube was inserted in the anterior axillary line in the 5th ICS and approximately 1 liter of hemothorax was drained out. FB exploration done by placing a horizontal skin incision in 5th ICS at anterior chest wall under anesthesia. Bullet pellet found to be embedded in between the external and internal intercostal muscles. Removed bullet pellet (image 3). Close monitoring of the patient was done post-operatively for ICD output, sudden fall in spo2 or Hemoglobin (Hb). On 6th post op day ICD output was <10 ml. Air column movement of ICD was absent on 7th post op dayday; henhenceD was removed on 8th post op day. Patient recovered well and the post op period was uneventful.

DISCUSSION:

In contrast to stab wounds, gunshots cause more exsanguination of blood. Penetrating wounds of the thorax caused by a knife, a fragment of glass or a bullet may induce pneumothorax (in 20% of such cases) or hemothorax (in 60-80%)[4]. Yet not much literature is available on cases with hemothorax due to GSW and their management. If the penetrating injury involves the heart, the chances of survival are less than 1%[5]. 60 ml to 200 ml of clotted blood is enough to cause death [5]. The delayed complication of calcific fibrothorax can occur as a result of previous hemothorax(6). A foreign body in the pleural cavity may cause chronic empyema, and malignant neoplasm associated with this condition and caused by a metallic foreign body has been reported in the literature (6). Hence the need for urgent drainage of blood and quick evaluation becomes inevitable. Most bullets that enter the body and do not exit usually lodge within the soft tissue or target organs[2] (as seen in this case).Most lung injuries can be managed conservatively. There is a major debate going on about whether to remove an intrathoracic foreign body or to leave it in situ. To leave a foreign body in the chest is a concern to both the patients as well as their families. Injuries to the visceral and parietal pleura and the lung parenchyma may easily be missed if surgical exploration of the wound is not properly performed. Radiological findings have great importance in identifying these FBs for the help of their removal during surgical intervention. Preoperative imaging studies in the presented case were found to be useful. CT useful in detecting metallic or high attenuation FBs. Sonography may also be a helpful means of investigation in cases of suspicion of non-radiopaque FB. Penetrating thoracic trauma is managed based on hemodynamic status. Intra-thoracic bleeding most commonly manifests as hemothorax in both blunt and penetrating trauma, and a massive hemothorax can lead to hypotension and hemodynamic shock.[1] Bullet injuries are not uncommon in any part of the world. Presenting complaints and also presenting time may differ from patient to patient. A chest drain should be placed at the affected side irrespective of presenting symptoms and the drainage may guide further management.[7] Medical management of gunshot injury must include tetanus prophylaxis, volume resuscitation with blood if blood loss is >20% of blood volume (as done here with 3-4 units of packed RBCs as initial presenting Hb was 9.7 g/dl with normal reference 14-16 g/dl), analgesics and antibiotics. The aim of medical management is resuscitation as well as preparation for surgical management. Immediate Thoracotomy would have been required if the mean total blood output was greater than 1500 mL of initial chest tube(ICD Tube) drainage. Thoracotomy needs to be done if total blood output is >1500 ml/24 hours; regardless of injury mechanism (blunt/penetrating), or if continued hourly blood loss of 250 mL or more for 3 consecutive hours after tube thoracostomy (ICD Tube).[8]. Other indications for thoracotomy after traumatic injury typically include shock, arrest at presentation, diagnosis of specific injuries (such as blunt aortic injury), or ongoing thoracic hemorrhage.[9].

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CONCLUSION:

Successful management of thoracic gunshot injury depends on identification of danger signs, proper resuscitative measures and timely intervention, and not denying thoracotomy when it is required. Immediate intercostal tube placement, volume restoration with blood transfusion, when necessary, antifibrinolytics, antibiotics, and analgesics form the mainstay of management. Whenever possible removal of FBs in the chest is recommended.[10] Other choices like thoracotomy or VATS (video-assisted thoracoscopic surgery) (subjective to availability) may be useful for patients with retention of FBs. There is a certain medicolegal risk if shrapnels or bullets like FBs are forgotten or unremoved. Appropriate surgical exploration and removal is of paramount importance in such cases.

Conflict of interest : NONE

Declarations of interest : NONE

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IMAGE-1:

IMAGE-2:

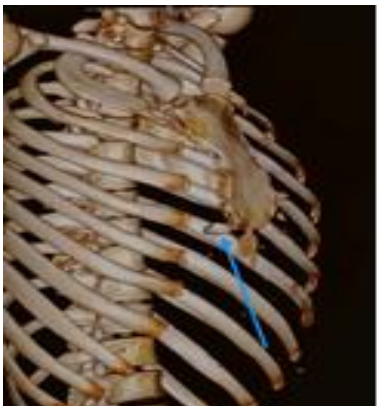

IMAGE-3:

osterior(AP) view of 3D-CT Chest showing FB in the 5 th ICS

Image 2- Lateral view of 3D-CT

Image 3- Removed Bullet pellet