



A Bullet in the Thoracic Wall Following Gun Shot Wound: A Case Report and Review of Literature

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Abstract

Retained Foreign Bodies (FB) in the chest wall following a penetrating chest trauma is rare in children. A rapid and accurate diagnostic work-up and surgical management is important. A 17-year-old boy with a penetrating thoracic wall injury from gunshot wound during a walk on the road is presented in this report. A bullet with high velocity from a gunshot was found to be embedded in the chest wall between ribs 6-7 posteriorly. The direction of the internal bullet path was left to right near midline and during surgical intervention under general anesthesia it was removed from the chest wall. The purpose of this report is to emphasize the characteristics of penetrating thoracic wall trauma in children with special reference to gunshot wounds and the topic is discussed with regard to relevant literature.

Keywords: Chest wall trauma; Gunshot wound; Children

Introduction

Penetrating chest injury is a challenge to the trauma surgeon. High-velocity gunshot wounds producing penetrating thoracic trauma in children may produce diagnostic and therapeutic dilemma for the clinicians dealing with these patients. In contrast to other locations, FBs in thoracic wall after a penetrating trauma in children are scarce. There are numerous variety of FBs in the chest reported previously and include shell fragments, shrapnel, pieces of clothing, bones, rib fragments and a bullet as in the presented case. For a successful surgical management, rapid and accurate diagnostic work-up is paramount. In this report, a 17-year-old boy having an isolated thoracic wall injury from a high velocity gunshot wound is presented. The purpose of this report is to review the presentation, imaging findings and management of thoracic gunshot wounds in children and the topic is discussed with regard to relevant literature.

Case Presentation

After a gunshot wound during a walk on the road, previously a healthy 17-year-old boy with a penetrating thoracic wall injury was admitted to the emergency department. The patient was normal and during the physical examination a penetrating wound with a diameter of 2 cm on the posterior wall of the left hemithorax between the ribs 6-7 which was presumed to be the entry site of the bullet was found (Figure 1). Chest roentgenogram and computed tomography was normal without either hemo-pneumothorax or signs of pulmonary parenchymal injury. A radiopaque FB revealing a bullet was noted in the left hemithoracic wall posteriorly close proximity to vertebral colon and it was easily palpated subcutaneously (Figure 2). For wound exploration and surgical treatment under general anesthesia, the patient was transferred to the operating room. The foreign body was palpated near the midline and 5 cm medial to the entry side of the bullet. A bullet embedded in the intercostal muscles with a length of 1 cm × 2 cm was found which was located between ribs 6-7 posteriorly and was extracted (Figure 3). The visceral and parietal pleura were intact and there was no pulmonary parenchymal injury. Following debridement of the devitalized tissues, primary suture closure of the entry side of the bullet and incision with fine absorbable material was performed (Figure 4). His postoperative recovery was uneventful. With a good post-operative recovery, the patient was discharged home on the first postoperative day.

Discussion

In contrast to other locations, FBs in the chest wall in children are scarce [1]. These reports usually come from adult series and there is no consensus with respect to treatment [2-7]. Literature on the retention of FBs in the chest wall in children after a trauma is rare [1,8]. Penetration of a FB into the chest wall may occur as a result of direct injury to the thoracic wall. Although it is commonly

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Figure 1: The infant with a penetrating gunshot wound on the posterior wall of the left hemitorax. Note the indentation produced by the bullet close proximity to the left midline.

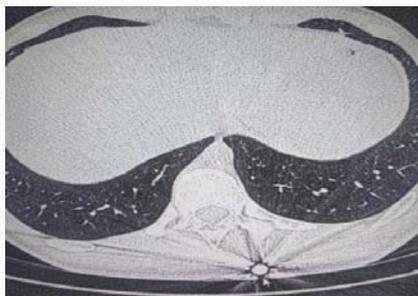


Figure 2: Computed tomography image (arrow) showing bullet in the left thoracic wall.

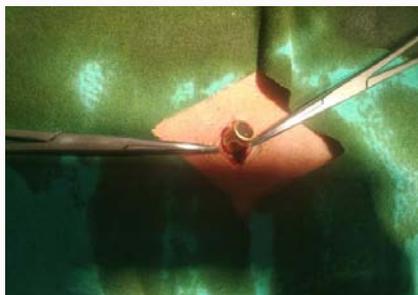


Figure 3: The bullet during removal from chest wall.

suggested that most lung injuries can be managed conservatively, leaving a FB in the chest may be a great concern to both the patients and the families [8-12]. Leaving the FB in chest wall may predispose the patient to a potential infection at future time and for this reason FBs in the chest wall should be removed promptly.

Thoracic FBs are classified into three types according to the cause [13]: These are type-I (Aspiration), type-II (Trauma or accident) and type-III (Iatrogenic). Type-II thoracic traumas may occur after a laceration or an injury by gun or explosion. According to a previous report penetrating wounds of the thorax may induce pneumothorax in 20% of such cases or hemothorax in 60% to 80% [13]. Hopefully neither hemothorax nor pneumothorax was detected in our patient and there was no associated pulmonary parenchymal injury in our patient. In addition the danger of an associated damage to other intrathoracic structures should be kept in mind [14]. There was no injury including the visceral and parietal pleura and the lung parenchyma in our patient and there wasn't either pneumothorax or hemothorax. These injuries may easily be missed if surgical exploration of the wound is not properly performed and so the clinician dealing



Figure 4: Postoperative view after closure of the entry side of the bullet and incision.

with these patients should be aware of this rare entity.

While getting the history from the patient, great attention on the mechanism of injury should be paid. Radiological findings have great importance in identifying these FBs for the assistance of their removal during surgical intervention. Direct roentgenography or CT are useful in detecting metallic and high-attenuation FBs. Preoperative imaging studies in the presented case was found to be useful which demonstrated a bullet that was confirmed postoperatively. In the case of a suspicion of a nonradiopaque FB, sonography may also be a helpful means of investigation. Magnetic Resonance Imaging (MRI) may also be used in detecting long standing FBs may with the formation of a foreign body granuloma.

FB impaction site, the magnitude of symptoms and potential risks is important in deciding whether or not surgery is indicated. It has been suggested that the indications to remove the retained FBs are significant hemothorax, persistent lung collapse, delayed lung collapse, major vascular injury and a bulging mass of unknown nature [8]. Manifestations of sepsis, migration of FB, signs of lead poisoning are other indications of removal of retained FBs. It has been reported that predictors for removal of retained thoracic FBs after penetrating trauma are bullet wounds, female sex, and bilateral chest injury associated with spinal fractures [8].

Conclusion

Penetrating chest injuries especially that due to high velocity gunshot wounds are challenge for health care providers dealing with these patients. Whenever possible, removal of FBs in the chest is recommended. Other choices of surgical interventions including thoracotomy or video assisted thoracoscopy may be helpful for the patients with retention of FBs. This report highlights the unpredictability of a gunshot wound in a child with penetrating thoracic wall trauma with a bullet. Appropriate surgical exploration of the wound is paramount in detecting these FBs. There is certain risk of medico legal problems if these FBs such as bullets or shrapnels are forgotten or unremoved. This clinical entity should be kept in mind in these patients and appropriate surgical intervention is paramount.

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