CASE REPORT

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Thoracic Wall Foreign Bodies Following Penetrating Trauma In Pediatric Age Group: Report of Two Cases With Literature Review

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ABSTRACT

Penetrating chest trauma is rarely seen in childhood. Following penetrative trauma various foreign objects may be detected as embedded in the tissues. A precise and prompt diagnosis together with an appropriate surgical management is paramount in these cases for a good prognosis. Here we present 2 cases with 2 different foreign bodies embedded in thoracic wall following different penetrating thoracic traumas. The purpose this report to critique the properties and handling of penetrative chest wall trauma in children with regard to post-traumatic retained FBs in thoracic wall and the topic is discussed under the light of relevant literature.

Key Words: Chest wall trauma-retained foreign body-children

Introduction

Penetrating chest injury may pose difficulty in diagnosis of these cases for the health provider. Foreign bodies (FB) in thoracic wall after a penetrative injury are scarcely seen in childhood. There is a wide spectrum of foreign objects retained in thorax following a trauma and these include bullets, shrapnel, a piece of wearing, bones, rib particles and glass. Rapid and accurate diagnostic work-up followed by an appropriate surgical management is important. Herein 2 different cases with foreign bodies embedded in thoracic wall following a penetrating thoracic trauma are presented. The other objective of this study is to review the handling of retained thoracic FBs in children and a brief literature review is given.

The study was carried out in compliance with the 1964 Helsinki Declaration and was approved by the ethical committee of Tepecik Training Hospital. The written informed consents from the families of the cases were taken.

Case 1: After a gun shot wound causing a penetrating chest injury, a 17-year-old boy was admitted to the hospital. The history of the patient brought out that he was injured with a gunshot while he was walking on the road. A 2 cm wound in diameter on the left backside of hemitorax was detected during the physical examination. The wound was in between the ribs 6-7 and was regarded as the access point of the cartridge bullet (Figure 1). There were not any findings consistent with hemo-pneumothorax or pulmonary parenchymal injury in imaging studies like chest roentgenogram and computed tomography. An easily palpable radiopaque FB was observed in the left hemithoracic wall adjacent to thoracic vertebrae (Figure 2). Under general anesthesia during surgical intervention a midline rigid object was palpated 5 cm medial and away from to the wound. A bullet located in the intercostal muscles was found and removed (Figure 3). There were no harm to visceral and parietal pleura and pulmonary parenchyme was normal. Devitalised tissues were debrided and closure of the wound and insicion was performed. The postoperative recuperation was eventless.

Case 2: After having a chest injury an 8-year-old boy was admitted to hospital. The history of the patient disclosed that while he was playing in home he suffered a chest injury due to a broken door. Physical examination revealed a wound sized 2 cm on the left anterior hemithoracic wall near to sternum (Figure 4). A radiopaque FB was noted in the left hemithoracic wall in the imaging studies like chest roentgenogram and computed tomography. Luckily no hemo-pneumothorax or pulmonary parenchymal injury accompanied the injury (Figure 5). During the surgical treatment under general anesthesia the entry site of FB on the left hemithorax was widened medially and laterally. A piece of dagger-shaped glass between the intercostal muscles was found with its sharp tip

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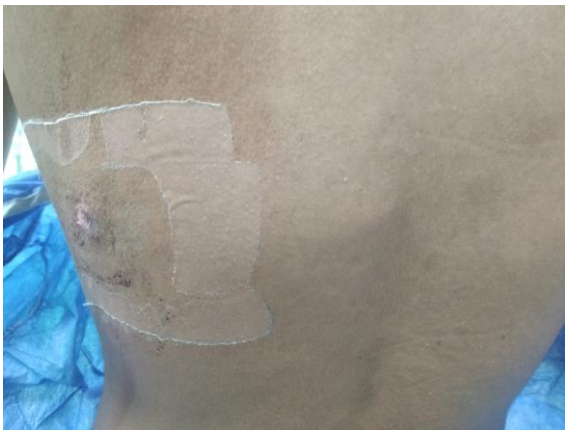

Fig. 1. The infant with a gunshot wound on the posterior wall of the left hemitorax. Note the indentation produced by the bullet close proximity to the left midline

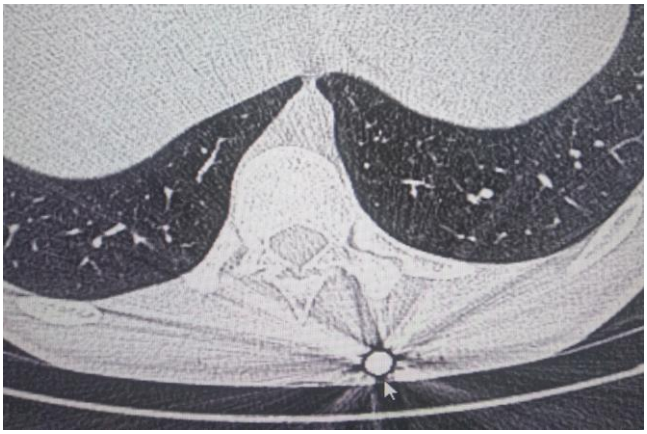

Fig. 2. Computed tomography image (arrow) showing bullet in the left thoracic wall

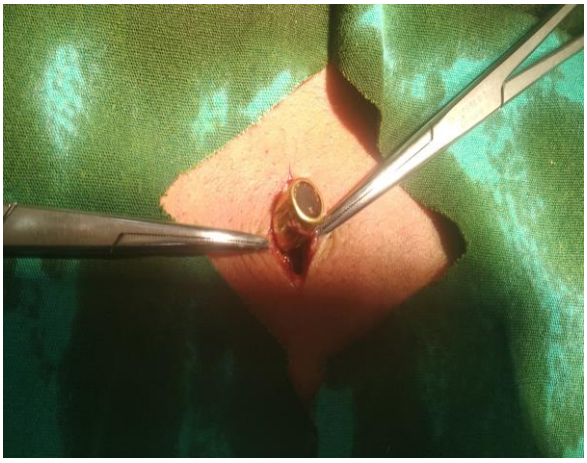

Fig. 3. The bullet during removal from chest wall

Fig. 4. The infant with a penetrating wound with on the anterior wall of the left hemitorax close proximity to sternum

looking downwards located between ribs 2-3 anteriorly and was easily withdrawn (Figure 6). Hopefully the visceral and parietal pleura together with pulmonary parenchyme were found to be intact. Primary closure of the wound was performed. He had an uneventful postoperative recovery.

Discussion

Due to rarity of its occurrence in children, traumatic FB in the chest wall is scarce (1-3). Most of the cases have been reported from adult series and there is no unanimity from the viewpoint of treatment (4-6). These injuries may occur due to direct harm to the chest wall and history taken from the patient should include the mechanism of injury. Despite the notion that conservative management may be possible for most lung injuries, unremoved or forgotten FB following a trauma may produce parental anxiety and a great concern for their children (7-9). To leave the FB in chest wall may produce risk for an infection at future and because of this it has been generally admitted that FBs in the chest wall should be taken away immediately. Open surgical removal of retained thoraciv foreign bodies is paramount. In a recent report video-assisted thoracic surgery was found to be useful in treating 2 cases with retained thoracic foreign bodies following trauma (10). It should be kept in mind that if a proper and careful examination of the wound is not performed these injuries may easily be overlooked.

There are 3 types of thoracic FBs with regard to cause: type-I due to aspiration, type-II traumatic or accidental in origin and iatrogenic FB classified as type-III (11). Type-II traumas are usually seen after a harm caused by a laceration, a gun shot wound or explosion. In a previous report, of patients with penetrating wounds of the thorax, pneumothorax and

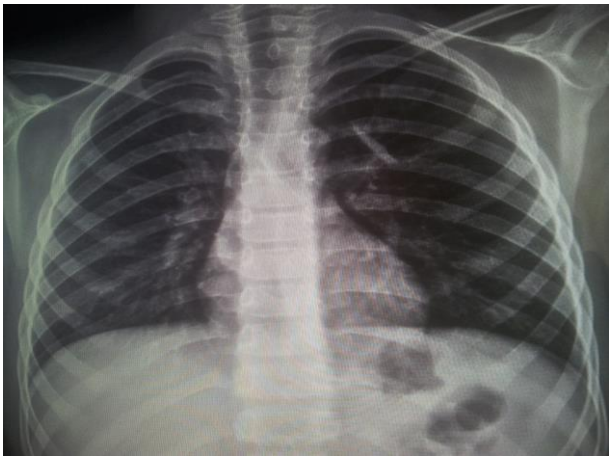

Fig. 5. Posteroanterior radiograph showing the radiopaque FB in the left upper hemithorax

Fig. 6. The dagger-shaped glass after removal from chest wall

hemothorax were seen in 20% and 60% of the patients, respectively (11). Our patients were lucky because they did not face either hemo-pneumothorax or an associated pulmonary parenchyme injury. In addition to these, the attending surgeon should bear the possibility of an accompanying injury affecting other intrathoracic structures (12).

Imaging studies are important in detecting these FBs. Metallic and high-attenuation FBs are easily detected in direct graphy or CT. Preoperative imaging studies in case 1 demonstrated radioopacity compatible with a bullet that was confirmed postoperatively. Despite the common notion that lead-free glass is radioluscent, actually nearly all kinds of glass are radio-opaque (11, 13). Preoperatively the FBs in the presented study in our patients were detected radiologically and were found to be a bullet in case 1 and a dagger shaped glass in case 2 after surgical intervention. Sonography may also be the choice of investigation if there is a suspicion of a nonradiopaque FB. As a response of body to long standing FBs in the chest, a foreign body granuloma may occur following chest trauma and magnetic resonance imaging (MRI) has been proposed in diagnosing these cases but findings on MRI are usually nonspecific (14).

There are numerous factors affecting the decision of surgical management. Some of these are site of impaction, the extent of symptoms and possible risks of surgery inherent. The indications to remove these embedded FBs include serious hemothorax, refractor lung collapse, injury to other vital vascular structures and a bulbous mass with an umbiguous sort (6). Other indications of removal of retained FBs include sepsis, migration of the object and lead poisoning. In a recent study predictors for elimination of embedded thoracic foreign objects included wounds related to bullet, female sex, two-sided chest injury containing spinal fractures (6).

In conclusion, chest hurts of penetrating type may stir up trouble for health professionals facing these patients. Wherever feasible, well accepted recommendation in these cases is the prompt removal of FBs embedded in the chest. Further treatment options include thoractomy or video assisted thoracoscopy. This report emphasizes the unpredictability of 2 different mechanisms of thoracic injuries. These are namely a gun shot wound or a glass injury. In order to detect and safely remove these foreign objects, appropriate surgical exploration of the wound is cardinal. The unavoidable risks including medical and legal problems should be kept in mind if these FBs are forgotten or unremoved. The physicians and radiologists should be aware of this entity and appropriate surgical intervention is paramount necessity.

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