



Case Report

PNEUMOTHORAX AND PNEUMOPERITONEUM CAUSED BY PENETRATING CHEST INJURY

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Abstract

Pneumothorax and pneumoperitoneum caused by penetrating chest injury are rare. Pneumoperitoneum following trauma usually indicates the presence of a perforated intraabdominal hollow viscous. Other causes of pneumoperitoneum are through the abdominal wall, through the diaphragm, through female genital tract and through retroperitoneum.

Here we report an unusual case of pneumothorax and pneumoperitoneum caused by penetrating injury in the posterior aspect of chest in a young male patient of 33 years who presented to us with chest & abdominal pain & breathlessness. The diagnosis was made on clinical & radiological examination. Tube thoracostomy was done followed by laparotomy and repair of diaphragmatic & splenic injury. Post operative recovery was uneventful & the patient was discharged on 9th p.o.d after removal of thoracostomy tube & wound stiches.

Keywords: Pneumothorax, Pneumoperitoneum, Thoracostomy, Laparotomy.

Introduction

The chest serves the important functions of respiration & of protection of the vital intrathoracic & upper abdominal organs from externally applied force and is composed of the rigid structure of the rib cage, clavicles, sternum, scapulae & heavy overlying musculature. Penetrating chest injuries are generally less common but more deadly than blunt chest injury. Approximately 10%-14% of penetrating chest injuries require emergency surgery¹ i.e. thoracotomy.

Pneumothorax is a common complication of penetrating thoracic trauma. It results from free air into the pleural cavity. There are three types of pneumothorax. Simple, communicating or open and tension pneumothorax. Simple pneumothorax does not result in shift

of the mediastinum or change in the hemi diaphragm.

Pneumoperitoneum following trauma usually indicates the presence of a perforated intraabdominal hollow viscous and the need for laparotomy². Other causes of pneumoperitoneum are through the abdominal wall, through the diaphragm, through female genital tract and through retroperitoneum³.

Here we present a case of penetrating chest injury where left lung, left dome of diaphragm and spleen are injured causing pneumothorax and pneumoperitoneum.

The purpose of this issue is to provide awareness about abdominal visceral injury which may be undiagnosed due to upper thoracic injury.

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Case Report

A 33 years old male patient was assaulted and stabbed by his cousin with a pointed rod to the back of the chest. He was brought to the emergency department of Jahurul Islam Medical College Hospital after approximately 12 hours of injury. Before that he was treated conservatively and had a stitch on his wound at another hospital. During admission he had pain in the chest and abdomen with breathlessness.

The patient looked anxious and his BP was 110/80 mm of Hg, Pulse rate 90/min, respiratory rate was 30/min and his temperature was high.

A thorough physical examination revealed there was a penetrating injury in the back of the left chest near the inferior angle of scapula which was about 1cm in diameter, tenderness was found around the wound but no active bleeding was detected. There was no crepitus or subcutaneous emphysema.



Site of Penetration of rod Site of Penetration of rod



Thoracoabdominal CT showing Pneumothorax & Pneumoperitoneum

Examination of the respiratory system showed movement of the chest was reduced on the left side. There was hyper resonance in the left side with diminished breath sound.

Examination of abdomen found it was distended, there was rigidity and tenderness in the abdomen and obliteration of liver dullness was detected.

X-ray chest revealed pneumoperitoneum with left sided pneumothorax and basal consolidation. But no bony lesion was detected. Trachea was central & there was no mediastinal shifting.

CT of abdomen and chest showed pneumoperitoneum and left sided pneumothorax, bilateral pleural effusion and basal consolidation. Abdominal Ultrasonography demonstrated left sided pleural effusion.

The Laboratory examination was unremarkable except for polymorphonuclear leucocytosis.

After resuscitation patient was taken to the operation theatre where under general anaesthesia with endotracheal intubation tube thoracostomy was done on the left side by placing a 40 French chest tube. At laparotomy, grade-1 injury in the spleen and a small perforation in the left hemi diaphragm were detected.

Diaphragmatic injury was repaired and splenorrhaphy was done. Abdomen was closed in layers keeping a drain in situ. The patient's vital signs, abdominal and thoracic conditions were monitored daily and the collection in the chest and abdominal drains were observed. The patient was improved gradually uneventfully and the abdominal drain was removed on the 4th POD. On 7th POD control chest x-ray was done and chest drain was removed and patient was discharged on 9th POD after removal of the abdominal and chest wound stitches.

Discussion

Penetrating thoracic injury is potentially serious. Some of the common injury pattern observed includes chest wall injuries, pneumo and hydrothorax, pulmonary laceration, pulmonary contusion, tracheobronchial injuries, cardiac injuries, diaphragmatic injuries, oesophageal injuries, injury to the great vessels and injury to the abdominal viscous⁴.

Among these pneumo and hemothorax are particularly common and intercostal chest tube placement is the most common intervention.

If the initial bleeding through the chest tube is 1500ml or 200ml/hour for 2-4 hours, then emergency thoracotomy should be considered⁵.

The cause of pneumoperitoneum and the clinical signs determine its mode of treatment- surgical or not. When sign, symptoms of acute abdomen (local peritonitis, pyrexia, leucocytosis) are present, surgical management is mandatory. But in case of non surgical pneumoperitoneum with mild symptoms and without any sign of peritonitis, conservative treatment is indicated⁶.

Recently laparoscopic exploration instead of laparotomy can be the operation of choice in cases of pneumoperitoneum because it can both determine and treat the cause offering all the advantages of minimally invasive surgery⁷.

Most of the diaphragmatic injuries are occult when associated with penetrating trauma but there is potential for late herniation⁸ resulting pulmonary compromise or strangulation of abdominal contents and includes a mortality rate of up to 36%⁵.

As the x-rays are non specific for diagnosis of diaphragmatic injury, a missed diaphragmatic injury and subsequent morbidity can be minimised by immediate laparotomy for all patients with abdominal or low thoracic penetrating injury.

The surgical approach to the diaphragmatic injuries is individualized. Acute left sided injuries are best approached through abdomen. Acute right sided injuries and all chronic injuries should be approached through the chest⁹.

Another option for diagnosis of diaphragmatic injury is video assisted thoracoscopic surgery¹⁰.

Conclusion

Penetrating chest injury causing pulmonary, diaphragmatic and abdominal visceral injury is uncommon. Pneumoperitoneum in the absence of hollow viscous perforation is also uncommon and even rarer when caused by low impact traumatic pneumothorax without concomitant abdominal trauma. A thorough physical examination and laboratory and radiological findings are useful tools for surgical intervention or conservative management.

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