

MASSIVE DIAPHRAGMATIC HERNIA FOLLOWING TUBE THORACOSTOMY

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ABSTRACT

A case of iatrogenic diaphragmatic rupture with a large hernia including bowel loops, omentum and spleen following tube thoracostomy (TT) is reported. The tube perforated the diaphragm and entered abdominal cavity. Low insertion of the tube in 9th intercostal space, inappropriate surgical technique and choice of chest tube were the reasons for this complication. In this report an early diagnosis and treatment of this rare complication of chest tube insertion are emphasised.

Key words Tube thoracostomy, Diaphragmatic rupture, Traumatic diaphragmatic hernia.

INTRODUCTION:

Incidence of diaphragmatic hernia following tube thoracostomy is rare and often remains undiagnosed.¹ Chest tubes are widely used with good results in blunt traumatic chest injuries. Complications of chest tube insertion are infrequent and include laceration of intercostal vessels and the lung, intrapulmonary or extra-pulmonary thoracic placement of the chest tube, and infection; however rupture of diaphragm is a rare occurrence.² We report this complication and discuss diagnosis, treatment and techniques to avoid it.

CASE REPORT:

A 35 year old gentleman was brought to accident and emergency department with history of sudden onset of breathlessness. He was taken to the local hospital where a chest tube was inserted in the left 9th intercostal space along the posterior axillary line after a diagnosis of spontaneous pneumothorax was made. He was later referred to our institution as his condition was not improving. On examination he was conscious, oriented and not in any obvious distress. His pulse rate was 120 per minute and his blood pressure 110/80mm of Hg. He was maintaining oxygen saturation of 97% on room air. An Intercostal tube was already in place in the left 9th intercostal space. Chest movements were equal on both sides.

Diminished breath sounds with occasional crepitations were auscultated in the left inframammary region. Bowel sounds were present in the lower and mid zones of left hemithorax. Abdomen was soft, non tender with normal bowel sounds. Chest x-ray showed elevation of left hemidiaphragm with bowel loops in left chest (Fig I). Spleen was not visualised on ultrasound abdomen. Computerised tomography of the chest revealed the chest tube to be in left subdiaphragmatic area, a diaphragmatic hernia with bowel loops in the chest (Fig II).



Fig I: Scanogram showing bowel loops in the chest cavity

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The patient was taken up for an emergency exploratory laparotomy and it showed that the chest tube was placed in the peritoneal cavity. The tube was a large bore Malecot catheter which entered the



Fig II: Left lateral chest x-ray showing tube in the abdomen

pleural cavity, pierced the diaphragm and ended up in the peritoneal cavity, close to spleen and splenic flexure of colon. The tube had caused a rent in the diaphragm measuring about 5cmx5cm in diameter. Omentum was also seen entering the pleural cavity through this rent. The rent in the diaphragm was closed with No.1 polypropylene with horizontal mattress sutures. A 28Fr PVC chest tube was placed in the 4th intercostal space. Patient had an uneventful recovery and the chest tube removed on the 3rd postoperative day (POD) and the patient discharged on the 8th POD.

DISCUSSION:

Tube thoracostomy is a life saving procedure and a skill that every surgeon should have in his armamentarium.³ However this procedure has its own complications.^{4,5} Diaphragmatic perforation due to chest tube insertion causing diaphragmatic hernia is a complication seldom reported.² Traumatic diaphragmatic hernia is a frequently missed diagnosis and there is commonly a considerable delay between trauma and diagnosis. A high index of suspicion, together with the knowledge of the mechanism of trauma are the key factors for the correct diagnosis.²

A large-bore (36-40 Fr) chest tube should be used in adolescents and adult patients for tube thoracostomy. The proper site of insertion is in the fifth or sixth intercostal space in the midaxillary line. The index finger should be inserted into the pleural space before tube placement to ensure that the pleural cavity has been entered and is free of adhesions and that any intra-abdominal organs have not herniated through the diaphragm.² It is important to emphasise that a trocar should never be used to insert a chest drain.⁵

A low insertion of the chest tube and probably a hurried procedure by an emergency physician without taking adequate precautions, might have been the factors leading to this complication in our patient. An emergency laparotomy using a midline incision is ideal for acute diaphragmatic rupture. Diaphragmatic hernia secondary to iatrogenic injury to the diaphragm is an avoidable complication.

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