

A Case of a Diaphragmatic Rupture Complicated With Lacerations of Stomach and Spleen Caused by a Violent Cough Presenting With Mediastinal Shift

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Abstract

Introduction: Diaphragmatic rupture is a clinical case that is mostly seen following a blunt thoracoabdominal trauma or is rarely reported as spontaneously induced by various factors. **Clinical Picture:** A 28-year-old man presented as an emergency with shortness of breath and severe abdominal pain following a violent cough. His chest radiography and computed tomography demonstrated left diaphragmatic rupture, mediastinal shift and herniation of gastric fundus into the pleural cavity. **Treatment:** Left thoracotomy for the replacement of herniated gastric fundus and median laparotomy for the repair of serosal layer of gastric fundus and a diaphragmatic gap were performed. **Outcome:** He made an uneventful recovery. **Conclusions:** Diaphragmatic ruptures may be caused by violent coughing with serious life-threatening complications.

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Introduction

Diaphragmatic rupture is a recognised consequence of high-velocity blunt trauma to the abdomen and chest and also has been reported in 0% to 5% of thoracoabdominal trauma patients. The diagnosis is often difficult and delay in diagnosis is implicated in increased morbidity and mortality.¹⁻⁴ Hereby, we present a case with diaphragmatic rupture following a violent cough.

Case Report

A 28-year-old man was brought to the emergency department from a peripheral hospital with an initial diagnosis of left lobe pneumonia due to a 48-hour history of severe shortness of breath, and abdominal pain that had progressively worsened, resulting in violent coughing. He had no prior history of abdominal or chest trauma. The patient had a medical history of chronic obstructive pulmonary disease (COPD). He was a heavy smoker. On admission, pulse was 110/min, blood pressure 140/90 mm Hg, temperature 37.6°C, respiration 42/min and O₂ saturation was 60% in arterial blood analysis. The abdomen was minimally distended, defense was positive, and rebound was negative. The initial chest radiogram

demonstrated a suspicious visualisation of pneumonia. His chest radiographs demonstrated a left diaphragmatic rupture and immediately afterwards a left mediastinal shift whereas a thoracoabdominal computed tomographic scan showed the abdominal viscera (gastric fundus) occupying the left hemithorax (Figs. 1 and 2) in the following hours. He deteriorated and immediately underwent a left thoracotomy. Perioperatively, the left hemidiaphragm was found to have ruptured, with a nearly 15-cm gap, laceration of serosal layer of gastric fundus and capsular tear of the spleen. The strangulated stomach was placed back in the abdomen and serosal layer was repaired primarily. Capsular tear of the spleen was stopped with compressing. The ruptured diaphragm was surgically repaired with polypropylene mesh from a superior median laparotomy. The patient made a full recovery and remains symptom-free 6 months later.

Discussion

The most common cause of diaphragmatic rupture is reported to be trauma, though different percentages have been cited in studies.¹⁻⁶ Seven per cent of thoracic injuries and 22% of thoracoabdominal injuries are associated with

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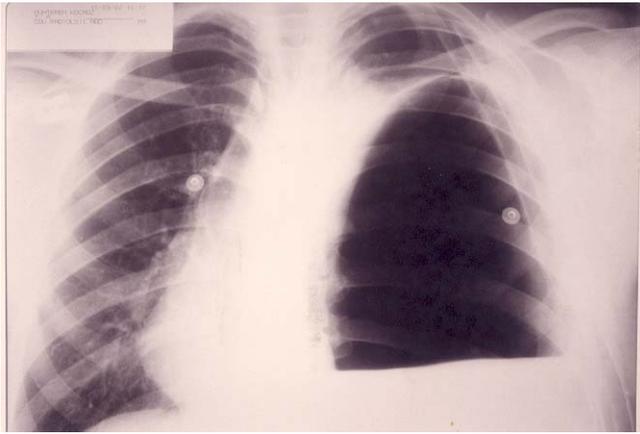


Fig. 1. Chest radiograph of the patient demonstrating left mediastinal shift prior to surgical intervention.

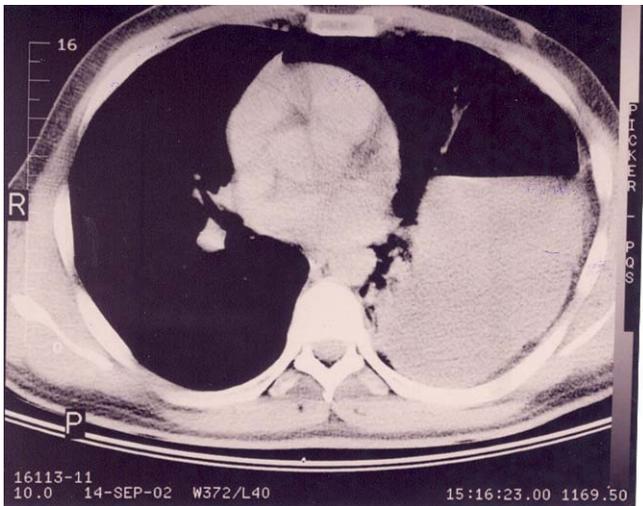


Fig. 2. Computed tomographic scan of the chest showing a rupture of the diaphragm with gastric fundus.

diaphragmatic injury and left-sided ruptures are 5 times more common than right-sided injuries.⁶ Our case presented a left-sided rupture of the diaphragm with no history of trauma.

The cough is a vital defense mechanism in the protection of airways from foreign materials.⁶ Various complications have been associated with coughing; including syncope,

the rupture of subconjunctival, nasal and anal veins, bradycardia, pneumomediastinum, pneumothorax, incontinence, the herniation of the lung through the intercostal space, and fracture of the ribs.⁶⁻⁸ As clearly explained in the case report of George et al,⁶ during the forced respiratory movements, the muscles of the abdominal wall contract, pushing the diaphragm upward and the ribs inward and downward. A sudden and forceful Valsalva manoeuvre can result in the lack of coordination of the different muscles used in expiration and this can contribute to the rupture of the diaphragm.^{6,9,10} Our patient had paroxysmal coughing as a result of COPD and caused a rupture of the diaphragm presenting with a mediastinal shift requiring surgical intervention.

Finally, this case report indicates that problems remain in the diagnosis of diaphragmatic rupture and it may cause life-threatening complications. It should be also kept in mind that violent coughing may sometimes cause a diaphragmatic rupture with complicating intraabdominal viscera lacerations.

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