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## Case Report

### Delayed presentation of blunt traumatic diaphragmatic hernia: A case report

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#### Abstract

Blunt traumatic diaphragmatic rupture is an uncommon but severe problem that is usually seen in poly-traumatized patients. Diagnosis is often difficult resulting in delayed presentation and increased morbidity. We report a case of blunt traumatic diaphragmatic hernia in a 39-year-old man presenting 10 years after the initial abdomino-thoracic injury sustained in a road traffic accident. He had herniation of the spleen and stomach. Through a left thoracotomy, the herniated organs were reduced and diaphragmatic defect closed with interrupted nylon sutures. A high index of suspicion would minimize the morbidity and mortality associated with delayed diagnosis.

Keywords: Trauma, diaphragmatic hernia, delayed presentation

#### Introduction

Blunt traumatic rupture of the diaphragm is a serious injury that is often difficult to diagnose<sup>1</sup>. It is an uncommon injury<sup>2</sup> whose incidence is rising because of the increasing number of road traffic accidents in the last few years, together with better pre-hospital and hospital resuscitation of severely injured patients and improved diagnostic facilities<sup>3</sup>. In developing countries where initial care of severely injured patients and diagnostic facilities are less than optimal, blunt traumatic diaphragmatic rupture (BTDR) may go undiagnosed. Reported cases<sup>2,4,5</sup>, constitute only a small fraction of the problem. We report a case of delayed presentation of blunt traumatic diaphragmatic hernia and reviewed the literature to highlight challenges in diagnosis and management of such cases.

#### Case Report

A 39-year-old man presented to us in September 1997 with a 3-year history of dyspepsia and a 5-month history of left sided chest pain. Pain was constant and dull in nature. There was no cough but had dyspnoea on exertion. No orthopnea and no paroxysmal nocturnal dyspnoea. He was involved in a motor vehicle accident 10 years prior to presentation during which he sustained blunt injury to the abdomen and chest with fracture of the left 8th-11th ribs associated with haemothorax. He was then treated with closed chest tube drainage.

Clinical examination revealed a healthy looking young man who was not pale and not in respiratory distress. There was mild tenderness over the left 6th-

8th ribs, decreased air entry on the left hemi thorax and audible bowel sound over the left anterior chest wall up to nipple line. He also had mild epigastric tenderness. A working diagnosis of left diaphragmatic hernia was entertained. Plain chest x-ray was reported as an "elevated" left dome of the diaphragm with cystic shadow "under" the dome. A radiological diagnosis of diaphragmatic tear with hernia was made to rule out loculated pneumothorax (Figure 1). Barium meal done to localize the stomach and fundus of the stomach revealed an intra-thoracic esophago-gastric junction confirming diagnosis of post-traumatic diaphragmatic hernia (Figure 2). Patient was counseled and prepared for a left thoracotomy which he had via the fifth rib bed under general anaesthesia. The findings at surgery were intra-thoracic fundus of stomach, spleen and adhesions with a 10cm rent in the left hemi-diaphragm extending laterally from the oesophageal hiatus. The stomach and spleen were carefully dissected free from the lung and reduced into the abdominal cavity. Diaphragmatic defect was repaired using interrupted nylon sutures. A chest tube was placed and the wound closed in layers. He received two units of whole blood transfusion. He was managed in the intensive care unit for the first three postoperative days. His recovery was uneventful and he was discharged on 10th postoperative day. He has remained well 6 years after surgery.

## Discussion

Road traffic accident remains the leading cause of BTDR in most reported cases<sup>2-5</sup>. Falls from height and violent attacks are other causes. Fundal pressure during labour had been reported as a rare cause of BTDR in a 49-year-old lady presenting over 26 years later<sup>6</sup>. Blunt diaphragmatic rupture commonly occur in poly-traumatized patient<sup>7,8</sup>. The mechanism is sudden rise in intra-abdominal pressure from blunt trauma with a closed glottis<sup>2</sup>. In most cases, early symptoms are missed and the injury may be detected only at exploratory laparotomy for other suspected intra-abdominal organ injuries. In the post-traumatic period, presenting symptoms are usually due to herniation of intra-abdominal organs such as stomach, omentum, intestines, spleen and liver into the thoracic cavity<sup>3,4</sup>. Hence, patients may experience chest pain, recurrent shortness of breath and gastro-intestinal symptoms such as nausea and vomiting, epigastric discomfort or abdominal pains. Bowel sounds may also be heard in left-sided hernia associated with bowel loops in the chest. Because of the difficulty in diagnosis, a variable percentage of cases between 9.5 to 60% are diagnosed late<sup>7</sup>. Delayed diagnosis on the left side could result in gastric incarceration and perforation and could even present with a gastro-pleuro-cutaneous fistula<sup>2</sup> especially when there were associated rib fractures with pneumothorax and/or haemothorax treated with tube thoracostomy. Our patient presented late with left-sided chest pain associated with tenderness over 6th to 8th ribs. He also had dyspeptic symptoms that may not be unrelated to the gastric herniation. This resolved after surgery without medical treatment. Chest x-ray may reveal bowel gas in the pleural space<sup>8</sup>. Other plain radiograph findings that may suggest possibility of diaphragmatic rupture include abnormalities such as multiple lower rib fractures, haemothorax, and pneumo-peritoneum<sup>8</sup>. Herniation of the stomach may present as elevation of dome of diaphragm with fluid level 'below' it or 'sub-diaphragmatic abscess'<sup>9,10</sup>. Initial chest radiograph in our patient suggested a subphrenic abscess to rule out a loculated pneumothorax (Figure 1). Barium meal usually

confirms presence of cardia and fundus of stomach above the diaphragm. When BTDR occurs without herniation, diagnosis becomes even more difficult. Hence CT scan and magnetic resonance imaging (MRI), which yield better result than standard chest radiograph<sup>9</sup>, may be necessary for preoperative diagnosis. With intra-thoracic herniation of abdominal contents, 'collar' sign which is waist like constriction of bowel, and/or 'dependent viscera' sign which refers to contact between stomach or bowel with posterior left ribs or contact between upper third of the liver with posterior right ribs may be observed<sup>11</sup>. The sensitivity of 'dependent viscera' sign in a series of 28 patients with acute BTDR was reported to be 90% overall; 100% in left sided diaphragmatic rupture<sup>10</sup>. In a report<sup>12</sup> of seven patients with BTDR diagnosed by ultrasound, the direct sonographic features were disrupted diaphragm in four patients, non-visualized diaphragm in three; floating diaphragm in two and herniation of liver or bowel loops through the diaphragmatic defect in three patients. Indirect features were pleural effusions, subphrenic fluid collection and splenic laceration. The focused abdominal sonogram for trauma (FAST) technique now being used in the evaluation of patients with blunt thoraco-abdominal trauma, could assist in the early detection of BTDR<sup>13</sup>. Treatment of BTDR is surgical via laparotomy or thoracotomy. Acute cases are better managed via a laparotomy as this also rules out and treat associated intra-abdominal organ injuries. Delayed cases, however, are better treated via a thoracotomy or thoraco-abdominal approach because of intra-thoracic adhesions<sup>2</sup>. Our patient had thick fibrous adhesions between the stomach, spleen, lung and pleural surfaces. Recently, laparoscopic and thoracoscopic approaches have been used to treat BTDR not associated with intra-abdominal organ injuries<sup>14,15</sup>. Repair of diaphragmatic defect is usually achieved with interrupted non-absorbable sutures like nylon and prolene in a single or double-layered fashion<sup>8</sup>. Mesh repair is used for large defect<sup>15</sup>. This case report demonstrates the morbidity that could follow delayed diagnosis of BTDR. High index of suspicion and the use of relevant radiological investigation should result in early diagnosis

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**Figure 1:** Plain chest radiograph of delayed presentation of blunt traumatic diaphragmatic rupture suggesting an 'elevated' left dome with 'subphrenic collection' or a 'loculated pneumothorax'.

**Figure 2:** Barium meal studies confirming intra-thoracic cardia and fundus of the stomach.