

Traumatic Diaphragmatic Hernia: A Case Report

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Abstract

A traumatic diaphragmatic hernia is caused as a result from blunt or penetrating trauma and occurs in about 5% of cases of severe blunt trauma to the trunk. Early diagnosis of traumatic diaphragmatic hernia is necessary to decrease morbidity and mortality associated with it. This case report describes the case of 18-year-old male who had an accidental fall from the tree and had a diagnosis of traumatic diaphragmatic hernia. On physical examination, upper abdomen is tender left hypochondrium is tender breath sounds over left half of chest are not heard, and bowel sounds are heard. Thoracoabdominal X-rays and computerized tomographic imaging have demonstrated multiple gas shadows in the left side of thorax with collapse of the left lung. Laparotomy and exploration revealed a diaphragmatic tear of size 15 cm with herniation of stomach, transverse colon, spleen, and omentum.

Key words: Diagnosis, Diaphragm, Hernia, Trauma

INTRODUCTION

Diaphragmatic rupture occurs due to blunt or penetrating injury, which would be either as an acute presentation or delayed as respiratory distress or obstruction.¹ The course of events following disruption varies highly.² This overshadowing injury to the bony skeleton, lungs, central nervous system, or abdominal viscera may obscure a diaphragmatic problem in the immediate post-traumatic period.³ The manifestation of diaphragmatic injury that represents first is delayed occurrence of visceral strangulation. The most serious complication of a diaphragmatic hernia is strangulation, and the occurrence of symptoms of intestinal obstruction or pulmonary compression in a patient with a recent or old wound of the chest or upper abdomen should arouse suspicion. Inadequacy of surgical diagnosis and management may be due in part to the relative infrequency of diaphragmatic rupture. However, early recognition and prompt surgical treatment appears to be within the capability of surgeons.⁴

It can be managed through a laparotomy or a thoracotomy³ and in the current scenario with minimal access surgery.

CASE REPORT

The 18-year-old male presented to the emergency room (ER) with complaints of dyspnoea at rest, orthopnoea and pain in the left upper abdomen due to fall from tree and blunt trauma to the abdomen. Examination revealed the presence of bowel sounds over the left thorax and normal bowel sounds in the abdomen and decreased breath sounds on left hemi thorax.

A plain X-ray taken in the ER showed bowel loop shadows in the chest (Figure 1a and b).

The patient was then stabilized in ER and later shifted for a computed tomography (CT) of thorax and abdomen which showed herniation of the bowel loops through the left hemi diaphragm. Mediastinal shift to the right and there was little lung field visualized on the left chest was observed. Diagnosis of diaphragmatic hernia was made.

After stabilization, patient was shifted to operation theatre with high-risk consent. Exploratory laparotomy revealed a diaphragmatic tear of size 15 cm × 12 cm with herniation of stomach, transverse colon, spleen, and omentum into the thoracic cavity. Contents (Figure 2a-c) are reduced,

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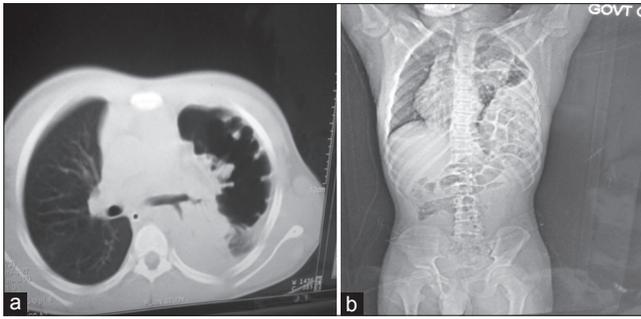


Figure 1: (a and b) Computerised tomographic chest showing bowel gas shadows in left hemithorax

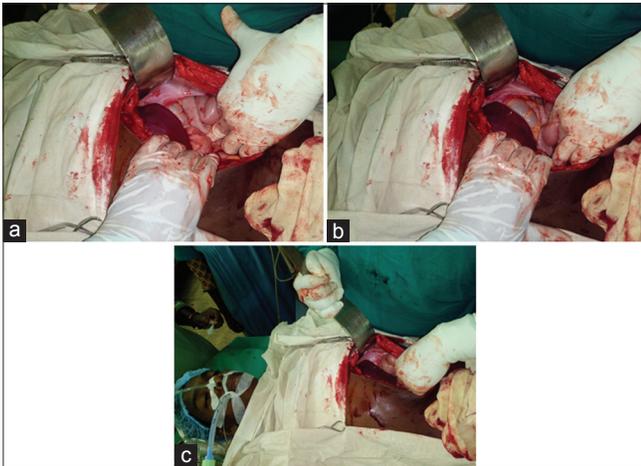


Figure 2: (a-c) Intraoperative pictures showing the defect and contents

and defect is closed with proline mesh. Lung tissue was compressed that did not expand even after reduction of a hernia. Then, a left thoracic drain was placed, and abdomen is closed after ensuring the rest of abdomen was normal.

DISCUSSION

Incidence

Diaphragmatic injury accounts for about 0.8-1.6% of blunt trauma abdomen. Nearly about 4-6% of patients who undergo surgery for trauma have a diaphragmatic injury.²

Etiology

The major cause of diaphragmatic injury is either by penetrating or blunt injuries to the abdomen. They are mostly diagnosed as part of multi-organ injury, or later either with respiratory distress or as intestinal obstruction.⁵ Shearing of a stretched membrane, the sudden force transmission through viscera acting as viscous fluid and avulsion at the point of diaphragmatic attachment is considered as possible mechanism in blunt injury. The most common injuries occur on left side, of about 68.5% of the patients and right side injuries accounts for 24.2%, and 1.5%

had bilateral rupture, 0.9% had pericardial rupture, and 4.9% were unclassified in the present collective review.⁶ Many autopsy studies have revealed that incidence of rupture is almost equal on bilateral sides, but the greater force needed for the right rupture is associated with more grave injuries. A positive pressure gradient of 7-20 cm of H₂O between the intraperitoneal and the intrapleural cavities forces the contents into the thorax. With severe blunt trauma, the pressures may rise to as high as 100 cm of water.⁷⁻⁸

Clinical Features

The patient with a diaphragmatic rupture often presents to surgeon with symptoms of breathlessness, which is been mistaken as bronchopneumonia. Abdominal signs due to obstruction may be another mode of presentation. The grading of severity has been proposed by Grimes who discussed diaphragmatic rupture in phases- acute, latent and the obstructive phase.⁷

The acute presentation is in the patient with poly trauma associated with multiple intra-abdominal and chest injuries. The latent phase is when herniation occurs through undetected diaphragmatic ruptures and rents. The obstructive phase is when the loop of herniated bowel obstructs, and the patient develops distension and strangulation.⁹

Investigations

An X-ray is diagnostic when the nasogastric tube is seen in the chest. The collar sign is seen when abdominal contents are seen in the thorax with or without focal constriction. Elevation and distortion of the hemi diaphragm are corroborative signs. A CT thorax has a sensitivity of 14-82% and a specificity of 87% and permits direct visualization of the contents and the rupture. Focussed abdominal sonography for trauma is now a good aid in diagnosing diaphragmatic hernia.

Management

When a diagnosis of diaphragmatic rupture is suspected in a patient with poly trauma, military anti-shock trousers are contra-indicated as it could cause severe cardiopulmonary deterioration. The patient is stabilized and taken up for emergent surgery. While controversies exist between laparotomy and thoracotomy-laparotomy is preferred as this is often associated with other abdominal injuries.¹⁰ In the series of 15 patients who underwent initial thoracotomy, 7 required laparotomy for associated injuries as against one in 65 that required thoracotomy after laparotomy. Minimally invasive procedures (abdominal and thoracic) are now-a-days preferred in small defects detected early. Laparotomy remains the gold standard in large defects. While simple suture is sufficient in the former, larger defects need a synthetic mesh.¹¹⁻¹²

CONCLUSION

Knowledge of diaphragmatic hernia is essential for both the physician and the surgeon in atypical abdominal and respiratory discomfort, especially when there is history of trauma. This hernia is amenable to correction by minimal access surgery and requires a prompt diagnosis aided by a high index of suspicion.

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