Diaphragmatic Hernia: An Uncommon Cause of Dyspepsia

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ABSTRACT

Adult onset diaphragmatic hernia is a rare condition with variable clinical manifestations. The majority of adult-onset diaphragmatic hernia is associated with trauma. Blunt thoracic and abdominal trauma associated with a 5% to 7% incidence of diaphragmatic injury, and in 3% to 15% for those with penetrating injury. These injuries may be left unrecognized when they occur but often are uncovered months later during work up for related symptoms. Prompt diagnosis and surgical repair is recommended by most authorities. Traditionally, diaphragmatic hernia is repaired by laparotomy or thoracotomy, or both. Herein, we report a case of adult onset diaphragmatic hernia presented with dyspepsia that was successfully repaired via laparoscopy. Operative approach and technique of diaphragmatic defect closure is elucidated.

Key Words: Hernia, Diaphragmatic hernia, Laparoscopy.

INTRODUCTION

Dyspepsia is a common gastrointestinal symptom. Occasionally, a chest radiograph may uncover some uncommon chest pathology. Adult onset diaphragmatic hernia (DH) is a rare condition with variable clinical manifestations. Surgical repair is mandatory to prevent its potential devastating morbidity and mortality. Traditionally, DH is repaired by laparotomy or thoracotomy, or both. With the recent advent of minimally invasive surgery, laparoscopic repair has become feasible. Herein, we report a case of adult onset diaphragmatic hernia that was successfully repaired via laparoscopy.

CASE REPORT

A 27-year-old female presented with a 4-day history of epigastric discomfort, which was associated with repeated vomiting. Physical examination and laboratory investigations were unremarkable. The initial chest radiograph on admission showed a large air-fluid level in the left thoracic cavity (Figure 1). A chest radiograph performed 2 years earlier was normal. She did not recall any event of significant trauma before admission.

The patient received no nourishment by mouth, and the stomach was decompressed by nasogastric tube aspiration. Computed tomography (CT) of the thorax and abdomen revealed disruption of the left diaphragm with herniation of the stomach and small intestine into the left thoracic cavity, and also a left lower lobe atelectasis was present. A contrast meal and follow-through revealed a wide-neck left diaphragmatic defect with herniation of the stomach (the fundus and body) and also the splenic flexure of the colon and its omentum had herniated.
though this defect (Figure 3). Only mild intrathoracic adhesion was present, and the herniated contents were reduced to the abdomen without difficulty. The size of the defect was 8 cm by 6 cm. This defect was closed primarily with interrupted 1/0-nylon suture by laparoscopic suturing. The repair defect was buttressed by a Gore-Tex DualMesh (Gore-Tex DualMesh, W. L. Gore & Associates, Inc, USA), which was secured with Tacker Helical Fasteners (Tyco Health Care, Ltd, USA) (Figure 4). A chest drain was inserted to the left thoracic cavity at the end of the procedure. Minimal intraoperative bleeding occurred, and the total duration of the operation was 95 minutes.

The nasogastric tube was removed the day after the operation. The chest drain was removed, and eating was resumed on postoperative day 2. A chest radiograph showed that the left lung was fully re-expanded. Only 1 intramuscular injection of 50-mg pethidine was required for pain control. The patient was discharged 4 days after the operation. She remained symptom free 1 year after the operation, and no evidence of recurrence exists on chest radiograph.

**DISCUSSION**

In our case, the chest radiograph with air-fluid level in the left thoracic cavity alerted us to the suspicion of DH, and the diagnosis was subsequently confirmed by CT scan and contrast meal. The diaphragmatic defect of our patient was located at the dome of the left diaphragm, which differed from Bochdalek’s or Morgagni’s type of hernia. This case was likely a delayed manifestation of occult diaphragmatic injury.

The majority of adult-onset DH is associated with trauma. The incidence of diaphragmatic injury occurs in up to 7% in those who suffer blunt abdominal/thoracic trauma and in 3% to 15% for those with penetrating injury.1 Other causes of adult DH include delayed presentation of congenital DH; iatrogenic injury during abdominal or thoracic surgery; as a consequence of persistent infection (pneumonia, empyema); and also stress on the diaphragm from straining/coughing have been reported. These patients may present with a spectrum of symptoms and signs, ranging from minor chest/epigastric discomfort as in our case to major respiratory distress and intestinal obstruction from strangulation of the herniated contents. The latter group is associated with a mortality rate of over 80%.

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**Figure 1.** Initial chest x-ray showed air fluid level in left thoracic cavity.

**Figure 2.** Oral contrast and follow through study showed herniation of abdominal contents into left thoracic cavity with no mechanical obstruction.
Prompt diagnosis and surgical repair is recommended by most authorities.

The commonly used imaging modalities are chest radiograph and CT scan. Other imaging modalities include upper gastrointestinal contrast study, magnetic resonance imaging, and laparoscopy, all of which have produced variable results. The reported sensitivity of the CT scan in diagnosing diaphragmatic hernia ranges from 33% to 83%.1

Traditionally, DH is repaired with the open method as first reported by Riolli in 1886.2 Laparoscopy was used to identify traumatic injury of the diaphragm by Adamthwaite3 in 1984. Frantzides4 reported the first successful laparoscopic repair of a diaphragmatic hernia in 1994. Thoracoscopy may be preferred for hernias with severe pleural fibrosis and adhesion.

The debate on whether synthetic mesh or primary closure produce the safest and most durable repair for diaphragmatic hernia has yet to be decided.5 Laparoscopic primary repair of diaphragmatic hernia is technically demanding when the defect communicates with the esophageal hiatus or close to pericardium.6 The placement of synthetic mesh repair in close proximity to the esophagus runs the risk of erosion.6 The diaphragmatic hernia sac was left intact in our patient as minimal sac redundancy occurred after primary suturing of the defect. For a sizable hernia sac after reduction, sac ligation followed by excision should be performed to reduce the chance of loculated fluid collection. Synthetic mesh was chosen for the large diaphragmatic defect as in our case. Gore-Tex DualMesh was used for its dual surface properties. It has a fascial side, which induces tissue ingrowth and thus results in better tissue fixation. On the other hand, on its peritoneal side it has a low-porosity smooth visceral surface that minimizes visceral adhesion.

Tension pneumothorax development is a concern for laparoscopic procedures in DH patients with pleuroperitoneal communication. The patient may become difficult to ventilate, which is not correctable by increasing the intrapleural pressure with PEEP.7 Conversion to open surgery is mandatory when ventilation difficulty is encountered.

In summary, adult onset DH should be promptly diagnosed and managed operatively. Laparoscopic repair is safe and feasible with a good clinical outcome.

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