



A Missed Case of a Strangulated Right-Sided Diaphragmatic Hernia Containing Perforated Small Bowel in an Elderly Patient

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Abstract

We present a patient who was admitted with hypoxemia and was thought to have a right-sided empyema secondary to a parapneumonic effusion. She was treated for two weeks prior to being transferred for a Thoracic Surgery consultation. On review of imaging she actually had a right diaphragmatic hernia with strangulated, perforated small bowel. She was initially stable but during transfer developed increasing respiratory requirements requiring emergent surgery. Atraumatic adult right-sided incarcerated diaphragmatic hernia with bowel perforation is extremely rare with only two other cases reports involving colon and none involving small bowel. We describe her presentation, management, and post-operative considerations.

Keywords: Diaphragmatic hernia; Perforated small bowel

Introduction

Diaphragmatic hernias are either congenital or acquired from traumatic diaphragmatic injury. Congenital Diaphragmatic Hernias (CDH) occurs in approximately 1 in 3000 live births, with 85% found on the left side [1-3]. They are usually diagnosed in the neonatal period, as early as 16 weeks gestational age, and require early surgical intervention [4]. Right-sided CDH are extremely rare due to the earlier fusion of the right diaphragm and the protective location of the liver [5]. We present a case report of a missed right-sided CDH involving strangulated small bowel with perforation resulting in a fecopneumothorax.

Case Presentation

An 81-year-old female with a past medical history of hypertension, hypothyroid and reflux disease is presented to the emergency department at a community hospital with nausea, vomiting, right-sided chest pain, and dyspnea. Her past surgical history included a hysterectomy and partial mastectomy. She had no known past high-impact blunt or penetrating trauma that would predispose her to a missed right diaphragmatic injury giving rise to an acquired diaphragmatic hernia. Her initial chest x-rays showed a right lower lobe consolidation with an associated effusion (Figure 1A). A CT was done at the time of presentation for a concurrent bowel obstruction, which was thought to be an ileus secondary to a thickened and inflamed right hemi-diaphragm adjacent to loops of small bowel. She was managed in the community for two weeks, where they attempted a thoracentesis that drained minimal fluid. She continued to decompensate with an increasing white count despite antibiotic therapy. Repeat imaging (Figure 1B) showed a worsening hemopneumothorax and it was felt that the patient would benefit from a thoracic surgery referral for tube thoracotomy and possible decortication. Vital signs on transfer were the following: blood pressure 143/65, heart rate 86, respiratory rate 20, and 93% oxygen saturation on 50% Ventimask. The images were reviewed by our thoracic surgeon and interventional radiologist, and it became apparent that this was not an empyema secondary to a parapneumonic effusion, but rather a segment of strangulated small bowel within a diaphragmatic hernia that had perforated (Figure 2). The only prior chest imaging available was a chest x-ray from 2013 which did not show evidence of the diaphragmatic hernia.

The decision was made to take the patient urgently to the operating room for an exploratory laparotomy and right thoracotomy. Exploratory laparotomy revealed an approximately 3 cm x 2 cm diaphragmatic defect, posterior and lateral to the falciform ligament. A loop of small bowel was incarcerated through the diaphragmatic defect. On our attempt to reduce the small bowel, the proximal small bowel was necrotic and disintegrated. We quickly tied off the proximal small bowel

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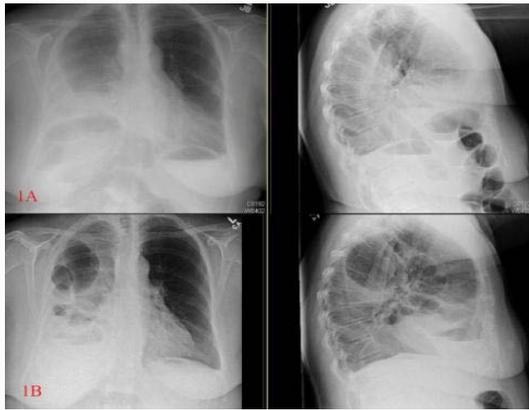


Figure 1: (A) Initial X-rays showing possible right lower lobe consolidation with pleural effusion. (B) Repeat X-rays showing air fluid levels in the right chest.

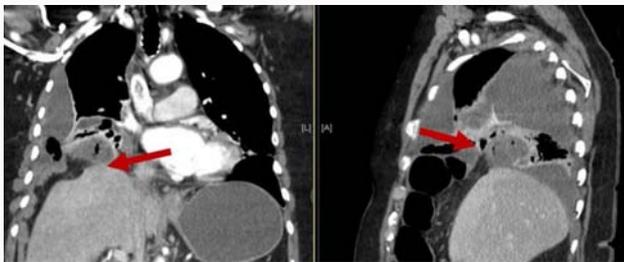


Figure 2: CT demonstrating diaphragmatic hernia with small bowel.



Figure 3: Intraoperative photograph of right serratus-sparing posterolateral thoracotomy with small bowel evident within thoracic cavity.

to prevent further spillage of stool. We measured the small bowel within the abdominal cavity. There was more than 200cm of small bowel proximal to the hernia, so we made the decision to divide the distal small bowel at the level of the hernia as it could not be reduced into the abdomen. We reduced the small bowel remnant up into the chest cavity, and proceeded to suction over 2L of feculent material from her chest via the hernia defect. During this time, she developed ventricular tachycardia and required electrical cardioversion. Once spillage of feculent material was controlled, a sponge was placed within the chest, with the intention of removing the small bowel and sponge during the thoracotomy. The diaphragmatic hernia was closed with 1.0 Ethibond sutures in an interrupted fashion. A side to side anastomosis of the small bowel was created with healthy bowel. The abdomen was irrigated and a Jackson-Pratt drain left in the right subdiaphragmatic space.

We then repositioned the patient in the left lateral decubitus position and performed a right serratus-sparing posterolateral thoracotomy. Irrigation and decortication was carried out along with

removal of the sponge and necrotic piece of small bowel (Figure 3). Our primary repair of the diaphragm was intact and there was no residual defect. There was good lung re-expansion post-decortication and multiple chest tubes were placed. Our patient was kept intubated and admitted to ICU post-operatively. After a prolonged hospital stay and rehabilitation, the patient was discharged home.

Discussion

As our patient had no history to support a traumatic diaphragmatic hernia, this was most likely congenital in etiology. The location of the diaphragmatic hernia was consistent with a Morgagni hernia. The lack of visualization on prior imaging was possibly due to the small defect size and protective effect of the liver precluding abdominal contents from herniating into the right thoracic cavity. Although respiratory symptoms in a patient presenting with a bowel obstruction are usually secondary to aspiration, this case demonstrates the importance of considering an incarcerated diaphragmatic hernia within the differential. Signs and symptoms that should have prompted an earlier referral to Thoracic Surgery include her lack of response to antibiotic treatment, inability to perform a successful thoracentesis, complex and loculated appearance of her hydropneumothorax, and prolonged GI symptoms. In this particular case, the loops of bowel were sitting anterior to the liver, which is unusual, and can be seen in the initial lateral films (Figure 1A). There was also evidence of a transition point with dilated loops leading up to the diaphragm with collapsed bowel distally, along with thickening of the bowel wall and stranding which would be contradictory to a diagnosis of an ileus. These were some radiographic features that should have prompted a closer review of the case. We decided to start with a laparotomy approach initially because we wanted to control the source of sepsis. As in any strangulated or perforated hernia, proximal control of the bowel and its contents is desired. If we chose to start with a thoracotomy first, the abdomen would have been filling with stool and grossly contaminated while we completed the decortication. If the hernia was merely incarcerated and not perforated, a thoracotomy as an initial approach would not be unreasonable. The posterolateral thoracotomy was required in order to reach and appropriately decorticate the apical and posterior surfaces of the lung. A thoracoabdominal incision would have been too anterior and inferior. There was no role for a VATS procedure in an unstable, grossly contaminated patient.

The post-operative recovery requires a multidisciplinary approach. As with our patient, ICU care and ventilation are pertinent. These patients require chest physiotherapy, nebulized saline to mobilize secretions, and intense bronchopulmonary toilet. There is a low threshold for performing a tracheostomy if there is prolonged ventilation or difficulty managing secretions. Management of GI symptoms with a nasogastric tube, electrolyte imbalance from GI losses, total parenteral nutrition for prolonged nil per os, and broad spectrum antibiotics should be considered. Interval CT is important in re-evaluating the empyema and the need or position of each chest tube.

Conclusion

Strangulated right-sided diaphragmatic hernia containing perforated small bowel is extremely uncommon. One needs to include this on the differential when patients present with symptoms of a small bowel obstruction in conjunction with respiratory distress and an effusion on imaging. Unusual anatomic position should prompt closer evaluation rather than assumption of congenital deviance.

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