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Diagnostic Dilemma In A Case Of Fecopneumothorax With Diaphragmatic Hernia

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Abstract:
Background*: While traumatic diaphragmatic hernias presenting with fecopneumothorax have been reported in both adults and children. Non traumatic diaphragmatic hernia leading to fecopneumothorax is an entity which has limited literature. Congenital diaphragmatic hernias (CDH) mostly remain asymptomatic. It has been documented that rarely it can present in an acute setting with tension fecopneumothorax secondary to strangulated hernial contents.On a detailed review of literature, it was found that a complication of tension fecopneumothorax from intraperitoneal perforation of bowel with healthy herniated contents has not been reported.*
Materials and Methods *We present a rare case of a 17-year girl, a diagnosed case of late-onset congenital diaphragmatic hernia, who presented with tension pneumothorax and no abdominal signs suggestive of peritonitis. Intercostal drainage tube placement confirmed tension fecopneumothorax and led to a significant clinical improvement. Surgical exploration revealed an intraperitoneal perforated ileal segment and a Bochdalek diaphragmatic defect with healthy thoracic contents.*
Results*: Fecopneumothorax is a rare entity. The presence of fecopneumothorax does not support the direct corollary of pathology being in the thorax alone. This case shows a trans-compartmental presentation of abdominal pathology in a congenital diaphragmatic hernia. This leads to a discussion of the direct and indirect causes of fecopneumothorax, which should be kept in mind while dealing with such cases. On exploration, combining a trans-abdominal approach would yield better outcomes instead of an isolated trans-thoracic approach.*
Conclusion: *A case of fecopneumothorax, where no pathology is noted in the herniated bowel- mandates a thorough abdominal exploration. Such cases would warrant a surgical exploration via a hybrid approach of trans-thoracic, combined with an abdominal approach. This would lead to a complete exploration of the differentials and in rare cases trans-compartmental pathology would not be missed.*
Key Word: *Fecopneumothorax, Congenital Diaphragmatic Hernia, Bochdalek hernia, Acute Presentation of CDH, Hybrid Approach to CDH, Approaches to CDH*

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I. Introduction

Congenital diaphragmatic hernia (CDH) occurs as a defect in diaphragm due to defective embryological development leading to herniation of abdominal contents into the thoracic cavity. Although most CDHs are usually detected soon after birth, in rare cases asymptomatic CDHs can be missed and present much later in life. CDHs that are detected later than 30 days are considered late-onset CDH1. Later presentation of CDH is more commonly seen in children between 2 months and 12.5 years old[1].

Intrathoracic colon herniation usually occurs in patients with congenital or acquired diaphragmatic hernias.

Fecopneumothorax occurs as a complication of CDH when the content herniated through the defect becomes strangulated, resulting in perforation. This causes a collection of fecal matter in the pleural cavity, leading to tension fecopneumothorax.

In the setting of an acquired diaphragmatic hernia after enduring either blunt or penetrating trauma, there is an acute phase followed by an interval phase, after which the patient will go into the phase of obstruction and strangulation, which would lead to perforation[2]. And in this background, the patient would present late with symptoms of tension fecopneumothorax.

In our case, the cause of fecopneumothorax in a case of CDH was not strangulated hernial content, but a perforated intra-abdominal ileal segment, a scenario which has not been discussed much in the literature.

II. Material And Methods

A 17-year girl, a diagnosed case of late-onset congenital diaphragmatic hernia presented to surgical emergency with acute respiratory distress and shock. The patient was diagnosed at another center as a late-onset congenital diaphragmatic hernia with CECT whole abdomen reported as a focal defect in the left hemidiaphragm with herniation of splenic flexure and dilatation of proximal colon. She was being worked up for a definitive repair at that center when she suddenly developed dyspnea and abdominal pain. There was no history of trauma or fever. On examination airway was maintained, the patient was cyanosed, tachypneic (Respiratory rate= 40/minute) and hypoxemic with oxygen saturation ranging between 50-60 % on oxygen support. Air entry was markedly diminished on left side. The patient's blood pressure was 60/40 mmHg with a low volume pulse rate of 130/minute, sinus rhythm. Abdomen was essentially normal on examination other than mild diffuse tenderness and no rebound tenderness.

After initial stabilization, chest radiography (Figure 1A) was suggestive of air fluid level with a significant mediastinal shift to right side.

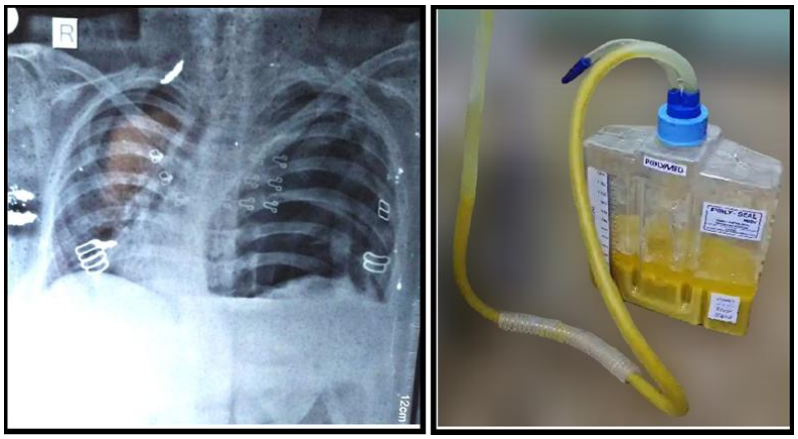

Figure 1 (A): Chest radiography showing tension pneumothorax with mediastinal shift to right. (B): Intercostal drainage tube draining fecal content

An intercostal drainage tube was placed which drained 500cc liquid yellow colored fecal content (Figure 1B). This led to an immediate improvement in the clinical condition of the patient. Tension fecopneumothorax was confirmed, and a provisional diagnosis of strangulated congenital diaphragmatic hernia was kept in mind.

The patient was taken up for surgery with a plan of Laparotomy and surgical exploration with evaluation of left thoracic cavity through diaphragmatic defect / conversion if required.

III. Result

On exploration 100cc fecal content drained, contents similar to ICD output. A defect of size 5 × 5 cm in the posterolateral aspect of the left hemidome of diaphragm (Figure 2A) was noted through which splenic flexure had herniated (Figure 2B). On reduction of left hemithorax contents, no perforation or discoloration was found in the herniated colon. Bowel walk revealed two subcentimetric perforations at the ileo-caecal junction (Figure 2C). Pleural cavity was lavaged by transdiaphragmatic approach. Primary repair of diaphragmatic defect was done by plication using delayed absorbable sutures (PDS 2-0).

This case showed a rare case of Bochdalek congenital diaphragmatic hernia in a juvenile, leading to tension fecopneumothorax caused not by a perforation in the herniated content. It was a result of a perforation at the ileo-caecal junction which was complicated by the negative thoracic pressure leading to feculent collection in the pleural cavity.

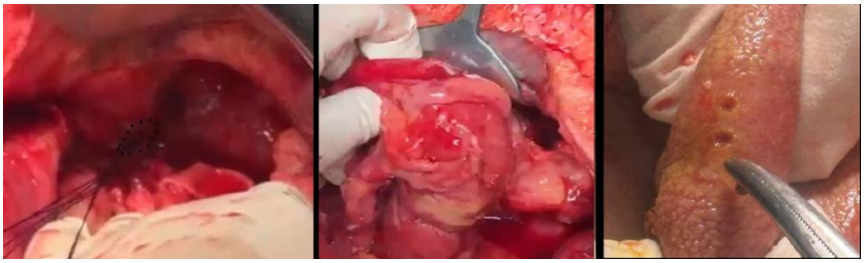

Figure 2 (A): Repair of diaphragmatic defect with non-absorbable sutures (B): Healthy splenic flexure as thoracic hernial content (C): Two subcentimetric perforations at ileo-caecal junction

IV. Discussion

Congenital Diaphragmatic Hernia (CDH) can be classified according to Anatomical location: Bochdalek/ Morgagnie/ Hiatal hernia; Etiology: Congenital/ acquired; Presence of sac: True Bochdalek hernia: defect through which content herniates without no sac/ CDH with sac: eventration (no direct visceral herniation) resulting in a "high-riding" diaphragm encroaching into the thoracic domain.

The Bochdalek foramen is located between the costal and the lumbar part of the diaphragm. This area normally contains muscle, but in these patients, the fusion of the 2 parts is disordered during embryogenesis, retaining a posterolateral defect. For any increase in intra-abdominal pressure, such as labor, pregnancy, and trauma, the abdominal viscera can be herniated into the thorax through the defect, causing Bochdalek hernia[3].

CDH is usually asymptomatic. Acute presentations of CDH include acute respiratory distress due to increased thoracic content (36%), Intestinal Obstruction (20%), Gastric Outlet Obstruction due to gastric volvulus in content, Shock with gangrenous hernial content, Peritonitis[4].

Infradiaphragmatic cause of tension pneumothorax is not usually kept as a differential. A few cases have been reported where the patients were diagnosed as late-onset congenital diaphragmatic hernia who presented with acute respiratory distress due to tension hydropneumothorax[5].

The causes of fecopneumothorax could be broadly classified as direct and indirect causes. Direct causes include causes leading to fecopneumothorax due to bowel perforation inside the pleural cavity- perforation in the herniated bowel content secondary to obstruction or strangulation in a congenital diaphragmatic hernia[6]. Fecopneumothorax in a case of spontaneous strangulation of type IV hiatus hernia has also been reported[7]. Other direct causes would be traumatic diaphragmatic hernia in an acute or chronic setting. In an acute setting, a penetrating trauma to abdomen can lead to diaphragmatic hernia when it leads to injury to both bowel and diaphragm. Traumatic diaphragmatic hernia can present months to years later with fecopneumothorax wherein herniated bowel has undergone strangulation[8]. The third scenario is when a placement of intercostal drainage in a case of tension pneumothorax leads to an inadvertent injury to the herniated colon or gastric content. Colo-pleural fistula in a case of complicated Crohn's disease and left sided colonic cancers have also been reported[9-10].

Indirect cause of fecopneumothorax is an entity which has not been reported yet. It is due to a perforated bowel segment in the abdomen which leads to fecal content entering pleural cavity through a pre-existing defect in the diaphragm as in the cases of congenital diaphragmatic hernia. This is attributed to the pressure difference between the thoracic and peritoneal cavity coupled with the negative thoracic pressure, which leads to abdominal fecal content entering the thoracic cavity.

Surgical Approaches for a case of CDH have been discussed in literature. Transabdominal approach via laparotomy. This enables evaluation of reduced abdominal contents & any other associated abdominal pathology. It is indicated when features of peritonitis are present, patient is hemodynamically unstable, as a part of Damage control Surgery

Thoracic approach via Thoracotomy through 7-8th intercostal space: posterolateral thoracotomy. Thoracoabdominal approach (Hybrid approach) is usually indicated when adhesions are expected, usually in a case of chronic diaphragmatic hernia[11].

Our patient was a diagnosed case of late-onset congenital hernia, who presented with tension pneumothorax. To stabilize the patient, an intercostal drainage tube was placed, which led to a provisional diagnosis of tension fecopneumothorax secondary to a perforated congenital diaphragmatic hernia. Surgical exploration led to the unexpected finding of a healthy herniated colon and fecopneumothorax secondary to an intra-abdominal perforated ileal segment.

Since there were no abdominal signs suggestive of peritoneal irritation, a perforation in the non-herniated bowel segment was not suspected preoperatively.

Hereby, we are reporting this rare case of tension fecopneumothorax in Bochdalek variety of congenital diaphragmatic hernia in a juvenile.

V. Conclusion

Fecopneumothorax is a rare entity. The presence of fecopneumothorax does not support the direct corollary of pathology being in the thorax alone.

This case shows a trans-compartmental presentation of abdominal pathology in a congenital diaphragmatic hernia. This leads to a discussion of the direct and indirect causes of fecopneumothorax, which should be kept in mind while dealing with such cases.

A case of fecopneumothorax, where no pathology is noted in the herniated bowel- mandates a thorough abdominal exploration. Such cases would warrant a surgical exploration via a hybrid approach of trans-thoracic, combined with an abdominal approach. This would lead to a complete exploration of the differentials and in rare cases a trans-compartmental pathology would not be missed.

A definitive repair of both the perforated segment and diaphragmatic defect in a preoperatively optimized patient can lead to a good recovery.

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