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Case Report

Non-traumatic left-sided diaphragmatic hernia causing volvulus in an adult ☆

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ABSTRACT

Diaphragmatic hernias can be classified into congenital and acquired types. Most cases of congenital diaphragmatic hernia present early in life with respiratory distress while acquired diaphragmatic hernia usually presents following a history of trauma. Adult presentation of congenital diaphragmatic hernia is a rare finding and can remain asymptomatic for years until the herniated abdominal contents cause significant respiratory or gastrointestinal complications. This is a case report of a 55-year-old male patient presented to the emergency department with acute left-sided chest pain associated with dyspnea and abdominal distension. Chest roentgenogram showed gastric air bubble in the chest cavity. After initial resuscitation, CT thorax, abdomen, and pelvis was done which showed large diaphragmatic hernia with a wide central defect in the diaphragm with entire stomach and distal pancreas along with fat and omentum have been herniated into the thorax with organo-axial rotation of the stomach denoting volvulus and some degree of obstruction. Resultant marked distension of the stomach with air-fluid levels noted. Diagnosis of congenital diaphragmatic hernia can be challenging. Physical examination including auscultation of bowel sounds in the chest offers a diagnostic clue but the mainstay of diagnosis by chest imaging including chest roentgenogram and CT scan of the thorax and abdomen.

Case presentation

Fifty-five-year-old male patient presented to the emergency department with left-sided chest pain of 6 hours duration. Initially started as central burning type chest pain similar to gastroesophageal reflux then started getting worse, crushing and heavy in character with associated dyspnea. He did not report any recent history of trauma. He was initially treated as Acute Coronary syndrome in emergency room due to the nature of the pain and the ECG/EKG results. His past medical history includes hiatus hernia, gastroesophageal reflux disease, osteoarthritis, and congenital diaphragmatic hernia that was incidentally discovered few years ago yet remained asymptomatic. His regular medications included analgesia for osteoarthritis as well as proton pump inhibitors for hiatus hernia.

On examination, he looked pale, clammy, and sweating profusely. His vital signs showed temperature of 37.2, pulse rate 130 beats/min, respiratory rate 35, blood pressure 104/59, and oxygen saturation of 94% on 10 L oxygen.

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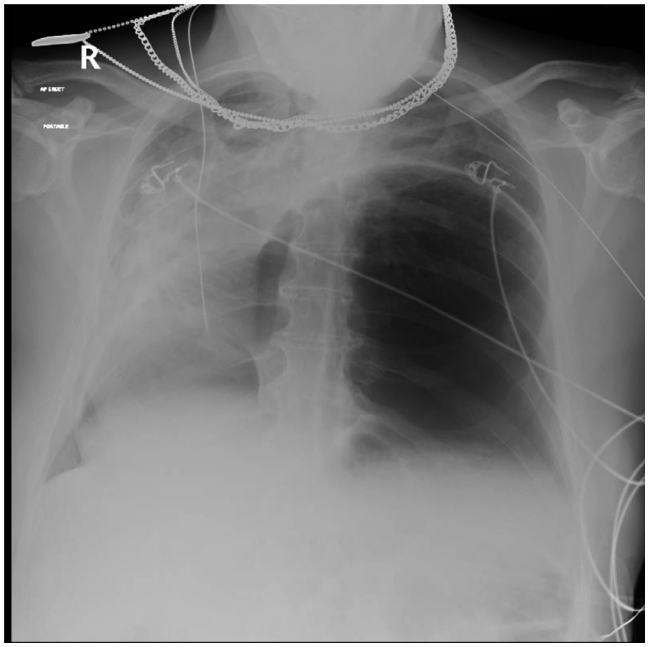

Fig. 1 – Chest roentgenogram showing gastric air bubble in left hemithorax with mediastinal shift to the right side.

Cardiovascular examination revealed heart sounds in the right hemithorax with bowel sounds auscultated in the left hemithorax. Respiratory system examination revealed patient in significant respiratory distress with tachypnea and significantly reduced breath sounds on the right side .His abdomen was soft non tender all over yet significantly distended.

His initial chest roentgenogram showed gastric air bubble in the left hemithorax with significant shifting of the mediastinum to the right side (Fig. 1).

His blood results showed PH 7.21 (reference range 7.35-7.45), HCO_3 22 mmol/L (reference range 22-26 mmol/L), Lactate 4.1 mmol/L (reference range 0.5-2.2 mmol/L) with Troponin of 8 ng/L (reference range <13 ng/L) and normal urea and electrolytes.

Patient had a cardiac arrest and was successfully resuscitated in emergency department following CPR. Following intubation, CT thorax, abdomen, and pelvis was done which showed large diaphragmatic hernia with a wide defect in the diaphragm measuring approximately 14 cm in size with the whole stomach along with omentum and peritoneal fat as well as distal pancreas have been herniated into the thorax. The stomach is grossly distended with air-fluid levels and shows organo-axial rotation denoting volvulus with obstruction at pyloric canal/duodenum. Resultant elevation and collapse of the lungs is seen on both sides (Fig. 2).

The mediastinum including the heart is displaced anterolaterally to the right side and compressed to some extent (Fig. 3).

Patient was then admitted to the intensive care unit before he had gastrectomy and partial esophagectomy which was not successful and unfortunately, he died 2 days later.

Discussion

Congenital diaphragmatic hernia has an occurrence rate of approximately 0.45 cases per 1000 births and it occurs due to failure of the musculature of the diaphragm to reform

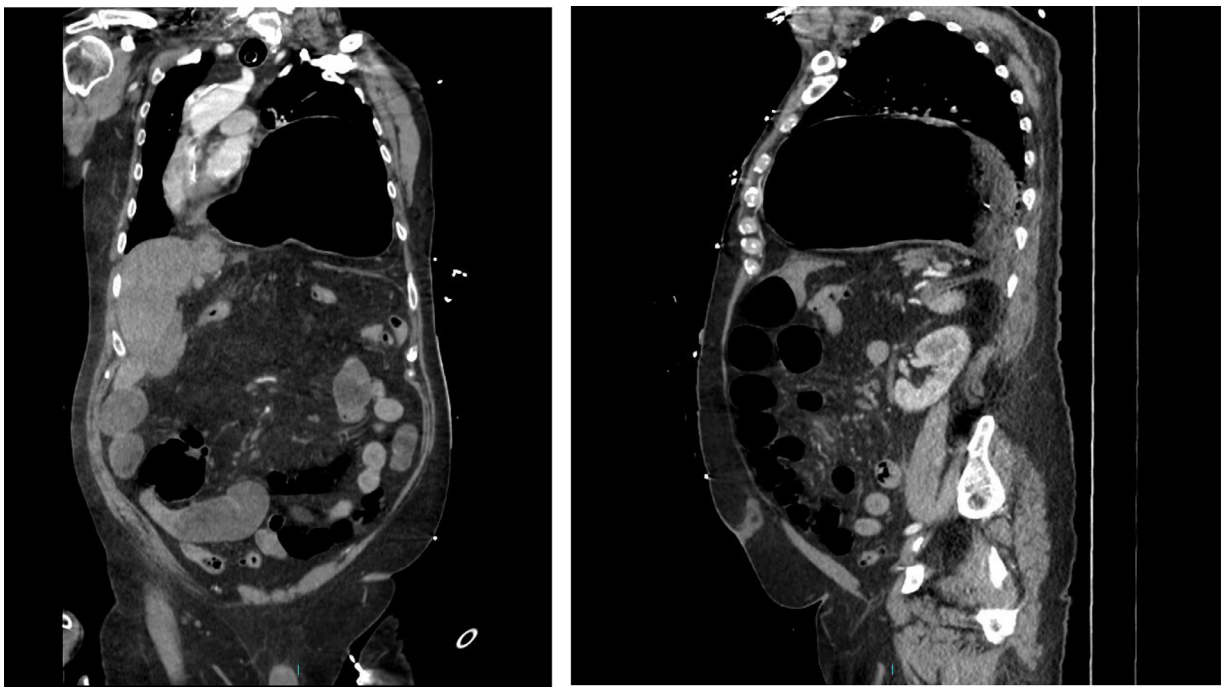

Fig. 2 – CT thorax, abdomen, and pelvis showing abdominal content in left hemithorax compressing the lungs bilaterally causing collapse and shifting the mediastinum to the right side.

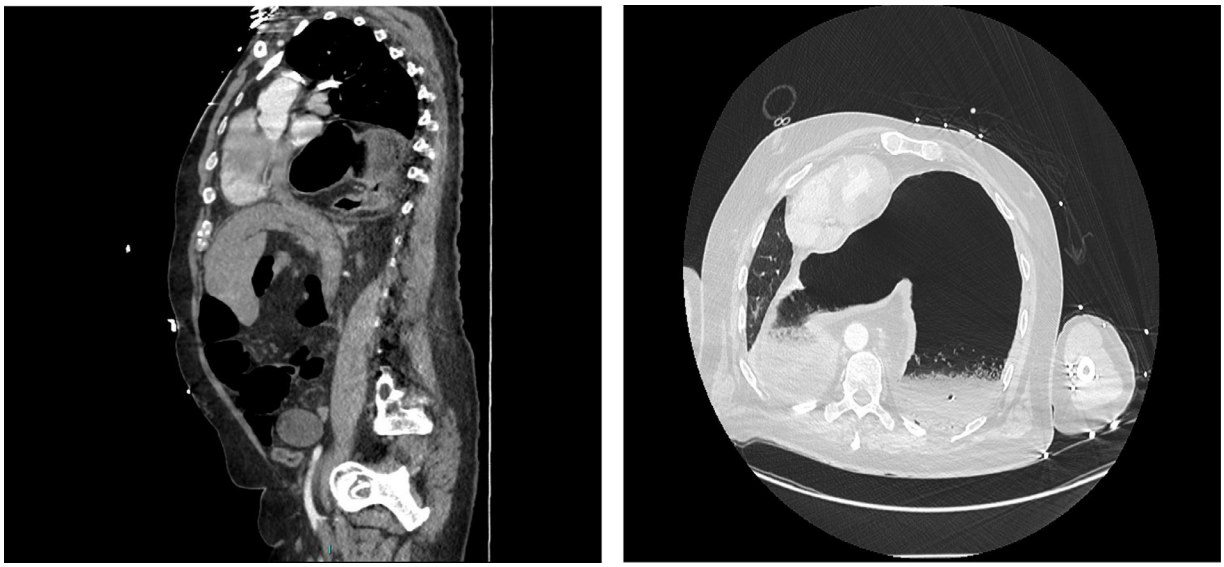

Fig. 3 – Displacement of the mediastinum including the heart to the right side.

fully leading to herniation of the abdominal contents into the chest cavity [1]. Most cases of Congenital diaphragmatic hernia (CDH) present early in life with acute respiratory distress while acquired diaphragmatic hernia occurs mostly due to blunt or penetrating trauma causing increased intra-abdominal pressure and herniation of the abdominal contents into the thoracic cavity with an occurrence rate of 5%-7% following blunt trauma to the chest or the abdomen and up to 15% following penetrating injury [2]. In rare cases, it can present spontaneously and often remain asymptomatic until the herniated abdominal contents compress the lungs causing respiratory distress. It can also present acutely in case of strangulation of the abdominal contents leading to a mortality rate of over 80% [3].

CDH in newborn presents with respiratory distress can cause mortality of up to 50% [4]. Adult presentation of CDH is rare and can present with wide variety of symptoms including respiratory or gastrointestinal symptoms and can remain asymptomatic for years [5].

In most cases, CDH occurs on the left side due to earlier closure of the embryonic diaphragmatic defect on the right side along with the hepatic protection of the defect on the right side and it occurs 4 times more commonly in males compared to females [6].

CDH presenting later in life is a rare entity and can remain asymptomatic for years until the herniated abdominal contents causes respiratory distress by compressing the lungs or causing gastrointestinal symptoms [3]. It can also present acutely—as in this case—with gastric volvulus or intestinal obstruction.

The most common cause of gastric volvulus is hiatal hernia with predisposing factors being ligamentous laxity [7]. Diaphragmatic hernia in adults rarely presents with gastric volvulus and has a very high mortality rate.

Clinical examination of diaphragmatic hernia reveals auscultation of bowel sounds in the chest. Investigations including chest roentgenogram, CT scan, and barium studies are the mainstay for diagnosis to reduce the mortality rate caused by necrosis or perforation of the herniated abdominal contents.

Treatment of diaphragmatic hernia in an adult depends on the presentation with surgical intervention through thoracic or abdominal approach.

Conclusion

Congenital diaphragmatic hernia should be always suspected as a differential diagnosis in patients with long history of respiratory or gastrointestinal symptoms. Bowel sounds on chest auscultation is a diagnostic clue. Initial investigations such as chest imaging including chest roentgenogram showing gas filled loops or gastric air bubble in the chest cavity can be helpful. Definitive diagnosis obtained by CT chest or barium study showing abdominal contents herniated into the thoracic cavity through a diaphragmatic defect. Asymptomatic patients with incidental findings of diaphragmatic hernia should also be followed up and considered for surgical repair.

Patient consent

Obtained from patient's next of kin.

REFERENCES

[1] Travaline JM, Cordova F. Agenesis of the diaphragm. Am J Med 1996;100:585.
[2] Rosati C. Acute traumatic injury of the diaphragm. Chest Surg Clin N Am 1998;8:371–9.

[3] Yang GPC, Tang CN, Siu WT, Ha JPY, Tai YP, Li MK. Diaphragmatic hernia: an uncommon cause of dyspepsia. JSLS 2005;9(3):352–5.
[4] Kanazawa A, Yoshioka Y, Inoi O, Murase J, Kinoshita H. Acute respiratory failure caused by an incarcerated right-sided adult Bochdalek hernia: report of a case. Surg Today 2002;32:812–15.
[5] Kitano Y, Lally KP, Lally PA. Late-presenting congenital diaphragmatic hernia. J Pediatr Surg 2005;40:1839–43. doi:10.1016/j.jpedsurg.2005.08.020.
[6] Katukuri GR, Madireddi J, Agarwal S, Kareem H, Devasia T. Delayed diagnosis of left-sided diaphragmatic hernia in an elderly adult with no history of trauma. J Clin Diagn Res 2016;10 Pd04–5. doi:10.7860/JCDR/2016/17506.7544.
[7] Atef M, Emna T. Bochdalek hernia with gastric volvulus in an adult: Common symptoms for an original diagnosis. Medicine (Baltimore) 2015;94(51):e2197. doi:10.1097/MD.0000000000002197.