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## Case Report

## Late presentation of a congenital problem; complicated left-sided Bochdalek's hernia in an adult: A case report

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## ABSTRACT

**Background:** A diaphragmatic hernia is a defect or hole in the diaphragm through which abdominal contents can enter the chest cavity. Diaphragmatic hernias may be congenital (Morgagni hernia, Bochdalek hernia), a hiatal hernia, or acquired (iatrogenic and traumatic). Bochdalek's hernia typically occurs on the left side and rarely occurs in adults. Less than 100 cases of left Bochdalek's hernia in adults have been described in the literature. Most of them are asymptomatic.

**Case report:** We report a complicated left Bochdalek hernia in a 43-year-old adult male who is a smoker. He came to the pulmonary clinic with symptoms and signs of pneumonia of the left lower lobe with persistent dyspeptic symptoms. Chest radiography revealed evidence of a left diaphragmatic hernia, which was confirmed by computed tomography of the chest and abdomen, and subsequently treated by left diaphragmatic repair via limited left thoracotomy.

**Conclusion:** We report a rare case of a left Bochdalek hernia in an adult who underwent an appropriate left thoracotomy. Bochdalek hernias in adults are rare and usually asymptomatic, but when they become symptomatic, surgical intervention is required to avoid complications. BH should be considered in the differential diagnosis when radiographs suggest pneumothorax and should be treated early to avoid complications.

## 1. Introduction

Bochdalek hernia occurs when the diaphragm fails to close backward during embryogenesis. Symptomatic Bochdalek hernias in adults are relatively uncommon, accounting for about 0.17%–6% of all diaphragmatic hernias when they occur spontaneously in

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adults [1,2]. About 100 cases of Bochdalek's hernia in adults have been described in the literature, most of them left-sided. Bochdalek hernias typically arise on the left side and contain fat or omentum, stomach, transverse part of the colon, mostly loops of the small intestine [3]. Thin-slice tomography with multiplanar reformatting CT is the standard for the diagnosis of Bochdalek's hernia due to its higher sensitivity and ability to detect concomitant congenital anomalies. CT has a sensitivity of 78% for left-sided hernias and 50% for right-sided hernias [4]. Treatment of symptomatic Bochdalek's hernia is surgical and includes either abdominal or thoracic approaches, either open repairs or scopic techniques to close the defect [5].

## 2. Case report

43-year-old male, Syrian, living in Saudi Arabia for 10 years, married, smoker (10 packs of cigarettes/year), fully vaccinated against coronavirus disease 19. He was diagnosed with irritable bowel syndrome 3 years ago (vague abdominal pain, bloating without nausea, vomiting, or constipation) and took short-term spasmolytic medications as needed. The patient presented to the pulmonary clinic complaining of intermittent pain in the left upper abdomen and lower chest, with a productive cough with yellow sputum. He denied shortness of breath, hemoptysis, fever, chest trauma, vomiting, nausea, or a change in bowel habits. His general examination was unremarkable. The thoracic examination revealed: dullness notes, decreased air entry, audible bowel sounds, and fine rales over the left infra-scapular region.

Chest radiography posteroanterior: opacity of the left lower lung zone showing the internal column of air continuous with abdominal gases, with well-defined left cardiac border with loss of lower transparency (posterior inferior location), features suggestive of left diaphragmatic hernia (Fig. 1a and b). Thoracic and abdominal computed tomography with intravenous contrast: complicated left diaphragmatic hernia with gastric and abdominal fat with marked inflammatory changes/early ischemic changes (the hernia defect is approximately 3 cm in diameter and the hernia sac above the diaphragm measures approximately  $12.5 \times 10.5 \times 7$  cm and contains 5 cm of gastric fundus). There is a small left pleural effusion with subsegmental compression atelectasis of the left lower lobe due to the effusion and hernia (Fig. 2a and 2b).

One week later: left Bochdalek's hernia repair via left thoracotomy was performed without intraoperative complications. Under general anesthesia and double-lumen endotracheal intubation, a posterolateral thoracotomy was performed in the left 6th intercostal space. There were extensive adhesions between the left lung, chest wall, diaphragm, and pericardium. Dissection was performed until a very large firm mass of amalgamated Omentum ( $15 \times 12 \times 12$  cm) overlying and covering the herniated stomach arose from the left copula of the diaphragm (Fig. 3a). The mass was resected and separated from the stomach (Fig. 3b). The herniated stomach was seen through a defect in the left copula of the diaphragm and placed in an anatomic position without rotation or compression (Fig. 3a). Finally, the left diaphragmatic defect was closed with Proline size 1 and re-enforcement with Proline Mesh (Fig. 3d). Hemostasis was ensured, and the chest was closed, leaving 2 chest tubes in place, was observed for one day in critical care and two days in the ward, and both chest tubes were removed on postoperative days 2 and 3. (see Fig. 3c)

Postoperatively he had bilateral lower lobes atelectasis and was treated conservatively (Fig. 1c). After 2 weeks during his follow-up at Pulmonology Clinic, he was free of symptoms, and normal chest examination and sutures were removed. The follow-up chest X-ray was normal (Fig. 1d).

Histopathology of the resected mass: omental mass: 4 specimens ( $15 \times 9 \times 0.5$ ,  $9.4 \times 5.5 \times 1.5$ ,  $11.5 \times 9 \times 5.5$ , and  $10 \times 2.3 \times 0.5$  cm), markedly compacted mature fibro adipose and fibrovascular tissue, some with sclerosing fibrosis and infiltration by foamy macrophages and foci of inflammation with patchy areas of coagulative necrosis, negative for malignancy.

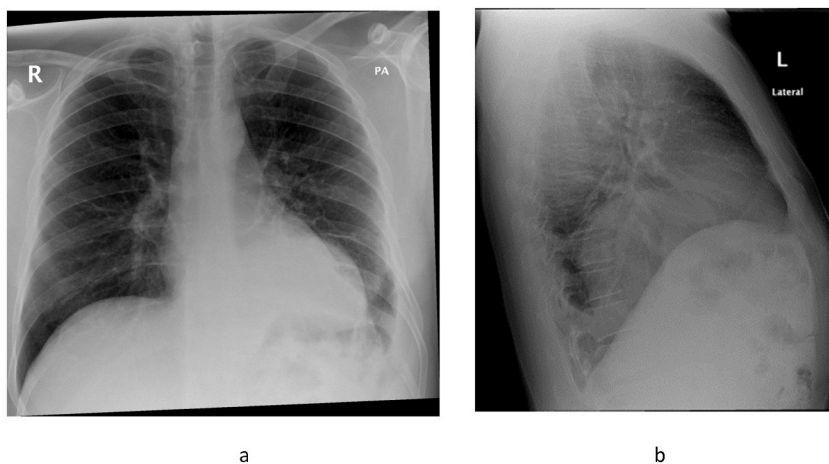


Fig. 1. Chest radiograph in posteroanterior and lateral views: shows a poorly defined left diaphragmatic copula with retrocardiac shadow. Opacification of the left lower lung zone shows an internal air column continuing with abdominal gases, suggestive of a left diaphragmatic hernia.

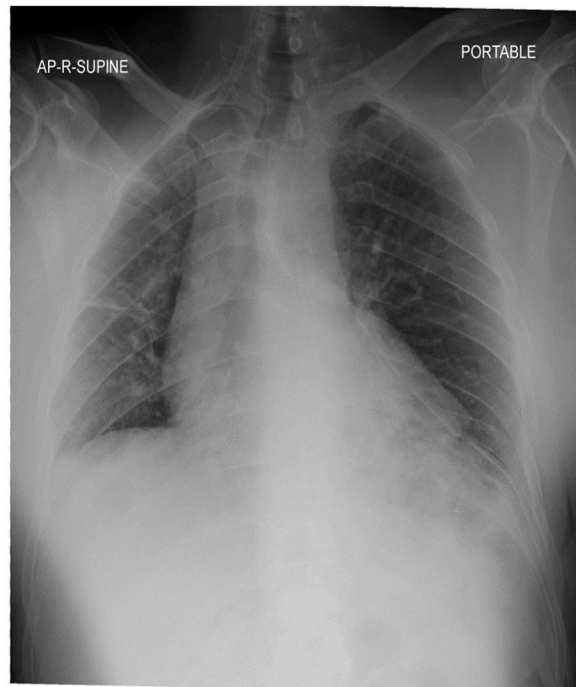


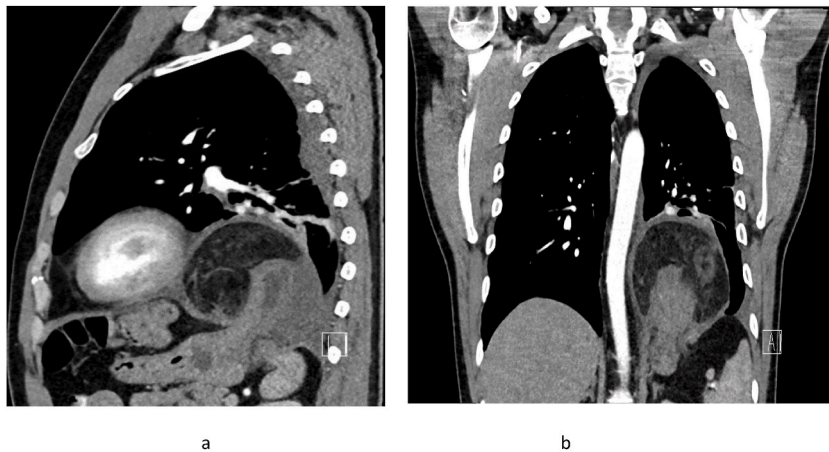
Fig. 1c. Chest radiograph anteroposterior: post operative with repair of the diaphragmatic hernia, left pleural drainage tube is noted.



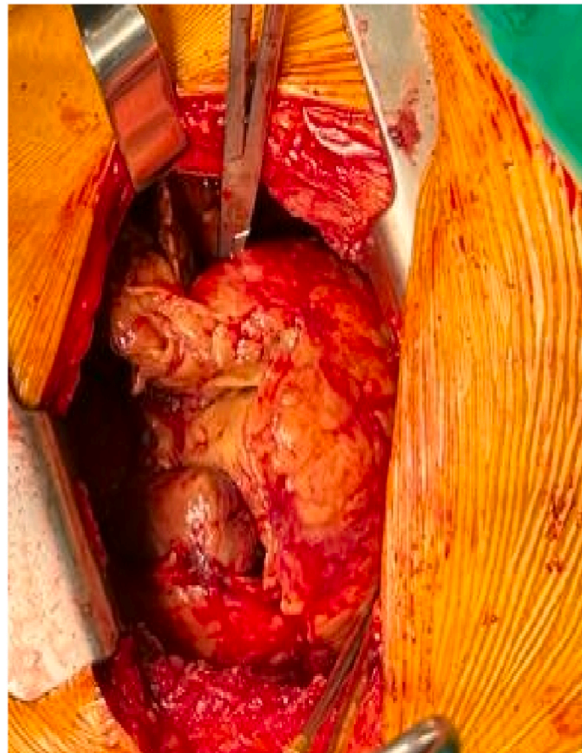
Fig. 1d. Chest radiograph lateral view: Intact left diaphragmatic cupula was demonstrated, and a bilateral basal linear atelectatic plate is noted.

### 3. Discussion

BH is the most common fetal congenital diaphragmatic hernia, more common on the left side: 75–90%, posterolateral, large and associated with worse outcomes, and occurs earlier. In adults, BH is very rare and is usually discovered accidentally [2]. The most common symptoms at presentation of Bochdalek's hernia in adults were chest and/or abdominal pain (66%) and symptoms of ileus (38%) [6]. Akita et al. reviewed in PubMed/Medline "adult Bochdalek hernia" (2010 and 2018) and found 55 operated case reports, with the average age of patients being 41 years and 65% being left-sided. The majority of patients presented with chest and/or



**Fig. 2.** a and b: thoracic and abdominal computed tomography: coronal, mediastinal window: there is a left middle diaphragmatic hernia, the hernia defect measures about 3 cm in diameter, and the hernia sac above the diaphragm measures about  $12.5 \times 10.5 \times 7$  cm. It contains a 5 cm gastric fundus that appears thickened and edematous with mild enhancement. The adjacent area of significant fat strands and nodular compaction likely represent inflammatory changes. No pneumatosis, mural gas density, or pneumoperitoneum. The gastroesophageal junction is below the diaphragm, with no evidence of a hiatal hernia. Findings of complicated left diaphragmatic hernia with gastric and abdominal fat with marked inflammatory changes/early ischemic changes, surgical consultation recommended. No perforation.



**Fig. 3a.** shows a very large firm mass of amalgamated Omentum overlying and covering the herniated stomach.

abdominal symptoms (96%), such as pain and dyspnea. BH may be misdiagnosed as pneumothorax or associated with a mediastinal shift to the opposite side, or complicated by cardiac arrest [7].

Suspicion of BH can be raised by chest radiography or thoracic ultrasonography, but multislice imaging CT with coronal and sagittal reformatted images is the most effective and useful imaging modality for BH, with a hernia sensitivity of 78% for left-sided hernias. It shows the herniating abdominal organs along with complications. MR Imaging can be performed in selected patients (in late-onset DH cases and when the diagnosis is still doubtful) [2,5,8]. Our patient presented with the features of long-standing dyspepsia and left lower lobe pneumonia. The clinical presentation combined with the chest radiograph raised the possibility of a complicated left Bochdalek's hernia, and the diagnosis was confirmed by multislice computed tomography of the chest and abdomen.



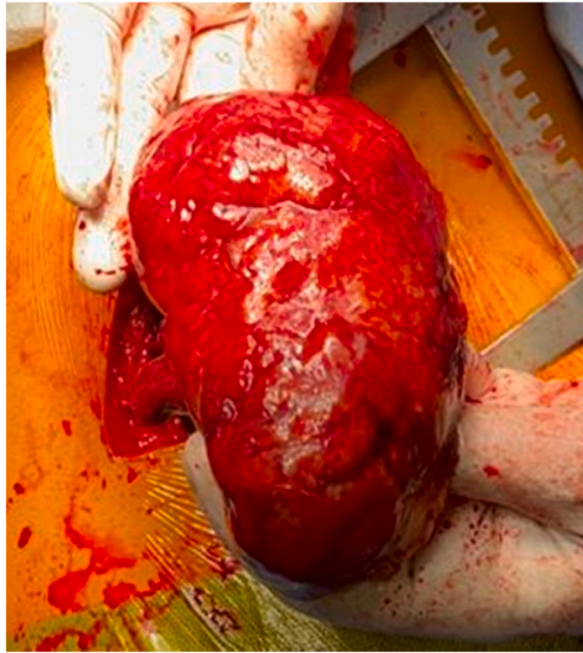


Fig. 3b. Shows the mass after resection and separation from the stomach.



Fig. 3c. shows the herniated stomach through a defect in the left cupula of the diaphragm.

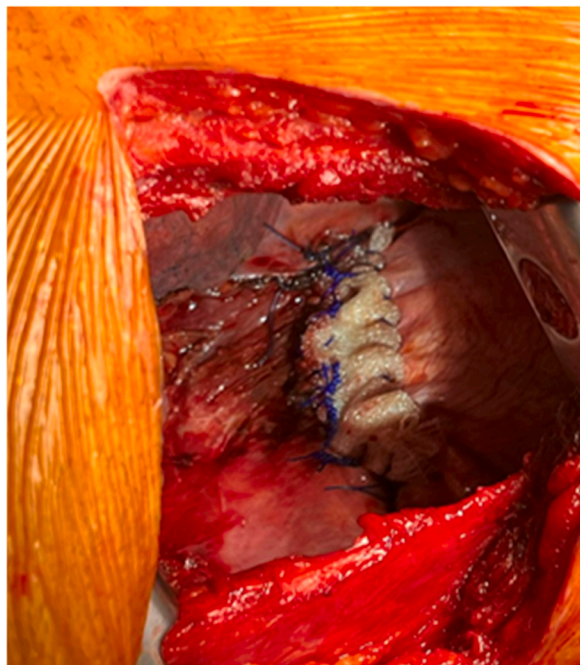


Fig. 3d. Final picture after the closure of the diaphragm with re-enforcement with Proline Mesh.

Repair of a Bochdalek hernia in an adult can be performed through either an open abdominal or thoracic approach, which aims to relocate the failed organs back into the abdominal cavity and close the diaphragmatic defect; repair of a diaphragmatic hernia usually involves the use of mesh, and the choice of procedure depends on the surgeon's experience (general surgeon or thoracic surgeon) [9–12].

The transthoracic approach is considered effective because it allows direct observation of the herniating viscera or hernia sac and it is easier to remove the herniating viscera when adhesions are present [10]. In the Akita survey, the following surgical methods were used for bra repair: Laparotomy (n = 26), laparoscopy (n = 19), Thoracostomy (n = 8), and Thoracoscopy (n = 2) [7]. In our case, hernia repair was performed by left thoracotomy.

Postoperatively, some patients required respiratory support, including mechanical ventilation or pleural effusion puncture. The most serious respiratory complication was empyema or death [7]. In our case, postoperative bilateral atelectasis was noted, which was treated conservatively.

#### 4. Conclusion

We report a rare case of a left Bochdalek hernia in an adult who underwent an appropriate left thoracotomy. Bochdalek hernias in adults are rare and usually asymptomatic, but when they become symptomatic, surgical intervention is required to avoid complications. BH should be considered in the differential diagnosis when radiographs suggest pneumothorax and should be treated early to avoid complications.

#### Declaration of competing interest

The authors declare that he has no conflict of interest.

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