

## Strangulated Bochdalek Hernia: Approach of Management in Emergency Setting

### Strangüle Bochdalek Fıtığı: Acil Durumlarda Yönetim Yaklaşımı

Pradeep Chand Chandran<sup>1,2</sup>, Dinesh Baithma Jothi<sup>2,3</sup>, Firdaus Hayati<sup>4</sup>, Chiak Yot Ng<sup>5</sup>

<sup>1</sup>Department of Surgery, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Kuala Lumpur, Malaysia.

<sup>2</sup>Department of Surgery, Queen Elizabeth Hospital, Ministry of Health Malaysia, Kota Kinabalu, Sabah, Malaysia.

<sup>3</sup>Department of Surgery, Faculty of Medicine, University of Malaya, Kuala Lumpur, Malaysia

<sup>4</sup>Department of Surgery, Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia

<sup>5</sup>Department of Radiology, Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia

#### ABSTRACT

Bochdalek hernia is a type of congenital diaphragmatic hernia that primarily manifests in children however in rare instances they do manifest in adulthood spontaneously or after physical exertion. We report a case of a left-sided Bochdalek hernia in an adult who presented with left-sided chest pain and worsening symptoms of dyspnea. His chest radiograph revealed dilated small bowel loops in the left hemithorax causing a mediastinal shift. A computed tomography done revealed a posterolateral diaphragmatic defect through which the abdominal viscera had herniated. He was subsequently intubated due to severe respiratory distress. The patient underwent an emergency laparotomy which revealed a large 10 cm posterolateral diaphragmatic defect with herniation of small bowel, spleen and transverse colon. The small bowel was gangrenous and perforated therefore a primary repair of the defect with non-absorbable sutures was done. Gangrenous bowel was resected and primary anastomosis was done. Postoperatively, the patient had significant clinical improvement and was discharged a week later with no immediate complications.

**Keywords:** Agenesis of hemidiaphragm, Bochdalek hernias, Congenital diaphragmatic defect, Congenital diaphragmatic hernias, Spiral computed tomography

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#### ÖZET

Bochdalek fıtığı, esas olarak çocuklarda ortaya çıkan ancak nadiren yetişkinlikte kendiliğinden veya fiziksel efordan sonra ortaya çıkan bir tür doğuştan diyafram fıtığıdır. Sol tarafta göğüs ağrısı ve kötüleşen dispne semptomları ile başvuran bir erişkinde sol taraflı Bochdalek hernisi olgusunu sunuyoruz. Akciğer grafisinde sol hemitoraksta mediastinal kaymaya neden olan dilate ince barsak ansları görüldü. Yapılan bilgisayarlı tomografi, karın iç organlarının fıtıklaştığı posterolateral diyafram defekti ortaya çıkardı. Daha sonra şiddetli solunum sıkıntısı nedeniyle entübe edildi. Hastaya acil laparotomi yapıldı ve ince barsak, dalak ve transvers kolon herniasyonu ile birlikte 10 cm'lik büyük bir posterolateral diyafram defekti ortaya çıktı. İnce bağırsak kangrenli ve delinmişti, bu nedenle emilmeyen dikişlerle defektin birincil onarımı yapıldı. Gangrenöz barsak rezeke edildi ve primer anastomoz yapıldı. Ameliyat sonrası hastada önemli klinik düzelme oldu ve bir hafta sonra herhangi bir komplikasyon gelişmeden taburcu edildi.

**Anahtar Sözcükler:** Hemidiyafragma agenezisi, Bochdalek hernileri, Konjenital diyafram defekti, Konjenital diyafram hernileri, Spiral bilgisayarlı tomografi

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**ORCID IDs:** P.C.C. 0000-0003-2203-030X, D.B.J. 0000-0002-2569-1413, F.H. 0000-0002-3757-9744, C.Y.N.0000-0003-4704-7482

**Address for Correspondence / Yazışma Adresi:** Firdaus Hayati, MD, DrGenSurg. Department of Surgery, Faculty of Medicine and Health Sciences, Universiti Malaysia Sabah, Kota Kinabalu, Sabah, Malaysia E-mail: m\_firdaus@ums.edu.my

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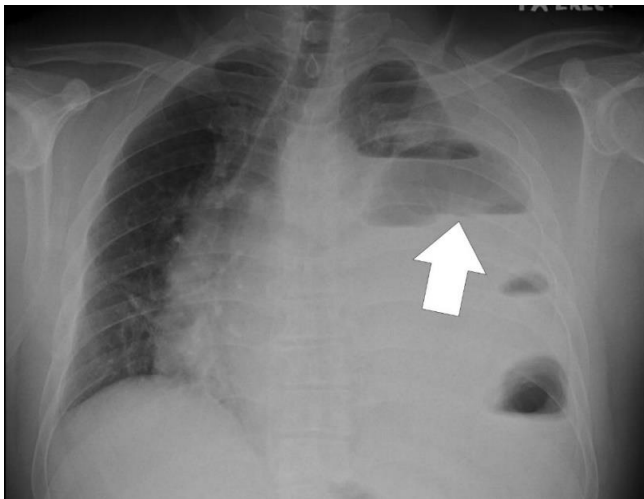
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## INTRODUCTION

Bochdalek hernia is a diaphragmatic hernia that results from a failure of the posterolateral diaphragmatic foramina to fuse in utero. Although mainly detected in childhood they can manifest in adulthood with a reported incidence rate as low as 0.17% and as high as 6% of all diaphragmatic hernias (1). The clinical presentation of a Bochdalek hernia in an adult is exceptionally rare. In 1959, Kirkland published the first review of adult Bochdalek hernia which included 34 cases and as of 1992 only 100 cases of symptomatic adult Bochdalek hernia have been reported in world literature (2). In adults, most Bochdalek hernias are detected as an incidental finding on computed tomography (CT) scan of the abdomen in asymptomatic adults, alternatively, it may be diagnosed only after complications occur. The clinical presentation of adult Bochdalek hernia is variable and is mainly confined to the respiratory or gastrointestinal systems; which makes the diagnosis even more difficult. Symptomatic Bochdalek hernia may lead to incarcerated or strangulated bowel, intraabdominal organ dysfunction and severe respiratory disease. Imaging plays a vital role in diagnosing and assessing the contents of the hernia and at the same time evaluating the presence of any associated abnormality. We describe a middle-aged gentleman who presented to us with strangulated Bochdalek hernia.

## CASE REPORT

A 49-year-old man presented to the emergency department of a district hospital with worsening symptoms of left-sided chest pain and dyspnea over a 3-day period. He had no prior known medical illnesses and denied any history of trauma or physical exertion. He also complained of difficulty to open his bowels and pass flatus since the onset of his primary symptoms. On examination, he was hypertensive and tachycardic. Auscultation revealed decreased air entry of the left side and per abdomen examination showed a tender epigastrium with no abdominal distension or peritonitis. His chest radiograph (Figure 1) showed dilated small bowel loops in the left hemithorax with significant mediastinal shift to the right.

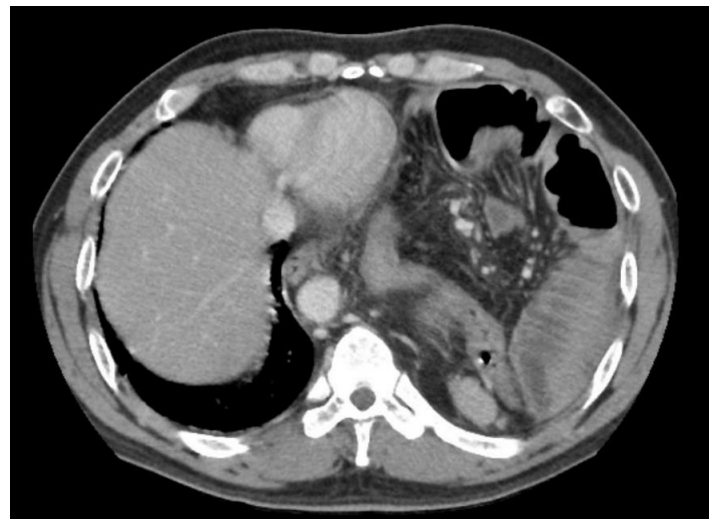


**Figure 1:** Chest radiograph in anteroposterior view showing small bowel loops (arrow) occupying most of the left hemithorax with obscuration of the left hemidiaphragm outline. There is a mediastinal shift towards the right hemithorax due to mass effect of herniated small bowels in the left hemithorax.

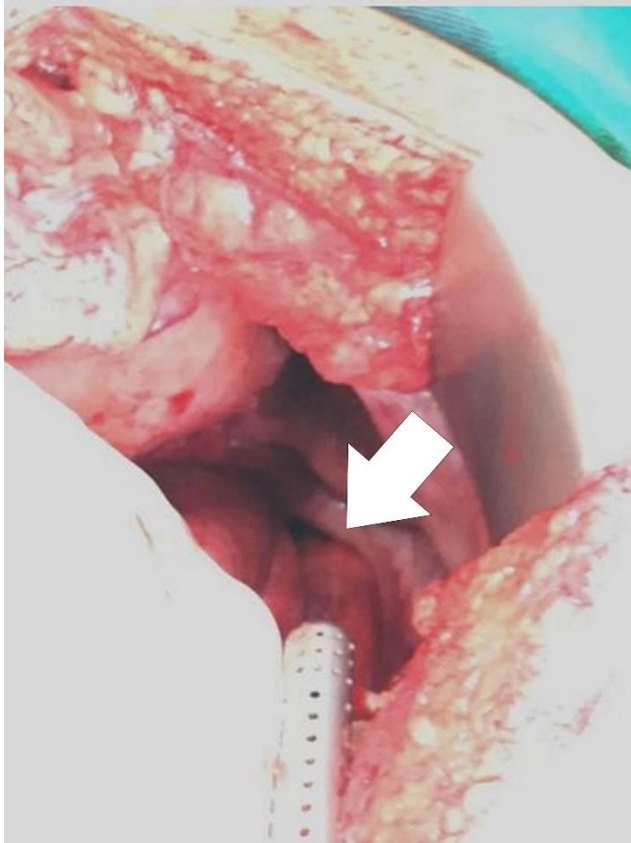
CT of the thorax and abdomen (Figure 2 and 3) was done immediately and showed a large left posterolateral diaphragmatic hernia with herniation of small bowel and mesenteric fat. The defect involved both diaphragmatic muscle and fascia. Small bowels were twisted around the mesentery causing a closed-loop obstruction, however, no evidence of ischemia was seen at the time. He was subsequently intubated due to worsening respiratory distress and was transferred to a tertiary centre for further definitive management.



**Figure 2:** Coronal view of CT of thorax and abdomen showing discontinuity of the left hemidiaphragm suggestive of a left diaphragmatic defect with fluid filled small bowel seen in left hemithorax causing a significant mediastinal shift of thoracic organs towards the right. Waistline constriction of the mesenteric vessels and intraabdominal contents through the left diaphragmatic defect, in keeping with “collar sign”.



**Figure 3:** Axial view of CT of the abdomen showing small bowels, mesenteric fat and mesenteric vessels within the left hemithorax through the left diaphragmatic defect.



**Figure 4:** Intraoperative findings of a posterolateral left diaphragmatic defect (arrow).

The patient was posted for surgery and intraoperative findings revealed herniation of small bowel, transverse colon, and small bowel through a posterolateral defect around 10 cm (Figure 4). After reduction of the hernia contents into the abdominal cavity, noted a segment of ileum was gangrenous with perforation resulting in a litre of faecal contamination of the left hemithorax. The gangrenous segment of bowel was resected and primary anastomosis was performed. The hemithorax was lavaged sufficiently and the posterior diaphragmatic defect was repaired with interrupted non-absorbable monofilament sutures (Prolene 1/0, Ethicon Inc; Johnson & Johnson, Somerville, NJ, USA). A polypropylene mesh was not used due to gross contamination. A single chest tube and a pelvic drain were inserted prior to closure. Postoperatively, the patient had an uneventful recovery and was discharged home a week later with no complications.

## DISCUSSION

The foramen of Bochdalek is 2 x 3 cm opening in the posterior aspect of the diaphragm in the fetus. It is through this opening the pleuroperitoneal canal communicates between the pleural and peritoneal cavities. This foramen usually closes at 8 weeks of gestation however failure or incomplete fusion of the lateral with posterior crural components of the diaphragm leads to a Bochdalek hernia formation. The left canal closes later than the right canal resulting in this hernia being found more prevalent on the left (1). Presentation of symptomatic Bochdalek hernia in adults varies with most patients presenting with chest pain, dyspnea, dyspepsia and even features of intestinal obstruction. This particular patient presented to us with classical symptoms of left-sided chest pain, dyspnea with features of intestinal obstruction without any aggravating factors. A high degree of suspicion and prompt imaging studies are vital to an early diagnosis and accurate management of the disease (3).

Bochdalek hernia can be routinely diagnosed by plain frontal and lateral chest radiographs however it lacks sensitivity and maybe confused with other thoracic pathologies such as hydropneumothorax, lobar collapse and mediastinal mass (2, 4). In fact, the sensitivity of detecting a diaphragmatic hernia using chest radiograph ranges from 23-73%, in comparison with sensitivity of conventional CT of 14-61% and specificity of 76-99% (5). Whereas the sensitivity of helical CT in detecting diaphragmatic hernia of 71% and with a specificity of 100% (6). Multiplanar reconstruction on coronal, sagittal and axial images of helical CT images enable high sensitivity and specificity (6). Therefore, helical CT of the thorax and abdomen is deemed the most accurate way to diagnose and evaluate contents of the hernia as well as detection of the thoracic cavity and other associated anomalies. Classically, CT signs of diaphragmatic hernia includes direct visualisation of the diaphragmatic defect, visceral intrathoracic herniation and collar sign (5). The collar sign is described as a "waistlike constriction" of the herniated structure at the site of diaphragmatic defect (7). Thankfully, our patient did not show any other thoracic or abdominal organ anomalies that may have suggested chronic herniation.

The treatment of Bochdalek hernias are mainly surgical and are associated with good postoperative outcome. In our case, the patient was suspected to have some degree of strangulation as evidenced by dilated small bowel loops associated with a closed-loop obstruction. Therefore, we chose a transabdominal approach via a midline laparotomy. A mesh repair was not performed due to significant contamination of bowel contents. However, in the absence of strangulation, gangrene or obstruction, a transthoracic or a laparoscopic approach with polypropylene mesh repair should be considered (8, 9).

## CONCLUSION

Asymptomatic Bochdalek hernias in adults are rare and require a high degree of medical acumen paired with prompt imaging studies. Chest radiography is a good screening tool but thin-section CT scanning has higher sensitivity for these lesions. Surgical approach whether transthoracic versus transabdominal, open versus laparoscopic, should be planned carefully to avoid any unwanted complications that impair recovery and result in a recurrence of the hernia.

## Conflict of interest

No conflict of interest was declared by the authors.

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