Left-Sided Bochdalek Hernia with Gastric Volvulus and Intrathoracic Kidney in a 21-Year-Old Male: A Case Report

Aneesh Kakkatt*, Shahana Aneesh

Department of Radiology, Blackpool Victoria Hospital, Blackpool, FY3 8NR, UK

***Correspondence:** Aneesh Kakkatt, Department of Radiology, Blackpool Victoria Hospital, Blackpool, FY3 8NR, UK

aneesh.kakkatt@nhs.net

Radiology Case. 2026 April; 20(4):1-7 :: DOI: 10.3941/jrcr.6009

AUTHORS' CONTRIBUTIONS
Aneesh Kakkatt: manuscript preparation, drafting, editing and submission
Shahana Aneesh: manuscript preparation, drafting and editing

ACKNOWLEDGEMENTS
None

DISCLOSURES
None declared.

CONSENT
Written informed consent for publication was obtained from the patient.

HUMAN AND ANIMAL RIGHTS
All procedures followed institutional and national ethical standards and the Helsinki Declaration

ABSTRACT

A 21-year-old male presented with sudden-onset left upper quadrant abdominal pain radiating to the chest, associated with shortness of breath. He had a history of intermittent abdominal bloating and fullness for 3–4 years. Contrast-enhanced computed tomography revealed a large left-sided posterolateral diaphragmatic defect (Bochdalek hernia) containing the stomach, spleen, and left kidney. The stomach was distended and twisted (organoaxial gastric volvulus) with surrounding inflammatory changes. Emergency surgery was performed, involving reduction of herniated contents, detorsion of the stomach, and mesh repair of the diaphragmatic defect. The intrathoracic kidney was left in situ due to normal perfusion. The patient recovered fully. This case highlights the importance of prompt imaging and surgical intervention in adult Bochdalek hernias presenting with acute complications.

CASE REPORT

BACKGROUND

Adult Bochdalek hernia (BH) is uncommon, with an incidental CT prevalence of ~0.17% and a left-sided predominance (≈75–90%). Acute presentations usually arise from complications such as gastric volvulus and strangulation, requiring urgent recognition and repair. Association with an intrathoracic kidney is exceptionally rare; when renal perfusion is intact, kidney-sparing repair with the kidney left in situ is reasonable. Contrast-enhanced CT is the diagnostic gold standard, defining the posterolateral defect, herniated contents, and complications. This case contributes imaging–operative correlation of tri-organ herniation (stomach, spleen, kidney) with organoaxial gastric volvulus in a young adult and underscores pragmatic, kidney-sparing management.

CASE REPORT

Imaging Findings

CT demonstrated a left posterolateral diaphragmatic defect with herniation of the stomach, spleen, and the left kidney into the thorax. The stomach was distended and twisted along its long axis (organoaxial volvulus) with adjacent fat stranding and mild fluid. The left lower lobe lung was compressed; the left kidney appeared normally perfused (Figures 1,2).

Management

Emergency laparotomy confirmed the CT findings. The stomach was detorsed and reduced, along with the spleen. The intrathoracic kidney was left in place due to adequate perfusion. The diaphragmatic defect was repaired with non-absorbable sutures and mesh reinforcement.

Follow-up

Postoperative recovery was uneventful. At 1-month follow-up, the patient remained asymptomatic.

DISCUSSION

Etiology & Demographics

A Bochdalek hernia is a congenital diaphragmatic defect that results from incomplete closure of the pleuroperitoneal canal during embryogenesis [2,7]. This defect allows abdominal viscera to herniate into the thoracic cavity. The condition is more common on the left side (75–90%) than the right [2,7], likely due to earlier closure of the right pleuroperitoneal canal and the protective presence of the liver on the right side. While Bochdalek hernia is typically diagnosed in the neonatal period due to severe respiratory distress, it is rarely detected in adults. Large CT-based series have shown an incidental prevalence in asymptomatic adults of only ~0.17% [6]. Adult presentations account for a small fraction of all BH cases reported in the literature [7], with many identified incidentally during imaging for unrelated issues.

Clinical & Imaging Findings

Adult BHs can remain asymptomatic for years, or cause nonspecific gastrointestinal and/or respiratory complaints, including intermittent abdominal pain, bloating, postprandial fullness, dyspnea, or chest discomfort [2,7]. Acute presentations, as in our case, usually occur when herniated organs become obstructed, inflamed, or strangulated [1,7]. Gastric volvulus within a BH is a recognized but uncommon complication. The abnormal intrathoracic position of the stomach predisposes it to rotation, which may lead to closed-loop obstruction, vascular compromise, and ischemia [1,2]. Radiographically, chest X-ray may show an elevated hemidiaphragm or air-fluid level within the thorax. However, the gold standard for diagnosis is contrast-enhanced CT [2,5,7]. CT precisely demonstrates the diaphragmatic defect, identifies herniated viscera, assesses complications such as volvulus, and aids in surgical planning. In our case, CT also revealed an unexpected finding — an intrathoracic kidney — which influenced surgical decision-making.

Intrathoracic Kidney Association

An intrathoracic kidney is a rare congenital anomaly representing less than 5% of all renal ectopias, and its association with BH is extremely uncommon (around 0.25% of BH cases) [3,4]. The ectopic kidney may enter the thorax during embryonic development through the diaphragmatic defect. Most intrathoracic kidneys are functional and asymptomatic, and when encountered during BH repair, surgical repositioning is often avoided if renal perfusion is preserved to prevent vascular injury [3,4]. In our patient, the kidney was well-perfused and tethered by its vasculature; therefore, the diaphragmatic defect was repaired around it rather than attempting relocation.

Treatment & Prognosis

All symptomatic BHs in adults require surgical repair to prevent life-threatening complications [2,7]. Even asymptomatic cases are often repaired electively, as the lifetime risk of complications such as strangulation is significant [7]. In acute settings with volvulus or obstruction, urgent surgery is essential [1,2]. The choice of surgical approach — open (laparotomy or thoracotomy) versus minimally invasive (laparoscopy or thoracoscopy) depends on patient stability, defect size, and surgeon expertise [2,7]. In emergencies, open transabdominal repair remains common, as it allows rapid reduction of herniated contents, assessment of viability, and repair of the defect. Large defects often require mesh reinforcement to achieve tension-free closure, as in our case [2,7]. The prognosis is excellent when BH is diagnosed and repaired promptly before ischemia or necrosis occurs. Delayed diagnosis can result in bowel or gastric infarction, splenic compromise, or even death [1,2,7].

Differential Diagnoses

Key differentials for an apparent intrathoracic abdominal organ shadow include: Traumatic diaphragmatic rupture (often irregular margins, history of trauma) [7]; Morgagni hernia (anterior parasternal defect) [2]; Eventration of the diaphragm (intact but thinned, elevated diaphragm) [7]; Pleural or mediastinal cysts (do not contain bowel gas patterns) [2]; and Large hiatal hernia (herniation through the esophageal hiatus, usually containing stomach) [7].

TEACHING POINT

Adult Bochdalek hernia is rare but potentially fatal when complicated by gastric volvulus. Contrast-enhanced CT is essential for diagnosis and surgical planning. Prompt surgical repair prevents life-threatening outcomes.

QUESTIONS

Question 1: Which imaging findings are most characteristic of an adult Bochdalek hernia?

Defect in the posterolateral diaphragm (applies)

Herniation of abdominal organs into the thoracic cavity (applies)

Pleural thickening with calcifications

Lung consolidation with air bronchograms

Mediastinal shift toward the side of the hernia (applies)

Explanation: Computed tomography typically shows a posterolateral diaphragmatic defect with herniated abdominal viscera, sometimes causing mediastinal shift [CT precisely demonstrates the diaphragmatic defect, identifies herniated viscera, assesses for complications such as volvulus, and aids in surgical planning].

Question 2: What is the most common side for a Bochdalek hernia in adults?

Right side

Left side (applies)

Bilateral equally

Posterior midline
Anterior parasternal

Explanation: Left-sided BH is more common (approximately 75–90%) due to embryologic closure patterns and the liver's protection on the right [The condition is more common on the left side (75–90%) than the right, likely due to earlier closure of the right pleuroperitoneal canal and the protective presence of the liver on the right side].

Question 3: Which are potential complications of a Bochdalek hernia in adults?

Gastric volvulus (applies)
Bowel obstruction (applies)
Pulmonary embolism
Strangulation of herniated organs (applies)
Chronic pancreatitis

Explanation: Gastric volvulus, bowel obstruction, and strangulation are recognized as acute complications of adult BH [Acute presentations, as in our case, usually occur when herniated organs become obstructed, inflamed, or strangulated. Gastric volvulus within a BH is a recognized but uncommon complication].

Question 4: Which imaging modality is the gold standard for diagnosing an adult Bochdalek hernia?

Chest X-ray
Ultrasound
MRI
Contrast-enhanced CT (applies)
PET-CT

Explanation: Contrast-enhanced CT delineates the diaphragmatic defect, herniated viscera, and complications, and guides surgical planning [However, the gold standard for diagnosis is contrast-enhanced CT].

Question 5: What is the recommended management for a symptomatic adult Bochdalek hernia?

Watchful waiting
Surgical repair (applies)
High-dose antibiotics
Thoracentesis
Percutaneous pleural drainage

Explanation: Surgical repair is necessary to prevent strangulation and ischemia; urgent surgery is essential in acute obstruction/volvulus [All symptomatic BHs in adults require surgical repair to prevent life-threatening complications. Even asymptomatic cases are often repaired electively, as the lifetime risk of complications such as strangulation is significant].

REFERENCES

[1] Biswas S, McNerney P, Patel P. Bockdalek Hernia With Gastric Volvulus With Ischemia in an Adult: A Case Report. *J Curr Surg.* 2017; 7(1-2): 15-19.

[2] Yagmur Y, Yigit E, Babur M, Gumus S. Bochdalek hernia: A rare case report of adult age. *Int J Surg Case Rep*. 2016; 20:13-16.

[3] Afzal M, et al. Incidental Finding of a Left Intrathoracic Kidney Associated with Bochdalek Hernia in a Child: A Case Report. *Ann Case Rep.* 2025; 10: 2345.

[4] Alragheb Y, et al. Conservative approach in adult right-sided Bochdalek hernia with an intrathoracic ectopic kidney. *Exploratory Res Med.* 2023; 4: 45-53.

[5] Lochman P, Hůlek M, Dušek T. Asymptomatic Bochdalek's hernia in an adult: a case report. *Cureus.* 2024; 16(5): e38430. PMID: 38832169.

[6] Mullins ME, Stein J, Saini S, Mueller PR. Prevalence of incidental Bochdalek's hernia in a large adult population. *AJR Am J Roentgenol.* 2001; 177(2): 363-366. PMID: 11461863.

[7] Brown SR, Horton JD, Trivette E, Hofmann LJ, Johnson JM. Bochdalek hernia in the adult: demographics, presentation, and surgical management. *Hernia.* 2011; 15(1): 23-30. PMID: 20614149.

FIGURES

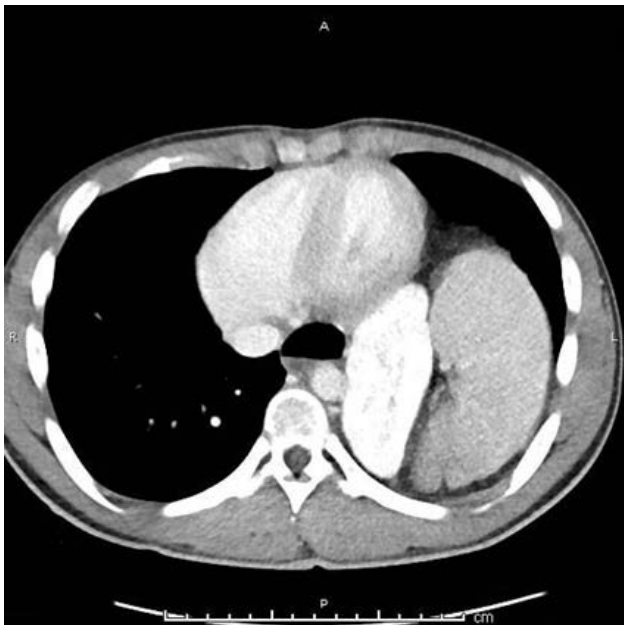

Figure 1: 21-year-old male with left-sided Bochdalek hernia. FINDINGS: axial contrast enhanced scan showing herniated spleen and left kidney in the thorax. TECHNIQUE: Contrast-enhanced CT chest and abdomen; portal venous phases; [100kVp, 101mAs, 3mm slice thickness].

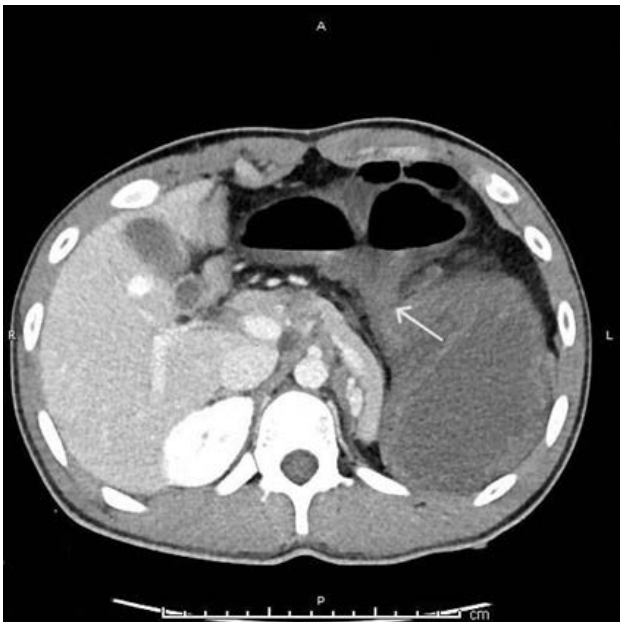

Figure 2: 21-year-old male with left-sided Bochdalek hernia. FINDINGS: axial contrast enhanced image showing organo-axial volvulus of the stomach(arrow). TECHNIQUE: Contrast-enhanced CT chest and abdomen; portal venous phases; [100kVp, 101mAs, 3mm slice thickness].

Figure 3: 21-year-old male with left-sided Bochdalek hernia. FINDINGS: coronal contrast enhanced image showing herniated spleen and left kidney in the thorax with volvulus of the stomach (black arrow) and diaphragmatic defect (white arrow). TECHNIQUE: Contrast enhanced CT chest and abdomen; portal venous phases; [100kVp, 101mAs, 3mm slice thickness].

Figure 4: 21-year-old male with left-sided Bochdalek hernia. FINDINGS: coronal contrast enhanced image showing herniated intrathoracic spleen and left kidney. There is normal contrast enhancement of the left kidney. TECHNIQUE: Contrast-enhanced CT chest and abdomen; portal venous phases; [100kVp, 101mAs, 3mm slice thickness].

Table 1: Summary table of key features of adult Bochdalek hernia.

Feature	Details
Etiology	Congenital failure of pleuroperitoneal canal closure
Incidence	~0.17% in asymptomatic adults on CT [6]
Gender ratio	Slight male predominance (varies by series)
Age predilection	Common in neonates; rare in adults
Risk factors	Increased intra-abdominal pressure, trauma (precipitating factors)
Treatment	Surgical repair; mesh for large defects [2,7]
Prognosis	Excellent if repaired before strangulation [1,2,7]
Imaging findings	Posterolateral diaphragmatic defect; herniated viscera; possible mediastinal shift

Table 2: Differential diagnosis of adult Bochdalek hernia with characteristic imaging features.

Diagnosis	X-ray	CT	MRI	US
Bochdalek hernia	Gas-filled bowel in thorax; elevated hemidiaphragm	Posterolateral defect; abdominal viscera in thorax	Similar to CT; better soft-tissue delineation	Limited
Traumatic diaphragmatic rupture	Similar if bowel herniates	Irregular discontinuity/defect	Helpful if CT equivocal	Rarely used
Morgagni hernia	Anterior cardiophrenic mass	Anterior diaphragmatic defect	Same as CT	Limited
Eventration of diaphragm	Smoothly elevated hemidiaphragm	Intact but thinned diaphragm	Confirms thinning	Limited
Large hiatal hernia	Retrocardiac air-fluid level	Herniation via esophageal hiatus	Defines soft tissue relationships	Limited

KEYWORDS

Bochdalek hernia; congenital diaphragmatic hernia; gastric volvulus; intrathoracic kidney; computed tomography; diaphragmatic defect; adult presentation; emergency surgery.

ABBREVIATIONS

BH = Bochdalek Hernia
CDH = Congenital Diaphragmatic Hernia
CT = Computed Tomography
LUQ = Left Upper Quadrant
CXR = Chest Radiograph