

# Adult Bochdalek Hernia Complicated With Perforated Gastric Ulcer: Preoperative Diagnosis With Multiplanar CT

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## INTRODUCTION

Bochdalek hernia is due to improper fusion of the posterolateral foramina of the diaphragm, which was first described by Bochdalek in 1848<sup>1</sup>. It is rare in adults and accounts for about 0.17% to 6% of all diaphragmatic hernia [1]. Small Bochdalek hernias may remain undetected until or through adulthood since they are almost always asymptomatic.

Quite often an adult Bochdalek hernia is detected as an incidental finding on abdominal CT in asymptomatic patients. Multislice CT, with coronal and sagittal reconstruction, is expected to be useful in diagnosing abdominal hernias including Bochdalek hernia prior to operation. Recent case reports have emphasized on the usefulness of helical CT with multiplanar reconstructions in revealing diaphragmatic hernia<sup>2</sup>.

We report a rare case of adult Bochdalek hernia who presented with symptomatic diaphragmatic hernia. The significant role of imaging especially multiplanar reformatted multidetector computed tomography (MDCT) in the accurate diagnosis of this abnormality is also discussed.

## CASE REPORT

A 42-year-old gentleman presented with one week history of abdominal pain associated with nausea and non-billous vomiting. There was no history of trauma prior to the symptoms. He was dehydrated and afebrile. Abdominal examination revealed sign of peritonitis.

The chest radiograph showed a huge cavity with air-fluid level occupying the left mid and lower zones. A provisional diagnosis of left lung abscess and pleural effusion was made. CT thorax and abdomen showed a dilated stomach with signs suggestive of inflammatory process with pneumoperitoneum. Reformatted coronal images revealed intrathoracic location of the dilated stomach (Figure 1 & 2). A provisional diagnosis of diaphragmatic hernia with perforated viscus was made.

He underwent an urgent laparotomy. Intra-operative findings revealed a Bochdalek hernia with fundus and proximal body of stomach located within the left hemithorax. There were two perforations at the stomach fundus which was primarily repaired with Vicryl suture and omental patch. The hernia

was repaired with prolene suture. Gross contamination of greenish fluid was noted in the peritoneal cavity.

Post-operatively, he was placed in intensive care unit with full cardiac and respiratory support. Despite of IV antibiotic, his condition was complicated by intra-abdominal sepsis and succumbed later due to septicemic shock.

## DISCUSSION

Congenital hernias result from developmental failure of the posterolateral diaphragmatic foramina to fuse properly. Most Bochdalek hernias are diagnosed in children, presented with clinical symptoms caused by associated pulmonary insufficiency<sup>1</sup>. Being a childhood disease, it can also be diagnosed incidentally in adult patients who undergo computed tomography (CT) due to reasons unrelated to suspicion of diaphragmatic hernia<sup>3</sup>.

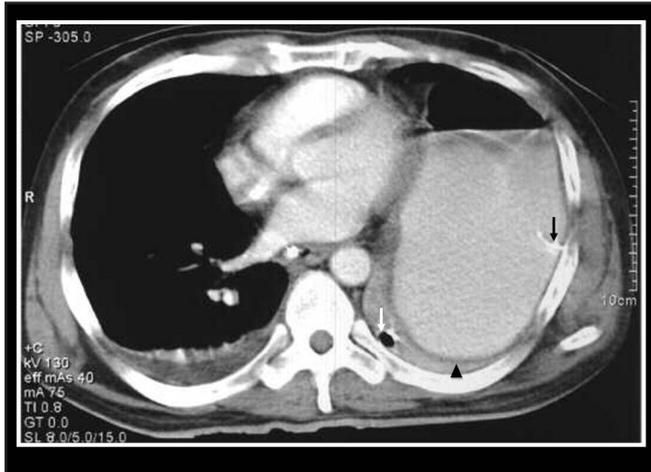
The true incidence of asymptomatic Bochdalek hernia remains unknown ranging from 1/7,000 to 6%<sup>1</sup>. In the largest study in the literature (thin section CT scanning with the most modern imaging equipment), the incidence was found in 0.17% (22 patients) of 13,138 patients and all these patients were asymptomatic<sup>1</sup>.

A review of 53 cases of non-traumatic symptomatic adult hernia done in 1991 showed that of these patients, 12 had a definite preceding precipitating factor<sup>2</sup>. Chui et al reported a case of sudden death due to perforation of gastric ulcer in an incarcerated Bochdalek hernia<sup>4</sup>. This was reported in 1993 whereby the advent of multiplanar reconstruction CT was not yet established. A local case reported by Islah et al highlighted incidence of Bochdalek Hernia in a pregnant woman that was also complicated with stomach ischaemia<sup>5</sup>. It is postulated that in this patient, the stomach dynamically moved in and out the thoracic cavity through the diaphragmatic defect, which precipitated the formation of ulcers at the gastric fundus. Later, when the ulcer has perforated, it gave him symptoms as the diseased stomach is strangulated through the hernia most likely due to changes in the intra-abdominal pressure.

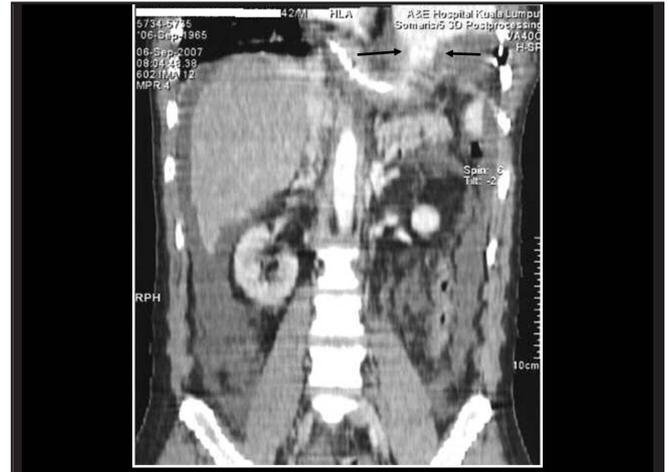
CT is the most accurate method of diagnosing and evaluating the content of a Bochdalek hernia<sup>3</sup>. CT with multiplanar reconstruction can accurately assess the thoracic cavity.

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**Fig. 1:** Contrast enhanced CT thorax shows dilated stomach with air-fluid level located intrathoracic. The stomach is no longer supported posteriorly by the left diaphragm and fall to dependent position against the posterior ribs (dependent viscera sign) (black arrowhead). Part of the gastric tube (black arrow) is seen within the stomach. Chest tube is seen posterior to the herniated stomach (white arrow).



**Fig. 2:** The coronal reconstruction of thorax/ abdomen shows the stomach in the left hemithorax and clearly demonstrates a defect at the left hemidiaphragm (black arrows), where the stomach has passed through (The collar sign).

Without the use of CT nearly 38% of adults were misdiagnosed to have pleural effusion, empyema, lung cyst and pneumothorax<sup>3</sup>.

The primary diagnosis of Bochdalek hernia is made by CT when there is presence of posterolateral diaphragmatic disruption<sup>3</sup>. The collar sign, a waistlike constriction of the herniating hollow viscus at the site of diaphragmatic defect is the most frequent sign detected and has a sensitivity of 36% with conventional CT and 63% with helical CT. Intrathoracic herniation of abdominal content has sensitivity of 55% and a specificity of 100%. An additional sign that was observed in 90% of cases is the dependent viscera sign. This sign is explained by the herniated viscera (bowels or solid organ) are no longer supported posteriorly by the diaphragm and fall to dependent position against the posterior ribs<sup>6</sup>. Nevertheless, the diagnosis of diaphragmatic hernia is largely depends on identifying abdominal viscera above the diaphragm rather than identifying the diaphragmatic defect. This can be best demonstrated by sagittal and coronal reconstructive images<sup>6</sup>.

The treatment of Bochdalek hernia is operative and patients generally do not have recurrence and remain asymptomatic [2]. Primary suture of the diaphragmatic defect could be done via a thoracic (47%) or abdominal (33%) approach; as in this case the repair was done via an abdominal approach<sup>2</sup>.

In conclusion, the late presentation of Bochdalek hernia poses a difficult diagnosis and hence a careful examination and strong index of suspicion are needed for prompt and early diagnosis in order to prevent morbidity and mortality. Imaging of the problem using chest radiograph and computed tomography are extremely helpful prior to operation. Multislice CT with reformatted images is of better quality and can be helpful in detecting subtle visceral herniation and even confirm the presence of diaphragmatic hernia.

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