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## Case Report

# Diaphragmatic hernia a rare cause of acute pancreatitis: Case report <sup>☆</sup>

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## ABSTRACT

Many complications are known to occur in association with a diaphragmatic hernia. Acute pancreatitis occurring in this situation is very rare. In this paper, we report a case and describe the radiographic features of this complication. We report an unusual case of acute pancreatitis complicating a neglected post-traumatic diaphragmatic hernia in a 30-year-old male. This patient had a history of an abdominal trauma 5 years ago, and arrived at the emergency room with epigastria and left chest pain and vomiting. Serum lipase was elevated. Acute pancreatitis could be considered as an exceptional complication of diaphragmatic hernia. It is a serious diagnostic and therapeutic challenge. The fundamental roles of CT are to determine the diaphragmatic defect, the abdominal content involving, the Balthazar scoring of pancreatitis, and the presence of local complications. Even if a conservative approach is preferred when facing a diagnosis of pancreatitis, timing of surgery should be carefully considered.

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## Introduction

Post-traumatic diaphragmatic hernia is described as the permanent or intermittent prolapse of any abdominal structure into the mediastinum or thoracic cavity via the diaphragm apertures [1]. In the sixteenth century, Ambroise Pare reported this disease for the first time [2]. The stomach is the most commonly herniated organ. Small intestine, spleen, and transverse colon herniations are among the least common. Pancreas's herniation is relatively uncommon. [3] However,

acute pancreatitis worsening a diaphragmatic hernia in the same situation is uncommon [4]. There have been extremely few recorded examples in the world literature. The reasons are thought to be; ductal injury, ischemia from vascular pedicle traction, or direct parenchymal trauma to the pancreas [5].

We present here an unusual situation of an overtly symptomatic patient with acute pancreatitis who had herniation of the head, body, and tail of the pancreas, the gut, the first part of the duodenum, stomach, and sections of the biliary tree into the chest. This case demonstrates herniation as a rare cause

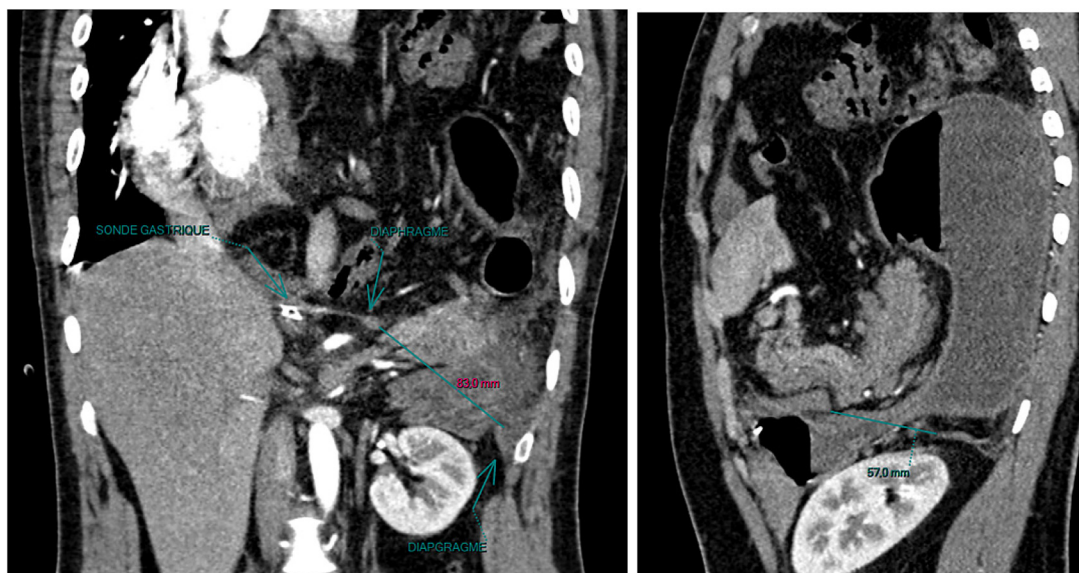
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**Fig. 1 – Enhanced CT coronal and sagittal reconstructions revealing a large and central defect of the left diaphragmatic dome measuring 83 x 57 mm.**

of pancreatitis and shows that herniation may explain certain cases of idiopathic pancreatitis.

## Case presentation

The case of our study concerns a 30-year-old man who is non-alcoholic and has had a post-traumatic diaphragmatic hernia 5 years ago (Fig. 1), who came to the emergency room after having a violent epigastric pain, and vomiting that lasted for 3 days.

Physical examination showed: his vital signs were; respiratory rate: 30/min, pulse rate: 66 bpm, temperature: 38.6°C, and blood pressure: 120/80 mm Hg. He appeared dehydrated, on general physical examination. Examination of the abdomen showed an undistended, non-tender abdomen, and ordinary bowel sounds. Bowel sounds were noticeable over the left chest.

Enhanced CT (Computed tomography) of the chest, abdomen and pelvis revealed a large diaphragmatic hernia occupying the left thorax with compressive atelectasis in portions of left lung adjacent to the hernia, and mass effect on the mediastinum. The diaphragmatic hernia involved the entire stomach, transverse and right colon, small intestine, duodenum as well as the head, body and the tail of pancreas, sliding through the left diaphragmatic defect (Fig. 2). The pancreas was folded into an “Ω” shape, enlarged with multiple fluid collections (Fig. 3). The Wirsung’s duct and the extrahepatic bile ducts were stretched. There was no gallstone or cholelithiasis as showed by magnetic resonance cholangiopancreatography (MRCP)(Fig. 4), and no ascites.

The case final diagnosis is acute pancreatitis Balthazar E as a complication of diaphragmatic hernia. Intravenous hydration with Lactated Ringer’s Solution, analgesics, and intensive care monitoring were used to manage the acute pancreatitis during

resuscitation. Four months later, an elective surgical repair of the diaphragmatic hernia was performed. Abdominal surgical approach was opted. After obtaining informed consent, procedure was performed under general anesthesia with endotracheal intubation. The defect was identified in left diaphragmatic dome measuring 8 cm, the abdominal contents were reduced, and the defect was closed with prosthesis. The patient’s postoperative course was uneventful.

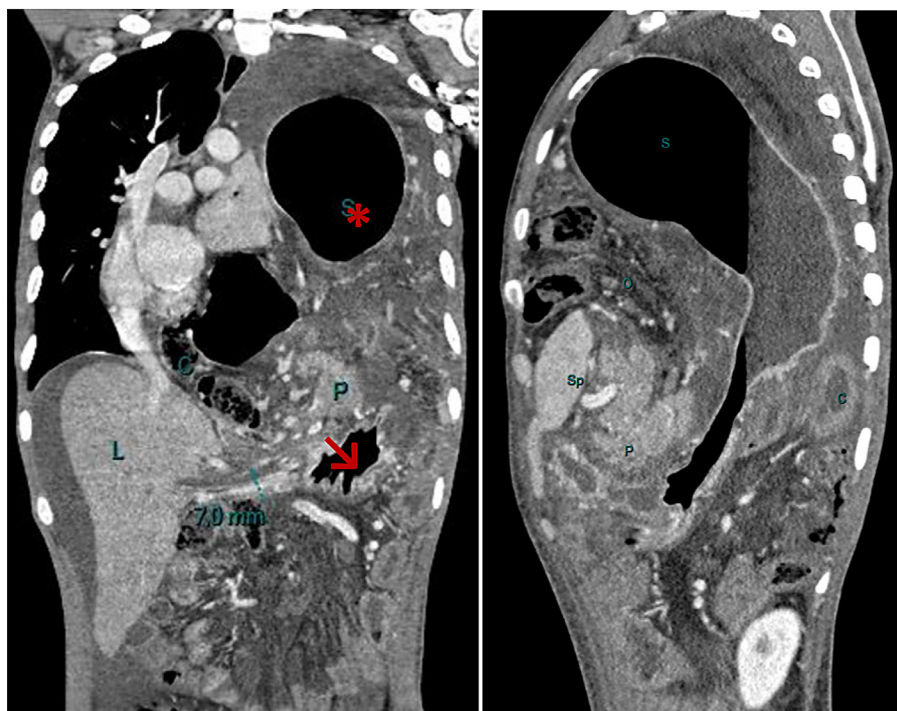
He was released from the hospital 10 days after surgery with no dysphagia symptoms.

On day 30 after diaphragmatic hernia repair, a CT scan revealed that the pancreas, stomach, and bile ducts were all in their correct anatomic positions (Fig. 5).

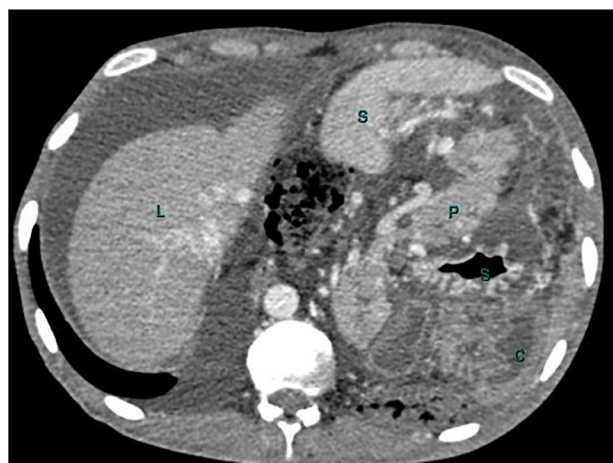
Three months after the operation, there was no dysphagia or hernia recurrence.

## Discussion

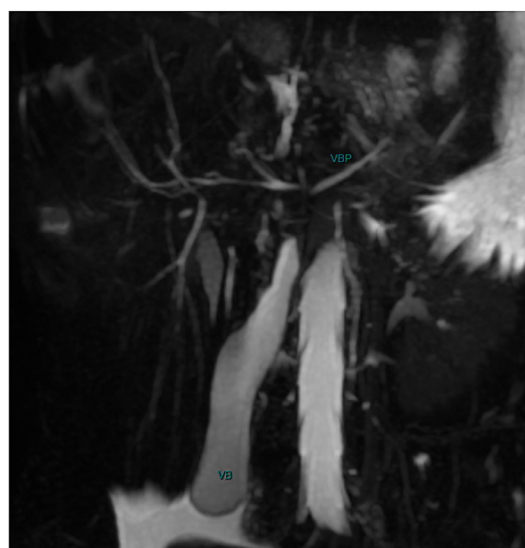
Diaphragmatic hernias can be congenital, hiatal, or traumatic in origin, and they are defined by a transitory or persistent migration of abdominal contents into the thoracic cavity through a diaphragmatic defect [6]. with the exception of the stomach, the small intestine, spleen, and transverse colon are the organs least prone to hernias [1]. Because the head segment of the pancreas and duodenum are positioned in the retroperitoneum and held by Treitz’ ligament, pancreatic herniation is extremely rare [3]. However, stretching of the transverse mesocolon due to increased intra-abdominal pressure induces posterior fascia loosening, leading in pancreatic mobility, and herniation [2]. Pancreatic herniation is a rare occurrence, with just 12 cases reported to date [3]. As a result of this mechanism, acute pancreatitis is extremely unusual, having been recorded in only 14 people previously [1].



**Fig. 2 – Enhanced CT coronal and sagittal reconstructions revealing diaphragmatic hernia containing the entire stomach (S) and duodenum, head, body and tail of pancreas who is folded into an “Ω” shape, large bowel (C), Spleen (Sp), omentum, and vessels. Collapse in the left lung (\*). Stretched extrahepatic bile ducts (Red arrow).**



**Fig. 3 – Enhanced CT axial image: enlarged with multiple fluid collections. Free fluid.**



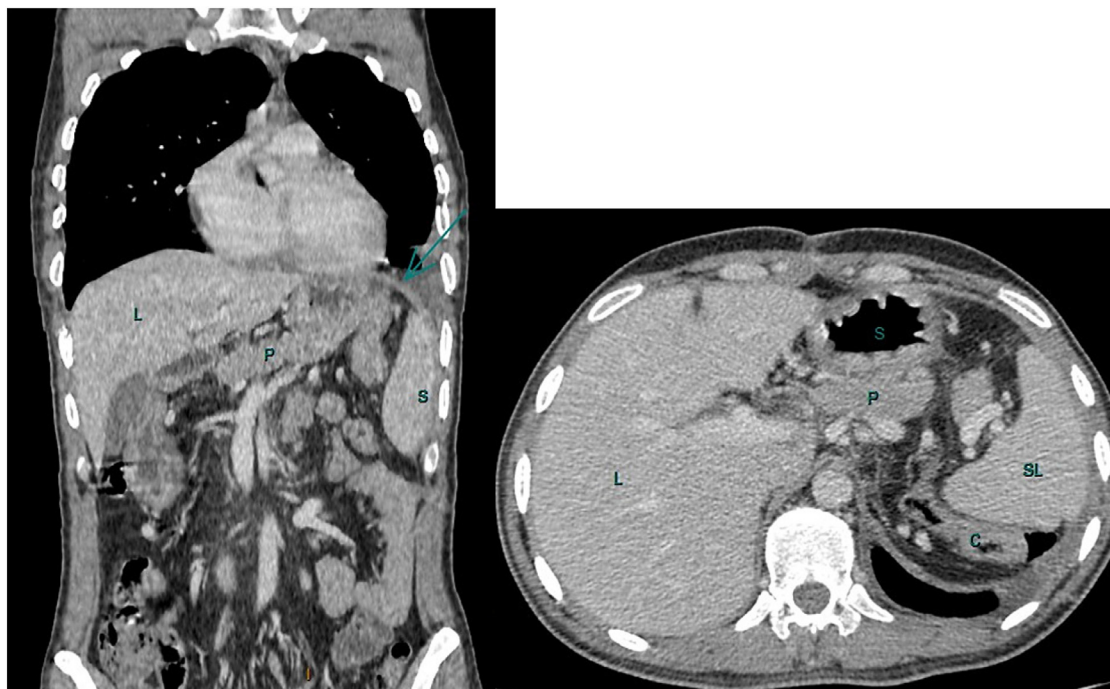
**Fig. 4 – 3D Bili MRI: no gallstone or choledocholithiasis.**

Acute pancreatitis secondary to diaphragmatic hernia is most commonly associated with congenital or hiatal hernias, whereas traumatic diaphragmatic hernia is uncommon [6]. The specific etiology of the acute pancreatitis remains unknown. The authors identified 3 possible mechanisms for acute pancreatitis in diaphragmatic hernia: complete incarceration of the pancreas in hernias without volvulus, abnormal pancreas's traction, pancreas's migration through a hernial sac and repetitive trauma during hernia crossing, and is-

chemia associated with stretching of the pancreatic vascular pedicle and drainage obstruction with folding of the main pancreatic duct [4–6]. Pancreatitis may also be caused by total pancreatic incarceration [3].

Pancreatic herniation symptoms can range from slight discomfort to severe pain and shock [7]. The most common symptoms are vomiting and abdominal pain. Weight loss,





**Fig. 5 – Enhanced CT coronal reconstructions and axial on day 30 after the repair of the diaphragmatic hernia showing that the stomach(S), pancreas (P), bile ducts large bowel (C), Spleen (SL), omentum, and vessels were located in their normal anatomic position.**

chest pain, orthopnea, diaphoresis, and Dyspnea are some of the other symptoms [1].

Elevated serum amylase and lipase levels are sensitive and specific indications of acute pancreatitis and should always raise the clinician's concern. A CT scan of the thorax and abdomen should be conducted after a thorough history, physical examination, and laboratory evaluation, ideally during a symptomatic time [8]. In the majority of cases, the hernia location and herniated organs within the thorax are easily noticeable, particularly in reformatted CT images. It displays intrathoracic herniation of abdominal contents, diaphragmatic discontinuity, and waist like constriction of the mesenteric folds (the "collar sign"). In pancreatitis, CT scan shows total or partial herniation of the pancreas, hypertrophy of the gland with edema, and homogeneous enhancement associated or not with a collection of peripancreatic fluid in the form of non-encapsulated collections of variable size and shape in edematous interstitial pancreatitis. In necrotizing pancreatitis; the CT backgrounds are heterogeneous enhancement and an acute necrotic collection [9]. This allows the morphology of this disease to be classified and its clinical severity to be predicted by applying imaging severity indices [10].

The primary role of CT in determining the severity of AP will be to determine pancreatitis score, the existence of local complications, the extent of necrosis, and superinfection. The most widely used have been the Balthazar score, which was published in 1985 and is based on pancreatic and peripancreatic inflammatory data as well as the presence of collections, and the CT severity index (CTSI), which was also described by Balthazar et al. in 1990 [11].

A multidisciplinary approach involving a general surgeon, an intensivist, and a cardiothoracic surgeon is recommended [12].

## Conclusion

Diaphragmatic hernia, a common clinical disease, can occasionally occur with acute pancreatitis. Although uncommon, pancreatitis resulting to pancreatic herniation should be considered in patients who have unexplained pain accompanied with a large diaphragmatic hernia. Elevated serum amylase and lipase confirm the diagnosis. The CT scan allows the scoring of pancreatitis and complications.

## Patient perspective

The patient was satisfied of the treatment and the follow-up he received.

## Patient consent

The patient gave informed consent.

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