

## *Case report*

# Unusual variant of left paraduodenal hernia herniated into the mesocolic fossa leading to jejunal strangulation

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**Abstract:** Paraduodenal hernia is a rare condition in which the small bowel loops are herniated into an unusual fossa in the periduodenal area. We treated a patient with paraduodenal hernia diagnosed preoperatively. A 28-year-old woman was admitted to our hospital because of intermittent abdominal pain. Abdominal ultrasonography revealed a large tumor adjacent to the pancreas. Provisional diagnosis made according to computed tomography (CT) findings was tumor of the pancreas tail. However, on a CT scan performed after the administration of diatrizoate meglumine/diatrizoate sodium (Gastrografin, Schering, Berlin, Germany) the mass was shown as a jejunum loop located between the stomach and the pancreas body. Subsequent laparotomy revealed that the jejunum loop was herniated into an unusually large mesocolic fossa and that the hernial orifice was covered by the adhesion between the transverse and descending colons. It seemed that the small intestine within the mesocolic fossa was strangulated by this adhesion. The patient's abdominal pain resolved postoperatively. These observations suggest that paraduodenal hernia should be suspected in patients with chronic, atypical abdominal pain, regardless of the findings for small bowel obstruction.

**Key words:** internal hernia, paraduodenal hernia, mesocolic fossa, computed tomography, diagnostic imaging

## Introduction

Internal hernia is a relatively uncommon cause of abdominal pain, accounting for about 0.2%–0.9% of small

intestinal obstructions.<sup>1,2</sup> Paraduodenal hernia, found in about half of the cases of internal hernia associated with small intestinal obstruction,<sup>3,4</sup> occurs with the herniation of the small bowel into an unusual fossa in the periduodenal area<sup>5</sup> and frequently manifests as acute intestinal obstruction.<sup>6,7</sup> Thus, paraduodenal hernia is generally taken into consideration as a differential diagnosis of small bowel obstruction if the patient has had no previous abdominal surgery. However, the preoperative diagnosis of paraduodenal hernia is difficult because radiographic findings may be subtle or even absent because of the intermittent nature of the intestinal herniation. Computed tomography (CT) scanning after the administration of Gastrografin (Schering, Berlin, Germany) is suggested to be effective in the diagnosis of paraduodenal hernia.<sup>8–18</sup> We report a case of a Japanese woman who was preoperatively diagnosed with paraduodenal hernia by abdominal CT.

## Case report

The patient was a 28-year-old Japanese woman, 164 cm tall and weighing 47.0 kg. She was admitted to our hospital complaining of intermittent abdominal pain of several months' duration that was increasing in both intensity and frequency. The pain was worse when she was in the supine position and was relieved when she sat upright. She had had no previous abdominal surgery and had a history of pyelonephritis at age 19 years.

On admission, her body temperature was 36.6°C, blood pressure was 100/60 mmHg, and radial pulse rate, 66 beats per min and regular. She had neither anemia nor jaundice. Neurological examination revealed no abnormal findings, and no edema was observed. Abdominal palpation revealed tenderness in the left upper quadrant and a mass in the same area.

Laboratory findings showed red blood cell count,  $399 \times 10^4/\text{mm}^3$ ; white blood cell count, 5000/mm<sup>3</sup> and

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platelet count,  $28.2 \times 10^4/\text{mm}^3$ . The hemoglobin concentration was 12.3 g/dl. Liver function tests revealed to be normal: aspartate aminotransferase, 10 IU/l; alanine aminotransferase, 6 IU/l; alkaline phosphatase, 4.5 KAU; leucin amino peptidase, 38 IU/l;  $\gamma$ -glutamyltranspeptidase, 9 IU/l; cholinesterase, 0.76  $\Delta$  pH; lactate dehydrogenase, 298 IU/l; and total bilirubin, 0.5 mg/dl. Test for C reactive protein showed 0.03 mg/dl (normal, 0–0.5 mg/dl), and the erythrocyte sedimentation rate was 7 mm/h. With respect to renal function, blood urea nitrogen was 9.7 mg/dl (normal, 8–23 mg/dl) and creatinine was 0.6 mg/dl (normal, 0.5–1.6 mg/dl). Serological studies for hepatitis B and C viruses were negative and some tumor markers (carcinoembryonic antigen, carbohydrate antigen 19-9) were also negative.

The results of endoscopic examination of the upper digestive tract and colonoscopic examination were normal. Ultrasonography (US) revealed a large, solid tumor measuring  $66 \times 43$  mm adjacent to the pancreatic tail. Abdominal CT scan revealed a large, comparatively well defined low-density mass in the pancreatic body and tail (Fig. 1).

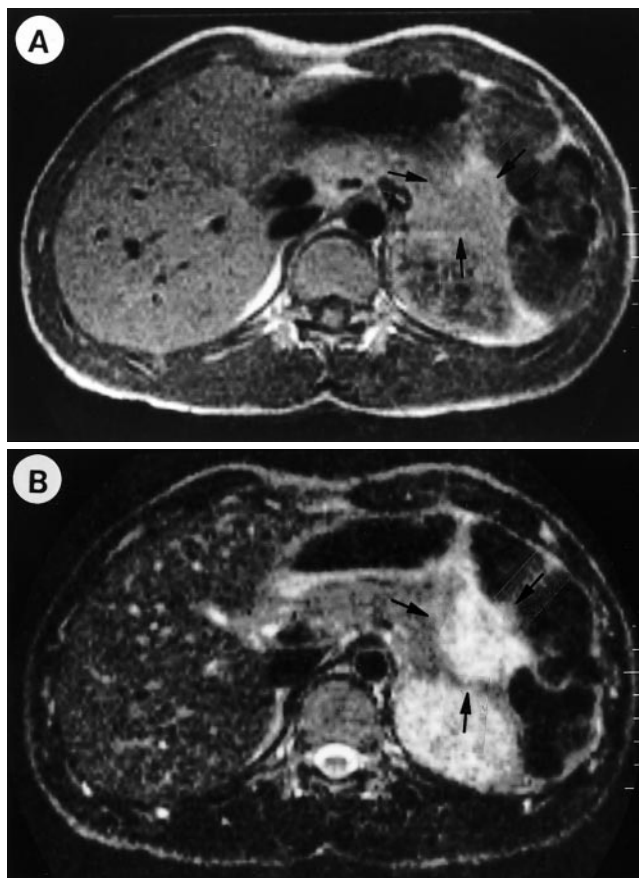
The clinical diagnosis, based on these imaging examinations, was benign pancreatic tumor. Endoscopic retrograde cholangiopancreatography (ERCP) revealed no abnormalities. Magnetic resonance imaging (MRI) showed that the tumor had iso-signal intensity on T1-weighted images and high signal intensity on T2-weighted images. The size of the tumor on MR images was decreased compared with the size on the first CT scan (Fig. 2A,B). Celiac arteriography revealed that the arteries around the pancreas were normal and that the spleen was markedly displaced (Fig. 3A). Supramesenteric arteriography revealed jejunal arteries displaced upward and to the left, and abnormal pooling

in the jejunum (Fig. 3B). These observations suggested that the tumor detected adjacent to the pancreas was part of the jejunum and the diagnosis should be changed to paraduodenal hernia. On the basis of this diagnosis we performed a second CT scan after the administration of diatrizoate meglumine/diatrizoate sodium (Gastrografin) and found that a loop of jejunum filled with Gastrografin was located between the stomach and the body of the pancreas (Fig. 4). Subsequent duodenography also revealed that proximal jejunal loops produced a mass in the upper abdomen, indenting the posterior wall of the stomach (Fig. 5).

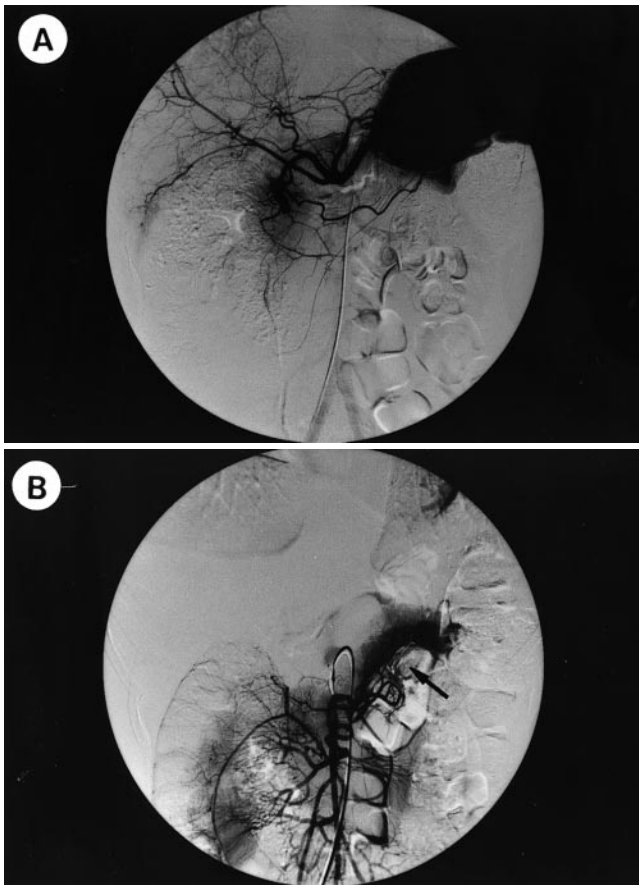
The patient underwent a laparotomy because of the continued abdominal pain after admission. During surgery, it was revealed that an internal hernia 50 cm to the left of Treitz's ligament had protruded into an unusually large mesocolic fossa through the unsupported area of the left colon mesentery, and that the hernial orifice was covered by the adhesion between the transverse and descending colons. The fixation of the descending



**Fig. 1.** Abdominal computed tomography (CT) image on admission, revealing a large, comparatively well defined low-density mass in the pancreatic body and tail (arrows)



**Fig. 2A,B.** Magnetic resonance image showed **A** tumor with iso-signal intensity (arrows) on T1-weighted image, and **B** high signal intensity on T2-weighted image of the pancreatic tail (arrows). Note that the tumor is smaller than that shown in Fig. 1



**Fig. 3A,B.** Arteriography images. **A** Celiac arteriography showed no abnormalities in the arteries around the pancreas, and marked displacement of the spleen. **B** Supramesenteric arteriography showed the jejunal arteries displaced upward and to the left and abnormal pooling in the jejunum (*arrow*)



**Fig. 4.** Abdominal CT scan after the administration of Gastrografin. Note the presence of several loops (*arrows*) filled with Gastrografin between the stomach and the body of the pancreas, suggesting that the mass is a paraduodenal internal hernia

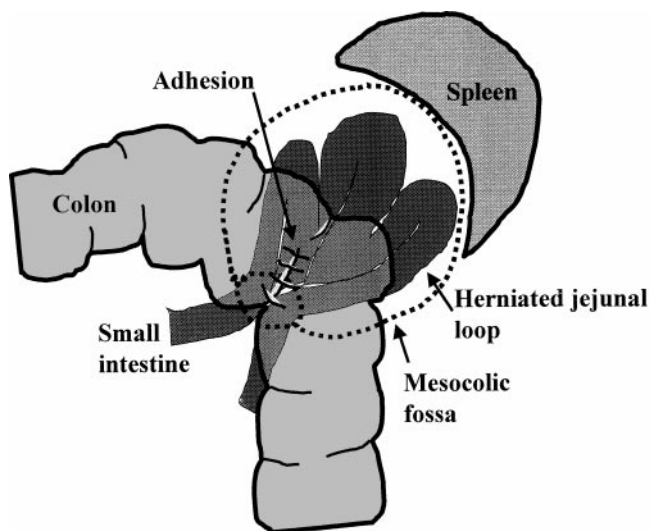


**Fig. 5.** Duodenography with Gastrografin showed proximal jejunal loops producing a mass effect to the left of the mid line, and indenting the posterior wall of the stomach (*white arrows*)

colon was normal and the hernial sac was absent. The herniated small intestine in the mesocolic fossa was dilated and edematous, suggesting that it was strangulated by this adhesion (Fig. 6). The adhesion between the transverse colon and descending colon was broken and the non-obstructed jejunum within the mesocolic fossa was extracted. As a result of this treatment the patient's abdominal pain resolved postoperatively.

## Discussion

Internal hernias were defined by Steinke<sup>5</sup> as the herniation of a viscus into an unusual fossa, fovea or foramen within the abdominal cavity, without any external bulging. Paraduodenal hernias are the most common internal hernias.<sup>3,4</sup> They frequently manifest as acute intestinal obstruction but may also cause chronic intermittent post-prandial abdominal pain.<sup>6,7</sup> Other clinical symptoms and complications include abdominal distention, nausea, and vomiting ranging to severe abdominal pain, vomiting, and dehydration associated with gangrene and peritonitis, and bowel perforations. These hernias are considered to originate from abnormal rotation and/or reduction of the midgut loop in the abdominal cavity, although their precise mechanism remains controversial.



**Fig. 6.** Laparotomy findings. An edematous jejunal loop was herniated into an unusually large mesocolic fossa (*dashed line*). The orifice of the internal hernia was closed by an adhesion between the transverse and descending colons. The spleen was markedly displaced upward and to the left

Although the preoperative diagnosis of a paraduodenal hernia can only be made radiologically, radiographic findings are often subtle, or may even be absent, because of the intermittent nature of the intestinal herniation. Without a specific radiographic diagnosis, this rare condition may be missed at laparotomy, as a result of spontaneous resolution of the hernia, or because of unnoticed reduction at surgery. At times, a plain film X-ray of the abdomen reveals several dilated loops of the small bowel in an ovoid mass with its main axis lateral to the midline. Several authors have suggested that paraduodenal hernia can be preoperatively diagnosed with the aid of a CT scan.<sup>8-18</sup> Passas et al.<sup>9</sup> reported that an abdominal CT scan after the administration of Gastrografin was effective in identifying a loop of opacified jejunum located behind and to the left of the pancreas body. Day et al.<sup>10</sup> also successfully identified a small-bowel obstruction between the stomach and the pancreas body by CT scanning; it was probable, in their patient, that the duodenojejunal junction was medially displaced by the herniated jejunal loops. Warshauer and Mauro<sup>12</sup> reported that the major CT findings for paraduodenal hernias were a cluster of mildly dilated small bowel loops with air fluid levels behind the stomach at the level of the ligament of Treitz.

Because of the CT and US findings in our patient, a pancreatic tumor was first suspected. The laboratory findings, together with the lack of abnormalities on ERCP, also suggested that the mass adjacent to the

pancreas was the presence of dilated edematous proximal jejunal loops in the mesocolic fossa. However, since pseudotumor of strangulating small intestinal obstruction is observed as a mass effect adjacent to the pancreas, we thought the presence of dilated jejunal loops in the mesocolic fossa supported the clinical diagnosis of a pancreatic tumor. Interestingly, however, the release from strangulating obstruction occurred when MR images were taken, allowing us to confirm, with the aid of CT scanning after the administration of Gastrografin, that the mass adjacent to the pancreas was a loop of the jejunum located between the stomach and the pancreas body.

Left-sided paraduodenal hernias are generally located in the fossa to the left of the ascending duodenal limb or in the mesocolic fossa on the left side of the abdomen.<sup>16</sup> The mesenteric fossa is situated within the transverse mesocolon on the left side of the abdomen; the entrance to the mesocolic fossa is directed upwards and its fundus is cephalad and blends with the posterior and dorsal surfaces of the omental bursa. In our patient, laparotomy revealed that the small intestine had herniated into an unusually large mesocolic fossa and that the hernial orifice was covered by an adhesion between the transverse and descending colons, resulting in jejunal strangulation. It also appeared that the fixation of the descending colon was normal and the hernial sac was absent. Yamada and Kogure<sup>19</sup> reported a case of left paraduodenal hernia with malrotation of the intestine and abnormal fixation of the ascending colon. Takamori et al.<sup>20</sup> reported a case of internal hernia in the paracolic fossa of the descending colon with abnormal fixation. These reports of internal hernia suggested that internal hernias were often related to abnormalities of rotation or fixation of the midgut loop. However, since no malrotation or abnormal fixation was seen in our patient, the hernia probably was not related to these abnormalities.

Our patient had an adhesion between the transverse and descending colons. Unfortunately, we could not determine the etiology of the colic adhesion in her past history. The transverse colon is linked to the descending colon through the left colic flexure. Since the left colic flexure is located higher than the right colic flexure and is tortuous anatomically, adhesion between the colons may arise more often in the left than in the right colic flexure. In a left paraduodenal hernia, the small bowel invaginates through an unsupported area of the mesentery of the left colon.<sup>11</sup> It has been reported that the descending colon may cover the herniated bowel or it may be displaced laterally to the left.<sup>6</sup> Taking these reports into consideration, we speculate that this unusual hernia developed because of the possible association of: (1) The presence of an unusually large mesocolic fossa, (2) the adhesion between the trans-

verse and descending colons, and (3) the descending colon covering the herniated jejunum.

Paraduodenal hernias must be recognized promptly, since a delay in surgical intervention may cause increased morbidity and mortality.<sup>6</sup> Thus, it is necessary to be aware that a paraduodenal hernia may cause small-intestinal obstruction or strangulation and should be suspected in a patient with chronic atypical abdominal pain, regardless of small bowel obstruction, when there has been no previous abdominal surgery.

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