

CT Findings of Right Paraduodenal Hernia Presenting as Acute Small Bowel Obstruction¹

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Because it is rare, acute small bowel obstruction due to right paraduodenal hernia is an entity with which radiologists are not entirely familiar. Its clinical importance, however, lies in the fact that delayed diagnosis leads to significantly increased morbidity and mortality rates. We report a case of small bowel obstruction due to right paraduodenal hernia in which all the known characteristic findings were demonstrated.

Index words : Intestines, hernia
Intestines, CT

Paraduodenal hernia is the commonest type of internal hernia, accounting for approximately 50% of all such cases. Although internal hernias occur in only 1% of all patients with intestinal obstruction, 50% of patients with paraduodenal hernia have obstruction (1). Because associated radiologic reports are rare, paraduodenal hernia is a condition with which radiologists are not entirely familiar. Failure to recognize the entity may, however, lead to death or to errors in surgical technique, and its early diagnosis and treatment are therefore essential (2). The CT findings of right paraduodenal hernia have been described (3, 4), but, to our knowledge, this is the first case report in which CT findings of acute small bowel obstruction due to right paraduodenal hernia are documented.

Case Report

A 22-year-old man presented with sudden abdominal

pain in the right upper abdomen, vomiting, and a palpable mass in the right upper quadrant. Since childhood, the patient had experienced many episodes of intermittent abdominal pain, but no specific management had been undertaken. Laboratory data included an elevated white blood cell count ($17,300/\text{mm}^3$), though hemoglobin, aminotransferase, and bilirubin levels were normal. Plain abdominal radiographs demonstrated increased mass-like density in the right middle abdomen, with scanty bowel gas.

Contrast-enhanced spiral 5-mm axial CT scans of the abdomen were obtained with intravenous power injection of 100 ml nonionic contrast media at a rate of 2.5 ml/sec 30 sec before initiation, and a sac-like mass of dilated small bowel loop was found to be causing substantial lateral displacement of the duodenum (Fig. 1A). The Superior mesenteric vein (SMV) was found to be anterior to the superior mesenteric artery (SMA), while the Inferior vena cava (IVC) and right psoas muscle were severely compressed by the hernial sac. Looping of the jejunal branches of the SMA was also demonstrated (Fig. 1B), and the right ureter was laterally displaced (Fig. 1C). And oral contrast agent, administered 40 minutes before scanning, failed to reach any of the dilated small bowel loops, filling only the stomach and duodenum. Some extraluminal fluid and increased mesenteric haziness was also found, suggesting bowel ischemia (Fig. 1D).

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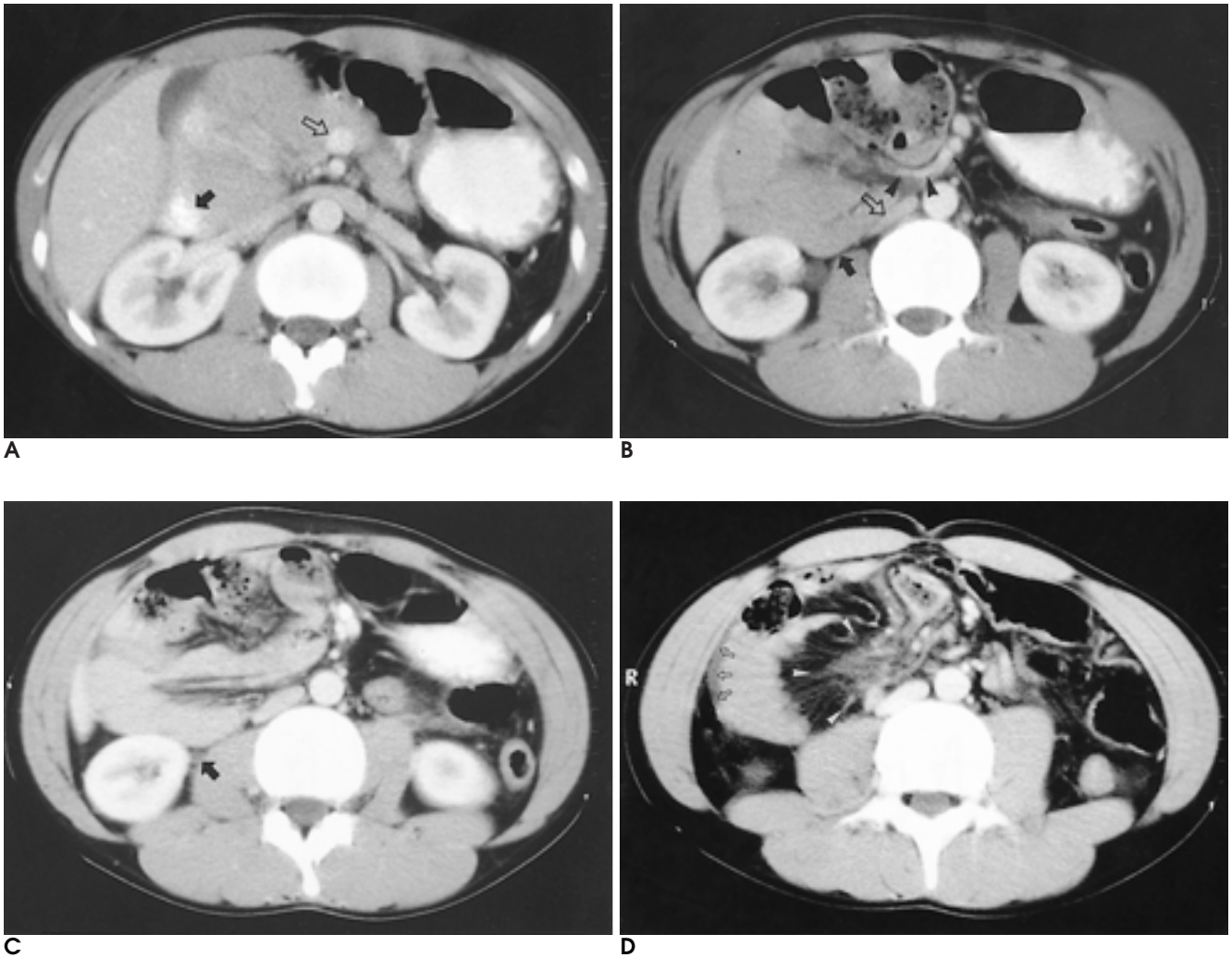


Fig. 1. Twenty-two-year-old man presenting with acute small bowel obstruction due to right paraduodenal hernia.

A. A sac-like mass of dilated small bowel loop has displaced the duodenum (arrow) far laterally. The superior mesenteric vein (open arrow) is located ventrally in relation to the SMA. Oral contrast agent failed to pass into the more distal loop, implying obstruction.

B. Looping of jejunal branches of the superior mesenteric artery (arrowheads) is seen. The inferior vena cava (open arrow) and right psoas muscle were compressed by a hernial sac (black arrow).

C. Posterolateral displacement of the right ureter (arrow) is apparent.

D. Extraluminal fluid (open arrows) and increased mesenteric haziness (arrowheads) are demonstrated, implying ischemia.

All these findings were compatible with right paraduodenal hernia with impending strangulation, and prompt surgical correction was performed. Initial exploration revealed the “empty bowel” sign in the left abdomen, and two thirds of the ileum as well as the jejunum were herniated behind the ascending mesocolon via the fossa of Waldeyer. The remaining small bowel loops were located in the right lower abdomen, the mesentery of which was twisted. The diameter of the mesentericoparietal fossa was estimated to be 4×3 cm.

The herniated small bowel loop was dark reddish in color, without normal peristalsis, and thus implying is-

chemia, but after successful manual reduction, normal color were regained and no bowel was resected. The location of the duodenojejunal junction, to the right of the spine, was abnormally low. During the one-month period following surgery, the patient remained asymptomatic.

Discussion

One-half of internal hernias are paraduodenal in location and 50% of patients with paraduodenal hernia will have bowel obstruction. The prevalence of these hernias

in the general population is unknown.

A review of reported cases of right paraduodenal hernia shows that most patients were adults, with a mean age of 36.6 years, and none were younger than eight years (5, 6). Right paraduodenal hernia is a rare congenital anomaly caused by arrest of the second stage of mid-intestinal rotation. As a result of incomplete rotation, the duodenojejunal junction remains on the right of the SMA, with eventual entrapment of the small intestine behind the ascending mesocolon, more accurately representing a "hernia into the ascending mesocolon". Acute intestinal obstruction is frequent, and this may cause chronic intermittent postprandial abdominal pain. All paraduodenal hernias should be considered potentially lethal. Knowledge of this entity is clinically important because of the significant increase in morbidity and mortality rates that result from delayed diagnosis. In its most malignant form, actual strangulation of the bowel may occur, with a corresponding increase in the mortality rate. Entrance into the hernial sac is most commonly via the mesenterico-parietal fossa (of Waldeyer) which is in the first part of the jejunal mesentery immediately behind the SMA and inferior to the third part of the duodenum. The postprandial abdominal pain which can occur, a symptom which may mimic peptic ulcer, cholecystitis, pancreatitis and gastritis (7), is sometimes relieved by changes in position. Initial exploration will often reveal the classic "empty abdomen" sign, with only a segment of ileum present in the abdominal cavity and the remainder of the small bowel encased in the hernial sac. The arteriographic appearance of right paraduodenal hernias is characteristic, with jejunal arteries arising normally from the left side of the SMA but then reversing direction and coursing behind their parent vessel towards the right (8). The major CT findings are looping of the SMA and SMV jejunal branches to the right, and posteriorly, in a fashion analogous to the arteriographic findings, and the clustering or apparent encapsulation of

small bowel loops in the right mid-abdomen. Relative to the SMA, the SMV is located further to the left and more ventrally than normal. In the present case, all the characteristic findings of right paraduodenal hernia were found. In addition, oral contrast agent failed to pass into the distal small bowel loops, thus indicating obstruction. To our knowledge, this is the first documented case in which bowel obstruction associated with right paraduodenal hernia has been disclosed on the by CT scanning. As well as lateral displacement of the right ureter, previously demonstrated in 1982 by Harbin using intravenous pyelography (9), CT also revealed that the right psoas muscle and IVC were severely compressed by a hernial sac.

In conclusion, when acute small bowel obstruction due to right paraduodenal hernia is suspected, the presence of certain characteristic CT findings provides the basis for correct diagnosis.

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