

소아에서 발생한 경장간막 탈장: 큰 장간막 결손을 통한 소장의 장분절 괴저

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A Transmesenteric Hernia in a Child: Gangrene of a Long Segment of Small Bowel through a Large Mesenteric Defect

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Intestinal obstruction is a common surgical emergency. Transmesenteric hernia is an unusual cause of bowel obstruction that may result in irreversible damage of the bowel and a fatal outcome. Once incarceration of the bowel occurs, strangulation and gangrene follow immediately. The mortality rate associated with this condition is about 15%, but in the presence of gangrene of the bowel, the mortality rate is more than 50%. An accurate preoperative diagnosis of a transmesenteric hernia is very difficult and rarely made. Therefore, in patients with small bowel obstruction, in the absence of a history of previous surgery to suggest adhesions or an external hernia, the possibility of a transmesenteric hernia must be considered. We describe a case with gangrene of a long segment of the small bowel caused by a transmesenteric hernia through a large defect of small bowel mesentery in a child. (*Korean J Gastroenterol* 2009;53:320-323)

Key Words: Intestinal obstruction; Internal hernia; Transmesenteric; Gangrene; Child

Introduction

Internal hernia, the protrusion of a viscera through a peritoneal or mesenteric aperture, is a rare cause of small bowel obstruction in children. It occurs in all age groups and the sex distribution is equal. Seventy percent of the defects were located in the mesentery of the small bowel, especially the ileum.¹ The diagnosis is not often made preoperatively. Symptoms are non-specific. Plain abdomen, small bowel series, and abdominal CT scan are useful for diagnosis of a

transmesenteric hernia, but an accurate preoperative diagnosis is rarely made.

This report presents a child patient with small bowel herniation through a large defect in the small bowel mesentery near terminal ileum. In patients with bowel obstruction and in the absence of a history of previous surgery to suggest adhesion or an external hernia, the possibility of a mesenteric hernia must be considered.

접수: 2008년 11월 15일, 승인: 2008년 12월 14일
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Case report

A 7-year-old girl presented to the emergency department with a 20 hour history of intense diffuse abdominal pain and multiple episodes of vomiting. The patient experienced increasing episodes of nausea and repeatedly vomited chocolate-colored fluid. The past medical history was unremarkable. The clinical examination revealed abdominal distension, severe tenderness and rebound tenderness throughout the entire abdomen. The patient had dry tongue and poor skin turgor. The blood pressure was 80/50 mmHg, the pulse rate was 168 beats/min and the temperature of 37.6°C. The laboratory findings were as follows: hemoglobin 10.2 g/dL, hematocrit 30.3%, white blood cell 24,200/mm³, Na⁺ 135 mEq/L, K⁺ 4.8

mEq/L, Cl⁻ 99 mEq/L, glucose 255 mg/dL, and CRP 1.4 mg/dL.

Plain erect abdominal X-ray showed multiple dilated loops of small bowel (Fig. 1). The CT scan of the abdomen showed a bulky amount of strangulated small bowel loops and ascites (Fig. 2). The shock-like state was associated with necrosis of the strangulated intestine.

Emergent exploratory laparotomy was performed after the initial resuscitation with the impression of septic shock due to small bowel strangulation. At surgery, a moderate amount of dark brown colored ascites was found in the peritoneal cavity. The jejunum was grossly distended and the colon was collapsed. A 180 cm loop of gangrenous ileum (from 120 cm distal of the Treitz ligament to 1 cm proximal of the ileocecal



Fig. 1. Plain erect abdominal X-ray showed multiple dilated loops of the small bowel.



Fig. 2. Abdominal CT scan showed bulky amount of ischemic small bowel loops and ascites in the abdominal cavity.

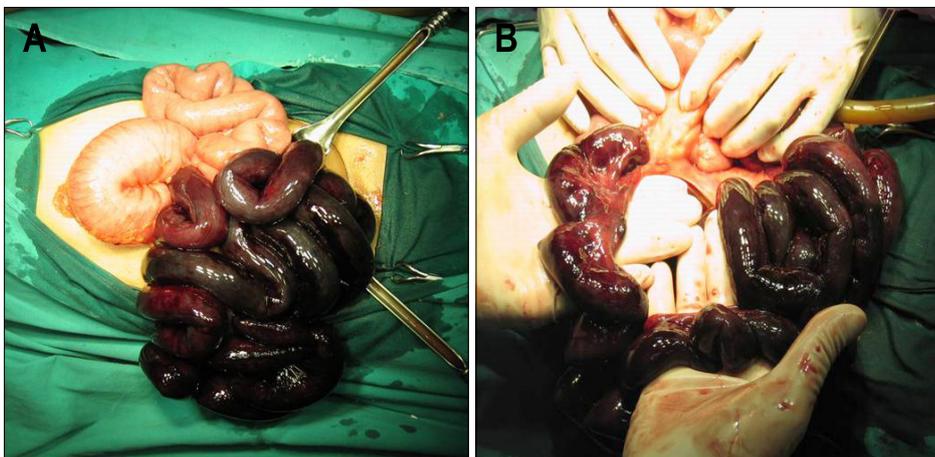


Fig. 3. Intraoperative findings. (A) Long segment of the strangulated ileum was gangrenous and normal appearing loops of the jejunum were dilated. (B) After reduction, a large round mesenteric defect near the terminal ileum with gangrenous loops of the entire ileum was seen.

valve) was found to be incarcerated through a defect of the small bowel mesentery. The defect was large, 15 cm in diameter, with a fibrous smooth end and was close to the ileum (Fig. 3). Resection of the necrotic bowel with an end-to-end anastomosis was performed. The length of remnant small bowel was about 115 cm. The patient had an uneventful postoperative course. Short bowel syndrome did not develop in this case.

Discussion

Internal hernias are protrusions into pouches or openings in the visceral peritoneum in contrast to external hernias that occur through an abnormal opening in the wall of the abdominal cavity. Three main types of orifices may be involved in an internal hernia.¹ The orifice can be normal: epiploic or an omental foramen. This type of hernia supposes two predisposing factors: the foramen is larger than usual, and high mobility of the right colon, or a long mesentery, is required.² The orifice can be abnormal as with a congenital hole in the mesentery, or with a ligament such as the falciform ligament of the liver. It can also be a pathological orifice formed in the mesentery or omentum: transmesenteric, transmesocolic or transomental: greater or lesser. The orifice can also be paranormal, which is the most frequent type. The two main locations are retrocecal or para- and retroduodenal.² Post-mortem studies have shown that the incidence of holes in the mesentery range from one in 50 to three in 1,600 autopsies.³ Transmesenteric hernias are among the least common cause of mechanical intestinal obstruction, and account for about 11% of all internal hernias.^{4,5} They occur in all age groups and the male and female distribution is equal. Seventy percent of the defects have been located in the mesentery of the small bowel, especially the ileum.^{1,6,7}

In children, transmesenteric hernias are the most common type of internal hernia; they are thought to develop from a congenital defect in the small bowel mesentery, near the ileocecal region or the ligament of Treitz, possibly related to prenatal intestinal ischemia. However, in adults, the etiology is usually iatrogenic, related to prior abdominal surgery, especially procedures involving Roux-en-Y anastomosis, for both liver transplantation and gastric bypass procedures.⁸

Among the mesocolic defects, the transverse mesocolon, ascending and descending mesocolon and mesosigmoid colon have been implicated in decreasing order of frequency. Due to the small size of the defect, once incarceration of the bowel

occurs, strangulation and gangrene follow immediately; a high associated incidence, 50%, has been reported.¹ The mortality rate with this condition is about 15%, but in the presence of gangrene of the bowel, the mortality rate is more than 50%.⁹ When a considerable amount of tissue occupies these small defects, the blood supply of the small bowel is compromised, rapidly resulting in ischemia and necrosis. Furthermore, the pressure of the herniated bowel loops and their mesentery compress the vessels in the free margins of the defect and may cause ischemic changes in the loop forming the margin of the mesenteric defect.¹⁰

In this case, the size of the defect was very large, 15 cm in diameter, and the herniated ileal segment was very long, 180 cm in length. The herniated ileum was entirely strangulated and the vessels in the free margin of the defect were severely compressed. An accurate pre-operative diagnosis of a mesenteric hernia is rarely made. In patients with small bowel obstruction and in the absence of a history of previous surgery to suggest adhesions or an external hernia, the possibility of a mesenteric hernia must be considered. The majority of patients with internal hernias present with symptoms of acute (75%) or intermittent (22%) small bowel obstruction.¹¹

The radiological findings only suggest a small bowel obstruction but do not indicate the cause of the obstruction. Because the bowel most often herniates from right to left, a collection of dilated loops may be seen within the left side of the abdomen on plain X-rays and CT scan. The consistent presence of intestinal gas after several hours suggests the possibility of an internal hernia. Especially, a comma shaped or coffee bean image on the abdominal X-ray films, in a patient with small bowel obstruction, should alert the clinician to the presence of strangulation.¹² Although CT scan has been recommended for preoperative diagnosis in most cases of transmesenteric hernia,¹³ the CT scan findings may be misleading because they might suggest a bowel "mass" rather than an internal hernia.¹⁴ While 16% of CT scans were suspicious for internal hernias, the preoperative diagnosis of an internal hernia was made in no case.¹¹

Because spontaneous resolution of the condition is unlikely, early laparotomy is mandatory. The treatment is based on the operative findings. If the bowel is viable, simple reduction should be performed. Gangrenous bowel should be resected with an end-to-end anastomosis to restore bowel continuity. The hernial defect should be closed with non-absorbable sutures. A mesenteric defect, regardless of its size, should be closed when

encountered by chance.

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