Small-bowel Obstruction due to Pouch-type Internal Hernia through a Defect in the Broad Ligament of the Uterus Diagnosed with Multidetector Computed Tomography: A Case Report

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Abstract

Small-bowel obstruction due to internal hernia through a defect in the broad ligament of the uterus is rare, and its clinical diagnosis is usually difficult because of the lack of specific symptoms. This report presents a case of small-bowel obstruction due to pouch-type internal hernia through a defect in the broad ligament, for which multidetector computed tomography proved useful for preoperative diagnosis. A herniated small-bowel loop appearing as a “sac-like mass” was considered diagnostic for distinguishing the pouch-type internal hernia from the fenestra-type internal hernia.

Key Words: Small-bowel obstruction; Internal hernia; Pouch-type; Fenestra-type; Multidetector computed tomography

Introduction

Small-bowel obstruction (SBO) caused by internal hernia (IH) is uncommon, with a reported incidence of up to 5.8% of all cases of SBO¹. Furthermore, IH through a defect in the broad ligament of the uterus, defined as protrusion of an abdominal viscus through or into a defect in the supporting structures of the uterus, is rare. Based on the degree of the defect, they can be classified into two types, fenestra-type and pouch-type².

Because of its post-processing techniques, multidetector computed tomography (MDCT) is currently the first-line imaging modality for diagnosing various types of IH³-¹⁰. These post-processing techniques include maximum-intensity and minimum-intensity projection, variable thickness viewing, and volume and surface rendering, in addition to standard reformatting methods such as sagittal, coronal, oblique, and curved reformatting¹¹.

For fenestra-type IH, MDCT findings have been presented in several reports⁷-¹⁰. However, reports of pouch-type IH are extremely rare. Here, we describe a case of SBO caused by pouch-type IH, for
A 49-year-old woman was admitted to our institution with a complaint of severe lower abdominal pain that started during the morning. Before onset of pain, she had suffered from constipation and nausea for 4 days and 3 days, respectively. She did not have vomiting or the diarrhea. She had been in good health prior to admission except for an appendectomy due to appendicitis at the age of 22 years. She was gravida 2, para 2, and had a history of two normal vaginal deliveries.

Physical examination revealed abdominal distention with tenderness in the left pelvis, without bowel sounds. No fever was noted. Laboratory test results were within normal limits, including no leukocytosis (white blood cells, 5100/μL; neutrophils, 70.1%), and negative C-reactive protein (0.03 mg/dL). Abdominal radiography showed multiple dilated small-bowel loops (not shown). Contrast-enhanced CT of the abdomen and pelvis was immediately performed using a 16-row MDCT scanner (Aquilion 16, TOSHIBA, Tokyo, Japan). MDCT showed multiple dilated fluid-filled loops of the proximal small-bowel and collapsed distal ileum, which was consistent with mechanical SBO.

In the pelvic cavity, encapsulated small-bowel with air-fluid was observed as a “sac-like mass” on the left side of the uterus (Figs. 1, 2, and 3). Within this sac-like mass, crowded mesenteric fat tissue and vessels were seen as a radial form converging toward the ventral side. Proximal and distal transition points were identified on the ventral side of the sac-like mass, adjacent to one another, suggestive of closed-loop SBO (Figs. 1 and 2). At the apex of the sac-like mass, a band-like structure between the uterus and the left ovary corresponding to the left fallopian tube was stretched and displaced ventrally (Figs. 1 and 2). Widening of the distance between the uterus and the left ovary was also noted (Fig. 2). Based on these MDCT findings, a diagnosis of SBO due to IH through a defect in the left broad ligament, and in particular the pouch-type, was made.

Subsequently, emergency surgery was performed. During surgery, the adhesion was not identified in abdominal cavity. A moderate quantity of yellow serous ascites was identified. Dilatation of
the proximal small-bowel was observed. A 10-cm long ileal loop, which was 30-cm proximal from the terminal ileum, had herniated through an 8-mm aperture in the anterior leaf of the left broad ligament (Fig. 4), and was entrapped between the anterior and posterior leaves of the broad ligament located in the parametrial tissue. Because the entrapped bowel loop could not be liberated, the hernial orifice was enlarged by a diameter of 7-mm. Then, traction and repositioning of the entrapped bowel loop were performed. The herniated bowel loop had initially appeared congested, but its color and peristalsis improved rapidly. No bowel resection was required and the defect was closed to prevent relapse. The postoperative course was uneventful, and the patient was discharged on postoperative day 10.

Figure 2. Contrast-enhanced coronal MDCT images are presented from the ventral side a) to the dorsal side c).

a) The small-bowel loops with mesenteric fat tissue and vessels (open arrow) have herniated into a defect in the left broad ligament.
b) The herniated small-bowel loops (white arrows) are observed as a “sac-like mass” on the left side of the uterus (U). The left fallopian tube (black arrows) is stretched and displaced superiorly.
c) Widening of the distance between the uterus (U) and the left ovary (white arrowhead) is also noted. MDCT, multidetector computed tomography.

Figure 3. Contrast-enhanced reformatted sagittal MDCT image clearly depicts the encapsulation of the herniated small-bowel loop, as a “sac-like mass” (white arrows). MDCT, multidetector computed tomography.
IH through a defect in the broad ligament is rare, accounting for only 4%-7% of all cases of IH. According to a report by Baron, the first case of this type of IH was reported in 1861 during an autopsy by Quain. Since then, approximately 200 cases have been reported in the English and Japanese medical literature including both the fenestra-type and the pouch-type. The fenestra-type is defined as herniation of an abdominal viscus through a full-thickness defect in the broad ligament. This type involves both the anterior and posterior leaves of the broad ligament, with no hernial sac. Thus, the herniated viscus is located outside the parametrial tissue, in the pelvic peritoneum. On the other hand, the pouch-type is defined as herniation of an abdominal viscus through a defect in only one leaf in the broad ligament. With this type, either the anterior or the posterior leaf is involved. The hernia sac is the broad ligament itself. The herniated viscus enters the parametrial tissue and gets trapped in it.

MDCT has proven to be useful in the preoperative diagnosis of various types of IH. Its findings of fenestra-type IH through a defect in the broad ligament have been reported as follows: 1) mechanical SBO with a double transition zone (closed-loop SBO) located lateral to the uterus; 2) a cluster of dilated fluid-filled small-bowel loops in the pelvic cavity; 3) displacement of the uterus to the contralateral side, displacement of the ipsilateral fallopian tube ventrally, and displacement of the rectosigmoid colon dorsolaterally by the herniated small-bowel loops; and 4) widening of the distance between the uterus and ipsilateral ovary. These findings were also observed in the present pouch-type case, with the exception that no displacement of the uterus or rectosigmoid colon by the herniated small-bowel loops was recognized.

In this case, the most impressive finding was that the herniated small-bowel loop appeared as a sac-like mass. Such an appearance is only seen when the herniated small-bowel loops lie within a small enclosed space. In the present case, this finding indicated that the hernial sac was lying within the broad ligament itself and that the contents were trapped in the parametrial tissue. This finding was considered diagnostic for distinguishing pouch-type IH from fenestra-type IH.

Differential diagnoses for IH through a defect in the broad ligament may indicate sigmoid...
mesocolon hernia, IH through a peritoneal defect in the pouch of Douglas, and internal supravesical hernia\textsuperscript{15-16}. The key to differentiating these hernias is to identify the hernial orifice: the orifice of sigmoid mesocolon hernia is located in the sigmoid mesocolon itself or near the root of the sigmoid mesocolon, whereas that of IH through a peritoneal defect in the pouch of Douglas is located in the pelvic floor, and that of supravesical hernia is the supravesical fossa. Furthermore, when a patient has a history of abdominal or pelvic surgery, SBO due to a fibrous band around the uterus should be considered among the differential diagnoses.

In conclusion, we encountered a case of SBO due to pouch-type IH through a defect in the broad ligament. During preoperative diagnosis, MDCT provided several useful findings suggesting this extremely rare disease. A herniated small-bowel loop appearing as a “sac-like mass” was considered the diagnostic key for distinguishing pouch-type IH from fenestra-type IH. Therefore when clinical manifestations and abdominal radiography suggest SBO, MDCT is recommended.

References
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