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Laparoscopic omentectomy for preoperative diagnosis of torsion of the greater omentum

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ABSTRACT

INTRODUCTION: Torsion of the greater omentum is unusual. In most cases, the preoperative diagnosis was difficult due to the non-specific clinical presentation.
PRESENTATION OF CASE: We present a case of greater omental torsion in a 28-year-old man with an untreated right inguinal hernia since childhood. Computed tomography (CT) revealed characteristic signs of omental torsion, which was important in making correct diagnosis. We made correct preoperative diagnosis and performed laparoscopic omentecomy. The greater omentum distal to the twisted part was dark red and showed necrotic change. This case was secondary omental torsion associated with a right inguinal hernia.
DISCUSSION: Omental torsion should always be included in the differential diagnosis of acute abdomen.
CONCLUSION: CT multi-planar reconstruction (MPR) imaging played a particularly important role in making a precise diagnosis. Laparoscopic approach could be useful in both diagnostic and therapeutic intervention. A successful laparoscopic omentectomy was performed in the present case.

1. Introduction

Torsion of the greater omentum is unusual. It causes acute abdominal pain. However, fewer than 350 cases have been reported so far, and most cases were segmental torsion or infarction of the greater omentum. Complete torsion of the greater omentum, as in our case, appears to be rare. In most cases, the preoperative diagnosis was acute appendicitis or cholecystitis, because it was difficult to make a correct diagnosis due to the non-specific clinical presentation. A successful laparoscopic omentectomy was performed in the present case because a preoperative diagnosis was made. CT multi-planar reconstruction (MPR) imaging played a particularly important role in making a precise diagnosis. This case, along with a review of the literature, is reported.

2. Presentation of case

A 28-year-old man was admitted to our hospital. He was 181 cm tall and weighed 83 kg. He had a history of untreated right inguinal hernia. His chief complaint was acute abdominal pain, especially around the middle lower abdomen, for 2 days prior to hospitalization. The abdominal pain was localized, without rebound tenderness or guarding. The patient had no associated nausea, vomiting, or diarrhea. The patient's temperature was normal, as were other vital signs. His white blood cell count was 15,110/mm^3, and C-reactive protein was 19.4 mg/dl. Abdominal CT revealed linear strands in a concentric pattern from the level of the transverse colon to the lower abdomen and a large fat density mass in the hypogastrium (Fig. 1). Furthermore, CT detected abundant fatty tissue with generalized increasing density in the lower pelvic cavity (Fig. 2).

At first, conservative treatment was tried in an attempt to allow spontaneous recovery because of the stable vital signs and lack of evidence of an acute abdomen. However, the patient developed progressive signs of peritonitis 12 h after admission with a rising fever up to 38.5 °C, WBC elevation, and increased CRP level. CT MPR imaging showed (1) a whirling vascular structure around a vertical rod of the omental vessel and (2) a heterogeneous "mass" of mixed fat density in the omentum at the lower abdomen (Fig. 3). A preoperative diagnosis of secondary torsion of the greater omentum associated with a right inguinal hernia was made. We decided to perform a laparoscopic operation. The abdominal cavity was reached using a 12-mm trocar under the umbilicus. Three accessory trocars were placed in the right lower quadrant (5 mm) and left lower quadrant (10 mm and 5 mm). There was a small amount of serous fluid in the lower abdomen, and the twisted part just below the transverse colon was easily detected on laparoscopy. The upper part from the twisted portion appeared normal (Fig. 4). Its tip had a slight adhesion to the right inguinal hernia. Laparoscopic resection of the necrotic omentum was performed using a tissue fusion device (Ligasure Atlas, Convidien, CO, USA). The resected greater omentum was exteriorized from the short incision below the umbilical trocar, about 3 cm in width. The operation time was 2 h and 3 min, with a small amount of blood loss. Macroscopically, the specimen was 37 cm × 47 cm in size and 1009 g in

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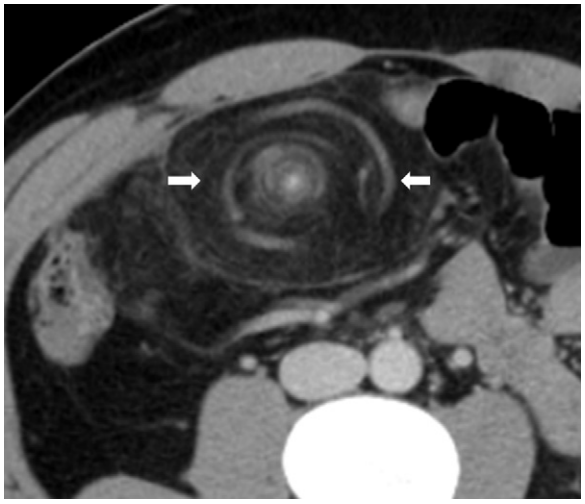

Fig. 1. CT shows linear strands in a concentric pattern (arrows).

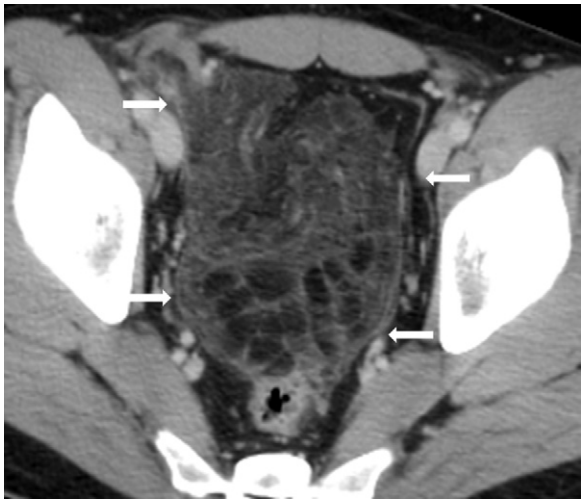

Fig. 2. CT shows a large fat density mass in the middle lower abdomen (arrows).

weight, and its dark red color suggested infarction or necrosis (Fig. 5). Histopathological examination revealed venous congestion, thrombosis, hemorrhage, and fat cell necrosis, confirming the diagnosis of acute omental infarction due to the torsion. The patient was discharged on the 5th day after the operation without any complications. Right inguinal hernia was repaired by Mesh-Plug method with open surgery under local anesthesia during this hospital stay.

3. Discussion

Torsion of the greater omentum is a rare cause of acute abdomen, often disguised as acute appendicitis, acute cholecystitis, epiploic appendagitis, and various other diseases.[1–3] Omental torsion is defined as axial twisting along the long axis. It is classified into primary and secondary types. The secondary type occurs when the torsion is associated with a causative condition, such as inguinal hernia, inflammation, previous laparotomy, trauma, or tumor. It is usually bipolar, that is, torsion of the central portion occurs between two fixed points, with the resulting formation of a narrow neck or pedicle somewhere in its continuity.[4] Morris classified greater omental torsion into 11 subtypes depending on the presence or absence of hernia or tumor.[3]

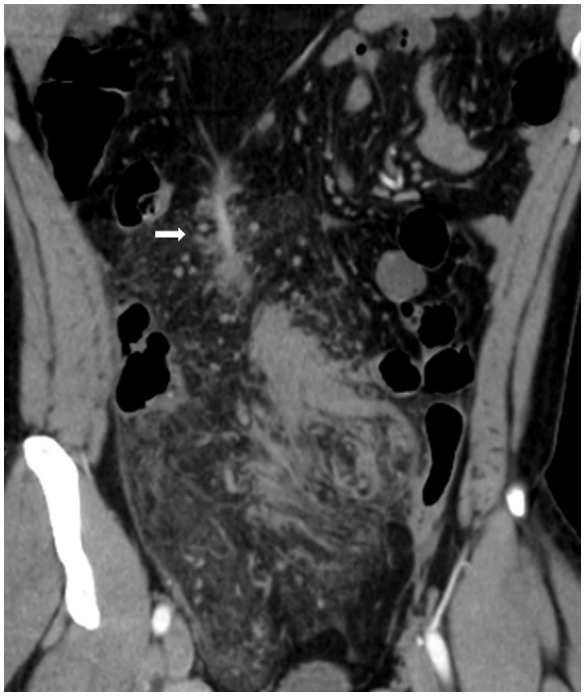

Fig. 3. CT MPR images demonstrate the entire greater omentum from the pedicle to the most necrotic lesions of the greater omentum (arrow).

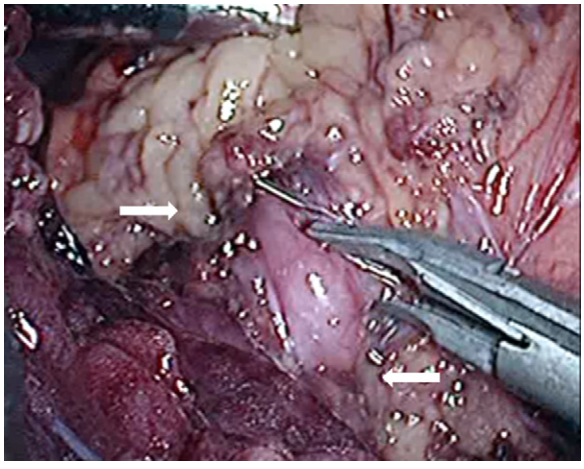

Fig. 4. Laparoscopic findings reveal a dark red omental mass with clockwise torsion.

Fig. 5. Surgical specimen.

The disease was first described by Bush in 1896.[5] Fewer than 350 cases have been published in the literature. Omental torsion occurs twice as often in men as women, and most frequently in the fourth or fifth decade.[3] Patients present with acute onset of severe abdominal pain that is localized to the right side of the abdomen in 80% of cases.[6] Nausea and vomiting may be present, but they are not predominant findings. The patient's temperature is usually normal, and palpation of the abdomen demonstrates localized abdominal tenderness with guarding, suggesting peritonitis. A mass may be palpable if the involved omentum is sufficiently large. Most cases are often located in the right lower or upper quadrant. This has been attributed to an embryologic variant of the blood supply of the right portion of the omentum, predisposing to venous thrombosis.[7]

The preoperative diagnosis varies from any disease associated with right-sided abdominal pain and tenderness, such as the most notable causes (acute appendicitis, acute cholecystitis, and torsion of an ovarian cyst), to epiploic appendagitis.[8] Epiploic appendages are small adipose protrusions from the serosal surface of the colon. An incidental epiploic appendage might undergo infarction due to the torsion of spontaneous venous thrombosis or torsion. Thus, the clinical appearance is similar to segmental omental infarction (SOI). US and CT play important roles in making an accurate diagnosis. Typical US findings are a hyperechoic, noncompressible, intrabdominal mass and central hypo-echoic changes.[8,9] Reported CT findings of greater omental torsion include a well-circumscribed, oval, or cake-like fatty mass with heterogeneous attenuation, containing strands of soft tissue attenuation probably corresponding to fibrous bands and/or dilated thrombosed veins.[8–11] The CT and US findings of a fatty mass in the omentum may also suggest other diagnoses, including lipoma, liposarcoma, angiomyolipoma, teratoma, and mesenteric lipodystrophy. The key to the correct diagnosis of omental torsion is the characteristic presence of concentric linear strands.[2,12] In particular, in the present case, the MPR images revealed the entire greater omentum from the pedicle to its tips. This image was also useful to make the diagnosis with coronal enhanced CT.

The management of omental torsion is controversial. Many papers have reported successful recovery with conservative treatment in cases of SOI. This is a benign and self-limiting disease. SOI gradually evolves to resolution of the inflammatory process with retraction, fibrosis, and complete resolution within 2 weeks.[8,9] Although spontaneous recovery of omental torsion or infarction has been reported, expectant management carries the risk of abscess formation, which may result in prolongation of the abdominal pain and hospital stay.[9,13] The surgical treatment is omentectomy or removal of the rotation. In most surgical cases, resection of the necrotic omentum was performed. In one case, the omental torsion was untwisted without omentecomy; this postoperative course was complicated by prolonged ileus and fever.[14] When the diagnosis is not made preoperatively, laparoscopy is useful for the diagnosis, as well as treatment.[15] The specimen might easily be removed because of the flexibility of the omentum, allowing it to adapt to the hole of a 12-mm trocar, although the incision can be extended if required. The advantages of the use of laparoscopy include the following: (1) complete examination of the abdominal cavity under visualization to confirm the diagnosis; (2) facilitation of aspiration and washing of the peritoneum; and (3) minimization of surgical invasiveness, postoperative pain, and complications related to the laparotomy wound.[15]

4. Conclusion

This is a rare case report of torsion of the greater omentum that was diagnosed preoperatively and treated successfully with laparoscopic resection. MPR imaging deserves credit because it played an important role in making an accurate diagnosis, which resulted in a successful operation.

Conflict of interest statement

We have no financial and personal relationships with other people or organisations.

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We have no sponsors involving this paper.

Ethical approval

Written informed consent was obtained from the patient for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

Authors contributions

T.A. and K.K. and G.T. evaluated the patient and wrote the manuscript. T.A., K.K., T.Y. and N.H. performed the laparoscopic omentectomy. T.N. was the leader of the treatment.

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