

A Child with the Rare Diagnosis of Acute Appendicitis and Omental Torsion

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Abstract

A 5-year-old girl with acute appendicitis and omental torsion (OT), who presented with acute abdomen, is reported. The greater omentum of right upper quadrant gathered as an edematous and hard-shelled conglomeration with 7.0 cm x 6.0 cm x 4.0 cm size. It also rotated 5 x 360° by clockwise direction. At the same time, the changes of the appendix were observed. The appendix was congestive, edematous and hard-shelled, with faecolith in the tip and had no adhesion with greater omentum. The whirled omentum and appendix were removed. The patient recovered smoothly, and was discharged 7 days later. OT occurring with acute appendicitis is a rare pathological condition with generic symptoms that may mimic many acute abdominal conditions. Laparoscopy is the first choice procedure for diagnosis and treatment of acute omental torsion and acute appendicitis.

Key words

Abdominal pain; Appendicitis; Omentum; Torsion

Introduction

Omental torsion (OT) is a rare cause of acute abdomen. This condition occurs when the greater omentum is twisted around its axis producing perfusion defects and vascular impairment of the organ. This can lead to an infarction which varies from simple oedema to ischaemia and gangrene of the omentum.¹ Omental torsion can be either primary or secondary, depending on the predisposing factors that cause it. Primary torsion of the omentum was first described in 1899.^{1,2} However, very few cases were reported thereafter, involving both adults and children. This report describes one case of overweight girl who presented

with acute abdomen and the definitive surgical diagnosis was omental torsion and appendicitis.

Case Report

A 5-year-old girl was admitted to the Second Affiliated Hospital of Wenzhou Medical College, with a two-day history of paroxysmal abdominal pain. She had the sudden abdominal pain 2 days ago before she was hospitalised. She described the pain as periumbilical, paroxysmal, without radiation, and being aggravated by movement. At the time of admission, she complained of nausea, without vomiting, fever, abdominal distension, or diarrhoea. These symptoms lasted two days. She had no bowel or urinary symptoms but poor appetite. She was previously healthy and had no history of abdominal surgery. Physical examination was unremarkable except obesity shape, Wt: 32.5 kg. The abdomen was flat, without gastrointestinal peristaltic wave. Tenderness in right side of the abdominal including McBurney's area was recognised with rebound and guarding. The percussion was tympanic note and the bowel sound was normal.

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Ultrasound (US) examination was performed and revealed a heterogenous echogenic mass in right lower abdominal wall. Enteric cavity has the change of oedema kind and the bowel gas was normal. No caecal and appendiceal abnormality was identified. Kidneys and hepatobiliary systems were also normal. Biochemical analysis revealed leukocytosis $12.2 \times 10^9/L$ (normal range, $4.0-11.0 \times 10^9/L$), and aneutrophilia $9.5 \times 10^9/L$ (normal range, $2.0-7.5 \times 10^9/L$).

She was diagnosed with acute appendicitis and appendicectomy was planned to be performed under general anesthesia after admission. We took rectus longitudinal incision. Some hemic percolate was seen after the peritoneal cavity was opened. The greater omentum of right upper quadrant gathered as an oedematous and hard-shelled conglomeration with 7.0 cm x 6.0 cm x 4.0 cm size. It also rotated 5 x 360° by clockwise direction (Figure 1). The conglomeration was adherent to ascending colon and lateral peritoneal. At the same time, the changes of the appendix were observed. The appendix was congestive, oedematous and hard-shelled, with faecolith in the tip and had no adhesion with greater omentum. The whirled omentum and appendix were removed. Postoperative diagnosis was omental torsion and acute appendicitis. The patient recovered smoothly, and was discharged 7 days later.

Pathological report: Omental adipose tissue's blood vessels were congestive and had marked neutrophil infiltration (Figure 2). The appendix was also congestive and oedematous and its mucosa had some infiltrated neutrophils, with faecolith in the lumen (Figure 3).

Discussion

Omental torsion is a rare condition, usually occurs during middle age and rarely affects children. Eitel reported the first case of primary torsion of the omentum (POT) in 1899.¹ Though first described more than 100 years ago, it still proves to be a diagnostic challenge. In one reported series, the affected children range from 9 to 16 years old. Small children less than 4 years old are considered unlikely to be affected due to relative paucity of omental fat.³ There has been increasing report of omental torsion among the children in recent years, which may be partly explained by more widespread use of computed tomography (CT) scan for investigation of paediatric abdominal pain. Another possibility is the increasing number of obese children. However, it has never been reported that omental torsion and appendicitis occur simultaneously in children.



Figure 1 The greater omentum of right upper quadrant rotated 5 x 360° by clockwise direction.

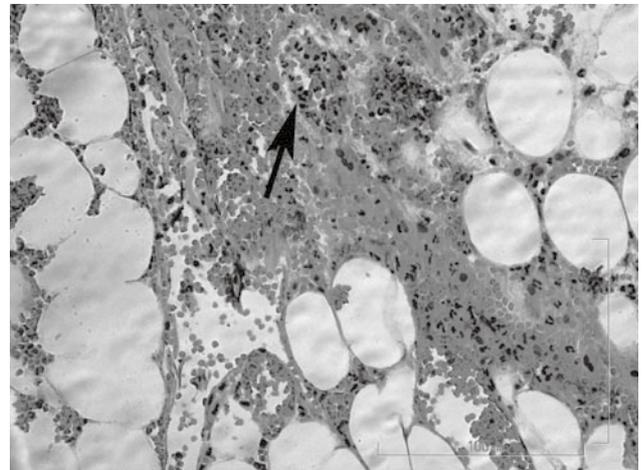


Figure 2 Omental adipose tissue's blood was congestive and had many neutrophils infiltrated.

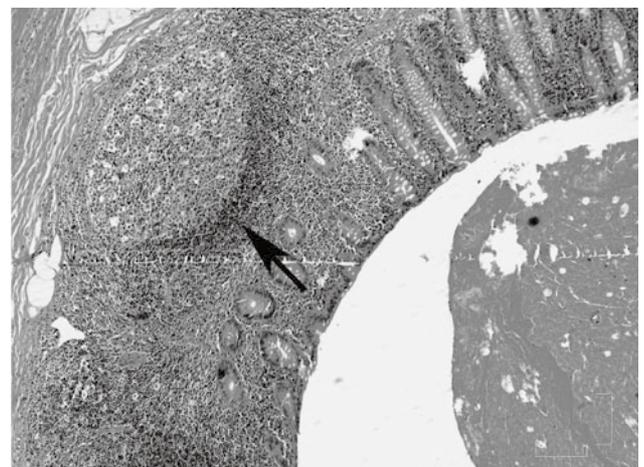


Figure 3 The appendix was also congestive and edematous and its mucosa had some infiltrated neutrophils.

Omental torsion can be classified as primary or secondary. The aetiology of primary omental torsion is not clear. The following factors may be relevant:⁴ (1) the morphologic abnormality of omentum such as hypertrophic omentum with narrow pedicle, paraomentum, double deck omentum, etc; (2) the omental varicose veins while the arteries are normal; (3) the intra-abdominal pressure raises up caused by heavy exercise, changing posture suddenly, fed-upness, cough and so on leading to greater omental dislodgement. Precipitating factors of the secondary type are previous surgery, trauma, inflammation, cysts, tumors, and hernias.

The case we described was a 5-year-old girl and her weight was 32.5 kg (Body Mass Index was 29.5, which accorded with the standard of obesity). Theriot et al reported that 11/12 (92%) children had hypergravitation after he analysed 12 children with POT.⁴ So he concluded that obesity was a fundamental factor of OT. Varjavandi et al⁵ postulated that increased fat deposit in obese children outstrips the blood supply to the developing omentum, leading to either relative ischaemia as the inciting event, increased omental weight leading to torsion, or traction to the most distal parts of the omentum. The heavily fat-laden omentum in these obese children predisposes the omentum to twist around its long axis, leading to vascular compromise, infarction, and gangrene.

What is the cause of the combination of OT and acute appendicitis in this patient? Can it be due to the flow of the inflammatory fluid from the torsion omentum to the appendix? The appendix was infiltrated by the inflammatory fluid produced by the omentum. Intraperitoneal inflammation involving the omentum was a result of omental torsion. However, there were also the faecolith and neutrophil infiltration in the appendix. In this case, a definite cause may not be found.

Omental torsion can sometimes be detected by ultrasound (US) using high resolution probe. The classical ultrasound appearance is an ovoid intra-abdominal mass adherent to the anterior abdominal wall. In our patient, ultrasound examination was performed which revealed a heterogenous echogenic mass in right lower abdominal wall. However, the diagnosis was missed in our case, because of lack of awareness.

CT is increasingly used for investigation of the abdominal pain, and is supplementary to negative US examination. CT is sensitive for diagnosing most acute abdominal conditions including omental torsion for which "vascular pedicle sign" and "whirl sign" are the two most

reliable features for diagnosis. The vascular pedicle sign consists of a central enhancing dot of mesenteric vessel surrounded by several twists of smaller mesenteric branches.⁶ The whirl sign corresponds to a hazy fatty mass with concentric linear fatty stranding and twisting blood vessels within the greater omentum, which whirl around the central vascular rod. Omental torsion usually locates at the anterior aspect of the middle and lower abdomen.⁷ However, whirling pattern may not be as apparent if the axis of rotation is not perpendicular to the transverse scanning plane.² With increased use of US and CT scan, preoperative diagnosis of OT may increase in frequency.

Traditionally, the standard treatment for omental torsion is resection of the involved segment of omentum.⁸ However, with the success of imaging tools there are some reported cases of omental torsion that have been successfully managed by conservative treatment, especially in patients with no associated complications.^{9,10} Although, we chose laparotomy due to equipment failure in this patient, we still think laparoscopic procedure is the best form of treatment for the condition. The minimally invasive access to the abdominal cavity without surgical incision evokes less pain compared with traditional procedure and permits a praecox discharge of the patient in the first postoperative day.¹¹ Hapuarachchi also thought laparoscopic approach was a reliable diagnostic method.¹² Furthermore, in cases of OT with extensive mass of omentum, the laparoscopic technique alone might require long surgery time, in such cases the therapeutic management of choice is diagnostic laparoscopy proceeding to laparotomy,¹³ which can permit the omental excision with small abdominal incision. We can comprehensively observe the abdominal cavity by laparoscopy and avoid missing the omental pathological change and proceeding to appendix removal.

Conclusions

We hope that this case observation would increase the awareness of omental torsion in children presenting with acute abdominal pain. OT occurring with acute appendicitis is a rare pathological condition with generic symptoms that may mimic many acute abdominal conditions. CT scans and US play an important role in the diagnosis of torsion of the greater omentum. Explorative laparotomy represents the diagnostic and definitive therapeutic procedure. Laparoscopy is the first choice procedure for diagnosis and treatment of acute omental torsion and acute appendicitis.

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