Omental ischemia

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Summary

Omental ischemia is a rare cause of acute abdomen. Clinical diagnosis is usually difficult because clinical signs and symptoms are similar to other common causes of abdominal pain. The most common differential diagnosis is acute appendicitis. Diagnosis is mainly based on ultrasound, and especially computed tomography scan analysis. There is, at present, no standard treatment modality for omental ischemia. When diagnosed by radiological imaging, omental ischemia can be managed conservatively. We hereby review incidence, etiology, pathology, clinical presentation, differential diagnosis, biological anomalies, radiological features, and treatment options of omental ischemia.

Résumé

L’ischémie du grand épiploon

Omental ischemia is a rare cause of acute abdomen; diagnosis is usually difficult because clinical symptoms and signs are similar to other common causes of abdominal pain. It mainly affects adults, with men being involved twice as frequently as women, with the majority being overweight [1-11]. It is quite difficult to establish a preoperative diagnosis of the condition, but with wide use of computed tomography (CT) in patients with acute abdominal pain, this rare disease may be accurately diagnosed before surgery [12-15]. The most common differential diagnosis is acute appendicitis [16,17]. Diagnosis of omental ischemia is mainly based on ultrasound (US) and especially CT scan analysis. There is, at present, no standard treatment modality. Two options are predominant: conservative medical treatment and early laparoscopic surgical intervention [5,12-15]. We hereby review incidence, etiology, pathology, clinical presentation, differential diagnosis, biological anomalies, radiological features, and treatment options of omental ischemia.

Incidence and etiology

The accurate incidence of omental ischemia has not been yet determined. When compared with appendicitis, omental torsion has an incidence of 0.0016 to 0.037%, which is a ratio of less than 4 cases per 1000 cases of appendicitis. The final outcome of 0.1% of laparotomies performed for appendicitis in children is omental torsion [3,5,6,9,18-32]. Leitner et al. [33] classified omental infarction into secondary and primary or idiopathic types. Torsion of the omentum, thrombosis due to various causes and congestion of the mesenteric veins were considered to be secondary, whereas cases with no identified causes are called idiopathic ischemia of the greater omentum [34-43]. Idiopathic omental infarction was first described by Bush in 1896 [44]. It was linked to trauma, increased abdominal pressure from valsalva’s manoeuvre, or to engorgement of dependent omental veins after a heavy meal. Others predisposing factors include congestive heart failure, digitalis administration and occlusive vascular disease. Torsion of the greater omentum is caused by twisting of the omentum around a pivotal point, more often in a clockwise direction. Precipitating factors leading to an increased risk for omental torsion include obesity, trauma, coughing, a sudden movements or change of body position, hyperperistalsis after a copious meal, compression between the liver and the abdominal wall, increased abdominal pressure, violent exercise, sneezing or coughing, pregnancy, constant movement of the omentum by peristalsis, and the occupational use of vibrating tools. The torsion may include part of the omentum or the entire length [1,39,45]. The great majority of cases of omental torsion were segmental involving the right side mainly due to the larger size and mobility of the omentum. Left-sided omental torsion is occasional but has been described [26,46,47].

Pathology

The greater omentum is a large fold of visceral peritoneum that hangs down from the stomach, passing in front of the small intestine and reflects on itself to ascend to the transverse colon before reaching to the posterior abdominal wall. In 1906, Ruth erford Morison characterized the omentum as the abdominal policeman because of its ability to travel to areas of intra-abdominal turmoil. The omentum only moves passively because bowel peristalsis and positional changes by the individual [5-11]. The first published report of torsion of the greater omentum is generally ascribed to Eitel in 1899 (although some credit deMarchetti with the first report of acute torsion of the omentum, in 1858) [48]. Omental ischemia is a benign self-limiting disorder which in unremarkable cases could cause ischemic necrosis of the involved part of the omentum and in intermittent cases may be a rare cause of recurrent abdominal pain [1]. Torsion leads to omental infarction; however, omental ischemia and infarction may be present without signs of torsion at surgery. No pathological findings can be found in the abdomen of the patient apart from a large and freely mobile omentum which has been rotated one or more times around a fixed spot, usually the right epiploic artery. The distal end of the omentum becomes congested and edematous; hemorrhagic extravasation takes place into the intestinal tissue, and thrombi form in the omental veins. There is inflammatory cell infiltration of varying degrees, and if the process is of sufficient duration, then gangrene may occur. As the omentum twists, the compromised venous system causes aseptic peritonitis with serosanguinous fluid accumulation in the peritoneal cavity. Furthermore, the arteries are compromised; this can lead to an infarction which varies from simple edema to ischemia and gangrene of the omentum [1,19]. If torsion of the greater omentum is left untreated, it may form a fibrous mass surrounded by adhesions which could become infected or it may be separated inside the abdominal cavity [26,46,47].

Clinical presentation and differential diagnosis

Omental ischemia can mimic various causes of acute abdomen [6-8,19,21]. Primary omental torsion is difficult to diagnose preoperatively with pinpoint accuracy limited to rates of 0.6% to 4.8% of all cases [1]. Clinical presentations are diverse, including mainly a sudden increase of pain on the right iliac fossa or right parambilical region, enhanced with abdominal movements, associated with signs of peritoneal irritation (guarding, rebound tenderness,…), without gastrointestinal symptoms [16,17,43]. Other symptoms may be present, such as nausea and vomiting, and moderate fever. When a large part of the omentum is involved, a mobile tender mass might be palpable in one third of cases. Diagnosis of omental torsion is rarely made preoperatively but should become more frequent.
with the increasing use of CT in the diagnosis of acute abdominal conditions [22,27,28]. Differential diagnosis should include appendicitis, cholecystitis, pancreatitis, appendagitis, sigmoid diverticulitis, cecal diverticulitis, perforated duodenal ulcer, abdominal wall hematoma, and intestinal obstruction. In women of reproductive age, salpingitis, ovarian cyst torsion, and ectopic pregnancy should also be considered. In children, differential diagnosis should also include Meckel diverticulum and mesenteric adenitis. Finally, torsion of accessory spleen is another diagnostic possibility, due to the fact that accessory spleen, when it exists, usually resides inside the omentum. The major complications of omental torsion include rupture and intraperitoneal bleeding, filtration purulent peritonitis and intraperitoneal abscess while fibrosis and inflammatory reaction may occur at occlusion [46-54].

Biologic and radiologic diagnosis

It has been reported that either non-operative or preoperative diagnosis is only made in 0.6 to 4.8% of cases of omental infarction [55]. A thorough blood workup reveals normal values in some cases. Leukocytosis with increased levels of C-reactive protein of the plasma and elevated erythrocyte sedimentation rate are nearly always present [1,52]. An abdominal X-ray is nonspecific in most cases. US and CT scan findings can be used to make a reliable diagnosis and establish the most appropriate treatment plan for the patient [22-28]. US imaging shows an ovoid or cake-like hyperechoic, non-compressible mass that is adherent to the abdominal wall at the site of maximal tenderness (located in the umbilical region or antero-laterally to the right half of the colon). Doppler sonography may show few vessels within the mass and peripheral hyperaemia. US also eliminates acute cholecystitis [12-14,27,56]. CT scan is considered the examination of choice in cases of acute abdomen [49,53]. A well-circumscribed ovoid area of heterogeneous fat stranding with hyperattenuated streaks located within the omentum between the anterior abdominal wall and colon present the typical findings of omental infarction on CT. CT scan findings include the classic whirling pattern of fat and vessels, plus caking and stranding of omental fat or fluid accumulation within the abdomen. However, all these findings can be observed in various other conditions, such as in lipoma, liposarcoma, angiomyolipoma, teratoma, mesenteric lipodystrophy, pseudomyxoma peritonei, epiploic appendagitis, segmental infarction of the omentum, and intestinal volvulus [49,52]. Unfortunately, except for the whirl sign, none of the other imaging findings seem specific enough for confident diagnosis and are dependent on the operator and interpreter. The key to the diagnosis of omental torsion is the presence of concentric linear strands which are characteristic, this important radiological sign is not present in other omental diseases [57-64]. As laparoscopy gain popularity, the diagnosis can now be confirmed and treated effectively in a minimally invasive fashion [29-32,65,69].

Treatment options

There is at present no standard treatment modality for omental ischemia. Two options are predominant: conservative medical treatment and early laparoscopic surgical intervention [29-31,43,51,58,65-72]. As high-quality US and CT have become part of the standard evaluation of acute abdominal conditions, the diagnosis of omental infarction has become more of a radiologic diagnosis, rather than found at the time of surgery [13,14,22,24,27]. This has led to a push for non-operative treatment, and successful conservative management has been reported in several series. Conservative treatment varies among physicians and includes all or part of the following: oral analgesics, anti-inflammatory drugs, and prophylactic antibiotics, with optimal fluid management in the first instance. Complications of conservative management include bleeding, abscesses and adhesions induced by the persistence of necrotic tissue in the abdomen. Patients under conservative treatment should be under continuous clinical and radiological observation. Follow-up after conservative treatment include US examination at four weeks to four months and CT scans at one to three years to confirm the reduction of the size of the ischemic lesion [14,49,52,53]. When the patient’s clinical, laboratory and radiological findings worsen or when diagnosis is doubtful or the surgeon decides that surgical intervention is required, then laparoscopy is the appropriate method for diagnosis and therapy [29-31,43,51,58,65]. Surgical management, consisting in abdominal exploration and omental necrosectomy is recommended by some authors believe that this approach will result in rapid amelioration of pain, enables patient discharge much sooner, and will prevent complications [29,30,51,65]. The question of the best treatment for omental infarction diagnosed with imaging and clinical criteria remains unresolved. In the absence of studies comparing conservative versus operative treatment, conclusions drawn from case reports are difficult to support. A short trial of conservative treatment is appropriate if a diagnosis of omental infarction or torsion is made on clinical grounds and based on imaging studies. However, laparoscopic operative treatment should not be delayed more than 24-48 h if no improvement is observed. Laparotomy or open surgery should only be necessary where good quality imaging and laparoscopy are not available, or rarely if laparoscopic resection is not possible [66].

Conclusions

Omental ischemia appears with a wide variety of clinical manifestations, thus mimicking different causes of acute abdomen. A preoperative diagnosis in most cases is difficult, and a high index of suspicion is required. Recently, high-quality CT and US have enabled us to make the preoperative diagnosis and have
also provided the option of conservative treatment of the condition. Conservative treatment is an appropriate first line of treatment for the first 24–48 h while resuscitation is initiated and antibiotics are administered. However, if the diagnosis is in doubt or if conservative treatment fails, then laparoscopy should be performed without delay. Laparoscopy has allowed not only a confirmation of the diagnosis but also an effective, minimally invasive treatment of the condition, with the added benefit of early recovery. Laparotomy or open surgery should only be necessary where good quality imaging and laparoscopy are not available, or rarely if laparoscopic resection is not possible.

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