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Superior Mesenteric Vein Thrombosis with Jejunal Ischemia Secondary to Acute Perforated Appendicitis

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Abstract

Superior Mesenteric Vein Thrombosis (SMVT) is a rare condition with a high mortality rate that can subsequently lead to secondary inflammatory changes and bowel ischemia. Several factors can predispose to SMVT, such as malignancy, recent abdominal surgery, and intraperitoneal inflammation or infection. We describe a case of an elderly patient who was presented with acute abdominal pain and was diagnosed with acute perforated appendicitis complicated with SMVT causing jejunal ischemia. To lower the high mortality rate linked to this complication, the fundamental management is the early identification of acute mesenteric ischemia by imaging such as plain radiographs, Contrast-Enhanced Computed Tomography (CECT), and surgical intervention.

Keywords:

Superior Mesenteric Vein thrombosis, bowel ischemia, jejunal ischemia, acute appendicitis

Introduction

Acute appendicitis is the most frequent surgical emergency, with the standard treatment being surgical management. There are several complications that can be developed secondary to acute appendicitis, including abscess formation, perforation, peritonitis, and arterial or venous thrombosis, especially involving the portal vein and superior mesenteric vein[1]. Superior Mesenteric Vein Thrombosis (SMVT) is an uncommon gastrointestinal emergency that is a diagnostical challenge. It is about 1 in 1,000 acute abdomen cases that presented to the emergency department or about 6-9% of all the cases of mesenteric ischemia[2]. Apart from acute appendicitis, there are various aetiology that also can cause SMVT, such as malignancy, hypercoagulability, and post-operation[1]. When thrombosis forms, it causes sudden onset of intestinal hypoperfusion, subsequently leading to acute mesenteric ischemia and secondary inflammatory changes. If delayed in treatment, it will lead to intestinal necrosis, which is life-threatening with a mortality rate of up to 30-50%[3]. We present a case of an elderly who presented with acute abdominal pain and was diagnosed with acute jejunal ischemia secondary to mesenteric vein thrombosis due to acute perforated appendicitis.

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Case report

A 74-year-old patient with underlying diabetes mellitus, ischemic heart disease, and hypertension presented with a four-day history of left-sided abdominal pain, which worsened in the last two days. It is dull, aching, non-radiating pain associated with fever, vomiting, and reduced oral intake. The patient also complained of no bowel movement for the past two days. However, she is still able to pass flatus. On admission, her temperature was 38 degrees Celsius, her heart rate was 87 beats per minute, and her blood pressure was 128/88 mmHg. Her abdomen was grossly distended and tender at the paraumbilical region. Investigations revealed an elevated white cell count ($20.8\times10^3/\mu L$). Venous blood gas was taken with a pH result of 7.24 and an increase in lactate level of up to 4.1 mmol/L. An abdominal radiograph revealed dilated small bowel with no radiographic features of pneumoperitoneum. A Contrast-Enhanced Computed Tomography (CECT) scan of the abdomen demonstrated an enhancing, irregular, and thickened appendix with ill-defined hypodensity at the tip of the appendix in keeping with acute perforated appendicitis (Figure 1). There is also small bowel feces sign (Figure 1). The jejunum is dilated with the fluid-filled with the presence of intramural gases within the jejunal wall (Figure 3). In addition, there is the presence of air within the superior mesenteric vein (Figure 2a, Figure 4) and jejunal and ileal drainage of the superior mesenteric vein with a filling defect within the jejunal tributaries (Figure 2b, Figure 4). Air is also noted within the branches of the right and left portal veins, indicating pneumoporta (Figure 3). The patient underwent urgent exploratory laparotomy and appendicectomy on the same day. Intra-operative findings revealed a macerated appendix with adhesion to the sigmoid colon and mesentery of the small bowel with pus at the right paracolic gutter as well as at the right iliac fossa. The proximal small bowel is grossly dilated with marked oedema and signs of venous congestion. However, no sign of whole small bowel necrosis was observed. Fortunately, no bowel resection, surgical thrombectomy, or interventional thrombolysis was performed. Histopathological examinations show the diagnosis of perforated necrotising appendicitis. Postoperatively, the patient was started on appropriate antibiotics and an anticoagulant and was discharged well after 18 days of admission.

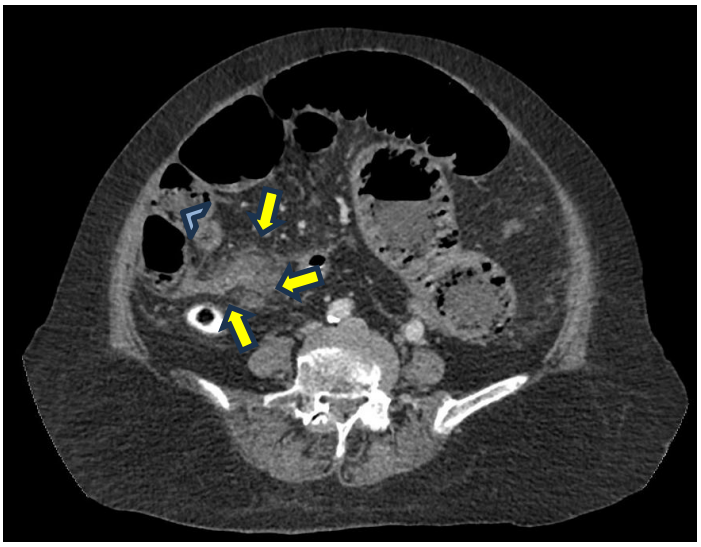

Figure 1: Abdominal CECT in axial plane showing enhancing, irregular and thickened appendix with ill-defined hypodensity at the tip of the appendix (yellow arrow). Noted periappendiceal fat streakiness and mall bowel feces sign (blue arrowhead).

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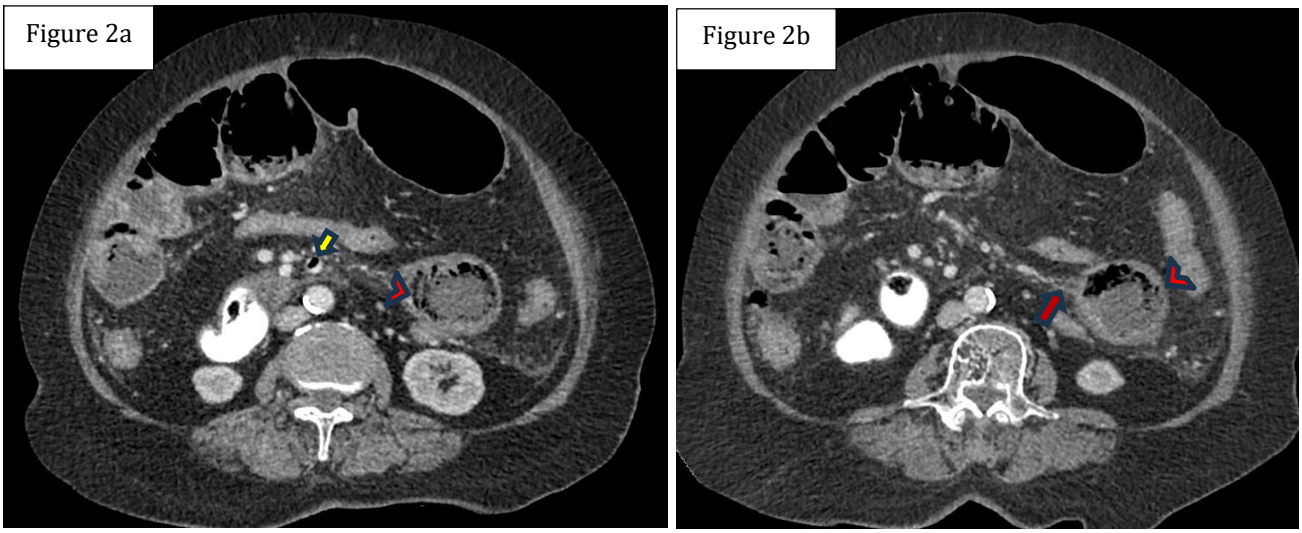

Figure 2: Selected axial images of CECT of the abdomen shows (2a) air within the superior mesenteric vein (yellow arrow) with thrombosis within the venous drainage of the jejunum (2b, red arrow). The adjacent jejunum is dilated with intramural gas (arrowhead).

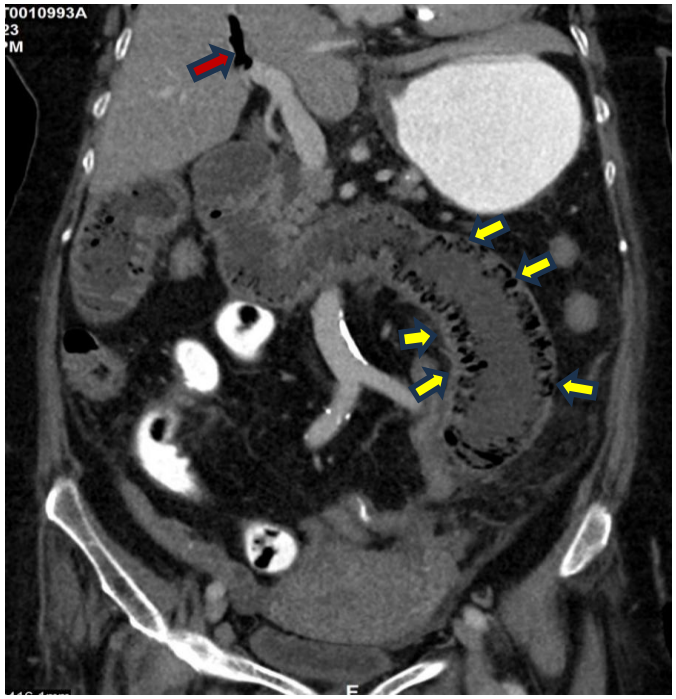

Figure 3: Coronal image of abdominal CECT showing fluid-filled dilatation of the jejunum with intramural gases (yellow arrow). Air within the porta vein also observed (red arrow).

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Figure 4: Coronal image of the contrast enhanced abdomen showing filling defect in the jejunal drainage of superior mesenteric vein (red arrow) with air within the superior mesenteric vein (yellow arrow).

Discussion

Acute mesenteric ischemia, in our case involving the jejunum, occurs when there is an abrupt interruption of the blood flow to the small intestine. This resulted in ischemia, cellular damage, and intestinal necrosis[4]. The aetiology of acute mesenteric ischemia can be divided into occlusive or non-occlusive, which is further classified as mesenteric arterial embolism (50%), mesenteric arterial thrombosis (15-25%), or mesenteric venous thrombosis (5-15%)[4]. The superior mesenteric vein is the commonest site of thrombus formation, subsequently affecting the venous return and leading to venous engorgement and ischemia. Compared to arterial thrombosis, bowel ischemia due to SMVT has a better outcome rate and can be managed conservatively if detected earlier. However, it requires prompt recognition and intervention to prevent further complications such as bowel infarction, perforation, and peritonitis. Notably, many causes can predispose to mesenteric vein thrombosis, such as intraperitoneal inflammation, abdominal surgery, malignancy, prothrombotic causes, or idiopathic causes[5]. In addition, intraperitoneal inflammation was discovered in 65.9% of cases[6] with various causes such as appendicitis, diverticulitis, and inflammatory bowel disease, with a significant mortality rate of up to 50%.

The reported cases of SMVT caused by appendicitis is about 0.25%[7]. The appendicitis can predispose to thrombogenesis with multiple mechanisms, such as a combination of Virchow's triad. This includes stasis blood flow, hypercoagulability, and endothelial injury[1]. Since one of the tributaries of the superior mesenteric veins is from the venous drainage of the appendix, the bacteria can drain into the mesenteric venous system or invade the local tissues. Subsequently, it causes periphlebitis of the vessel wall, forming the thrombus.

Conclusion

Acute appendicitis is the most common surgical presentation that requires an emergency intervention. Various complications are usually associated with acute appendicitis, such as perforation, abscess

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formation as well as peritonitis. However, some unusual complications, such as SMVT that causes jejunal ischemia, are challenging to recognise and require further management to be initiated. If these complications are left untreated, they pose a high mortality rate for the patient. Therefore, early clinical and imaging recognition, as well as multimodalities of treatment, will benefit the patients.

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Conflict of Interest Disclosure
We declare that we have no conflict of interest.

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