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Delayed intestinal stenosis of nonocclusive mesenteric ischemia after autologous blood collection: A case report

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ABSTRACT

INTRODUCTION: Nonocclusive mesenteric ischemia (NOMI) has been reported to be associated with high mortality. Early diagnosis of NOMI and prompt restoration of the intestinal blood flow is necessary in order to achieve a favorable outcome.
PRESENTATION OF CASE: We present the case of a patient who developed NOMI after autologous blood collection and was treated by selective infusion of the superior mesenteric artery with papaverine, intestinal decompression using a long intestinal tube, the administration of antibiotics, and fluid replacement. Although this non-surgical management was successful, 8 weeks after the ischemic event, segmental bowel resection was necessary because of repeated intestinal obstruction caused by bowel stricture.
DISCUSSION: Autologous blood collection might be a risk factor of NOMI. In addition, the possibility of delayed intestinal stenosis remains, even if bowel necrosis and surgical resection were avoided with non-surgical management including vasodilator therapy.
CONCLUSION: Rapid diagnosis and intervention are essential to minimize intestinal ischemia.

1. Introduction

Nonocclusive mesenteric ischemia (NOMI) is relatively rare but often fatal. The overall incidence of autopsy-verified fatal NOMI was 2.0/100,000 person years [1]. It accounts for about 20–30% of all the cases of acute mesenteric ischemia, with a mortality rate of about 50% [2–4]. NOMI is caused by the reduction of blood flow in the mesenteric circulation. The risk factors include heart failure, hemodialysis, septic shock, recent cardiopulmonary bypass, and several medications such as furosemide, digitalis, and vasoconstrictive agents. Rapid infusion of vasodilators via the superior mesenteric artery (SMA) is the only decisive intervention. We report a case of NOMI after autologous blood collection, developing delayed intestinal stenosis following vasodilator therapy.

1.1. Presentation of case

A 76-year-old man was admitted to the hospital with fever and right lower quadrant pain after autologous blood collection, as preparation for nephrectomy scheduled in two weeks to resect a renal cancer. He had temporal hypotension (67/33 mmHg) about 40 min after the collection of autologous blood (400 ml). Although his vital signs were stabilized with fluid replacement in approximately 30 min, abdominal pain remained severe, requiring analgesic agents several times. Laboratory data showed no specific changes on admission and the inflammatory markers on day 3 were the following: WBC 14,020/μl and CRP 35.02 mg/dl.

Contrast-enhanced multi-detector computed tomography (CT) on day 3 demonstrated thickening of the small bowel wall, poor staining of the wall, and intramural emphysema (Fig. 1). In addition, angiography revealed diffuse spasms in the branches of the proximal SMA (Fig. 2A). With a diagnosis of NOMI, we started continuous infusion of papaverine (2.5 mg/h) with a bolus of prostaglandin E_1 (5 μg) through the intra-arterial catheter placed in the SMA and continued until day 8. Angiography on day 6 demonstrated an improvement of the circulation of SMA (Fig. 2B). Decompression using a long intestinal tube was also continued from day 5 to day 14. Piperacillin/tazobactam (4.5 g) was administered three times per day from day 2–day 9. Non-surgical management was successful resulting in discharge of the patient on day 21.

However, the patient was readmitted because of intestinal obstruction on day 35. Conservative treatment was successful and he was discharged on day 43. The intestinal obstruction occurred again on day 49. During this time, conservative treatment including decompression by a long intestinal tube was unsuccessful. CT revealed a perforation of the small bowel associated with the intestinal obstruction. On day 56, an emergency operation (right hemicolectomy, and partial resection of 60 cm of the strictured and inflammatory distal ileum) was carried out.

According to pathological examination, two sites of stricture were found in the ileum, which were adhering to each other causing obstruction (Fig. 3). Moreover, in the stricture sites of the ileum, severe thickening was found with fibrosis in the sub-mucosal layer (Fig. 4A). An ulcer formation was also observed in the stricture

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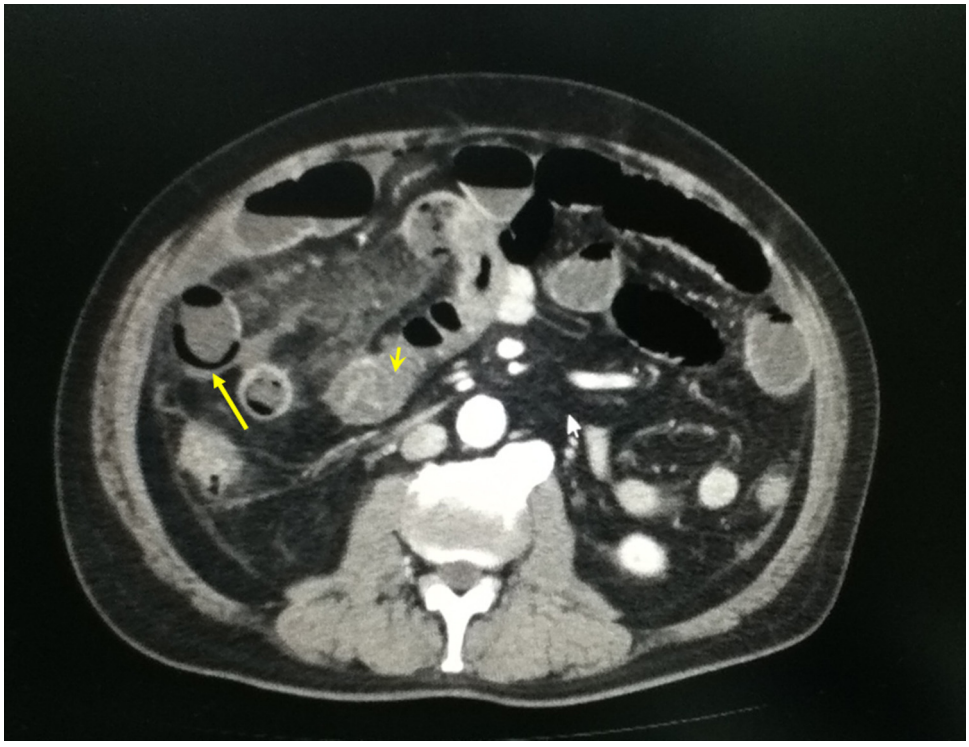

Fig. 1. Abdominal CT findings.
A thickening of the wall was found in the small bowel, and the enhancement with contrast medium was weakened (→: short tail arrow). Gas in the intestinal wall was found in the small bowel (→: long tail arrow).

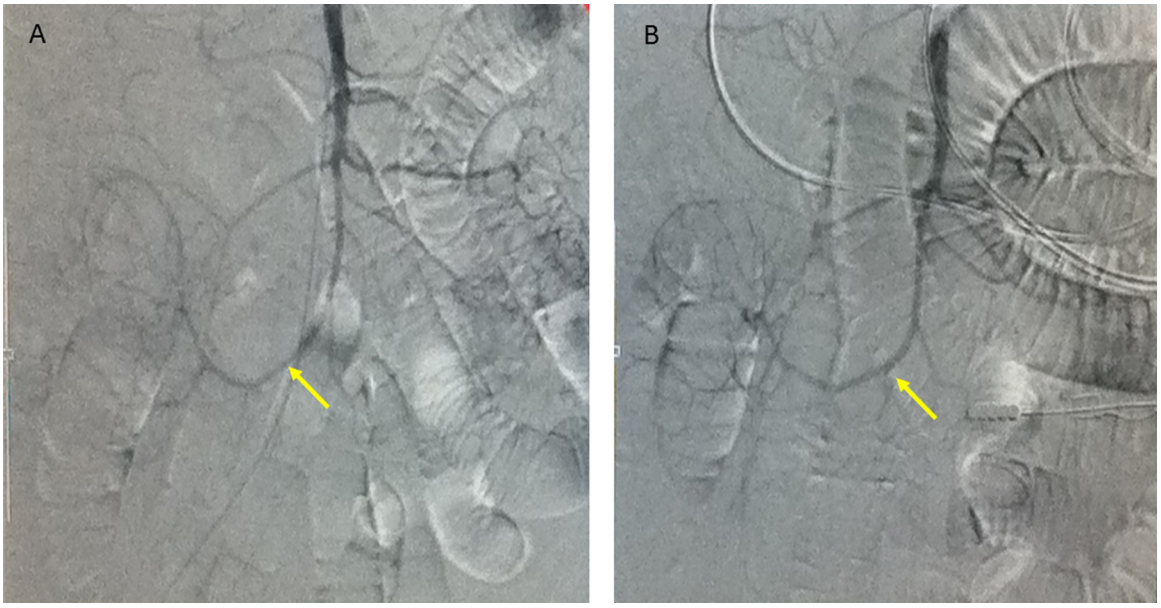

Fig. 2. Selective SMA angiography findings.
(A) The proximal SMA was intact, but distal branches were spastic on day 3. (B) The spasm of the distal branches improved on day 6.

site leading to perforation (Fig. 4B). Post-operatively, complications of gastric ulcer and liver abscess arose, and the hospital stay was extended to day 109.

2. Discussion

The following two points are the subject of this case report. First, autologous blood collection can be a risk factor of NOMI. Second, delayed intestinal stenosis after the recovery from NOMI may require surgical intervention in some cases.

Low cardiac output states have been reported to lead to NOMI developing [1–3,5]. Taking blood for autologous blood transfusion may cause volume depletion and low cardiac output, which is similar to the condition of removing water during hemodialysis. In fact, temporal hypotension was found while collecting autologous blood in this case. It is known that the temporal decreases in the SMA blood flow for only several hours can cause mesenteric vaso-