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*Case Report*

# Abdominal pain and diarrhea caused by splenic arteriovenous fistula: a case report

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**Abstract:** Abdominal pain and diarrhea were the most common symptoms in clinics, which could be caused by various diseases such as acute gastroenteritis, intestinal cancer and so on. Here, we report an unusual case of splenic arteriovenous fistula (SAVF) with splenectomy history. Our patient was initially presented with the symptoms of abdominal pain and diarrhea. The diagnosis of SAVF was identified by computed tomography angiography and Doppler's ultrasonic examination. The patient with SAVF was successfully cured by surgical ligation and recovered uneventfully postoperatively.

**Keywords:** Splenic arteriovenous fistula, abdominal pain, diarrhea, portal hypertension

## Introduction

Splenic arteriovenous fistula is a rare disease with various causes-congenital or acquired. Most of them are due to trauma, splenectomy-or rupture of a splenic artery aneurysm into the splenic vein [1-4]. Because of cirrhosis-related splenectomy and the high traffic accident frequency-induced spleen injuries in the clinic, the doctors should not neglect the possibility of SAVF in china [5]. Here, we reported a posttraumatic SAVF with the initial symptoms of only abdominal pain and diarrhea.

## Case report

A 41-year old man was admitted to a local hospital due to abdominal pain one month ago. However, the symptoms developed to persistent abdominal pain, postprandial vomiting and watery diarrhea after two weekly-conservative care. The patient was referred to our department for further diagnosis and treatment. On admission, his temperature was 36.7°C, his pressure was 90/60 mmHg, his pulse was 120 beats per minute, and his respiration was 19 times/min. A soft abdomen with normoactive bowel sounds but with diffuse moderate tenderness was found in physical examination. He denied any medications illicit substances or significant amount of alcohol use. He had a history of splenectomy 8 years earlier following a traffic accident.

The results of laboratory tests showed white blood cell (WBC) count 14.29 × 10^9/L (4-10 × 10^9/L), platelet count 365 × 10^9/L (normal 86-303 × 10^9/L), total bilirubin 31.14 μmol/L (3.4-17. 1 μmol/L), g-glutamyl transpeptidase 214.1 U/L (11-50 U/L), Creatinine 134 mmol/L (normal 45-104 mmol/L), alkaline phosphatase 203 U/L (normal 46-127 U/L), globulin 36.8 g/L (20-30 g/L), APTT 40.1 s (25.1-36.5 s), Fecal occult blood test positive (negative). D-D dimer 7.059 μg/mL (0-0.5 μg/mL) C-reaction protein (CRP) 69.2 mg/L (0-3 mg/L); whereas alanine aminotransferase 63 U/L, aspartate aminotransferase 36.0 U/L, albumin 47.4 g/L hemoglobin level 14.6 g/dL, lactate dehydrogenase 186 U/L, PT 10 s and amylase 71 U/L were within the normal range (**Table 1**).

An enhanced spiral CT scan demonstrated increasing ascites and diffusely thickened small bowel and colonic walls (**Figure 1A**). The CT scan also revealed portal hypertension with an enlarged portal vein and many small varicose veins (**Figure 1B**). More importantly, the splenic vein showed the same intensity as the aorta on the arterial phase of a contrast enhanced CT

**Table 1.** The result of laboratory tests

| | Result | Normal Range |
|---|---|---|
| ALT (U/L) | 63 | 13-69 |
| AST (U/L) | 36 | 15-46 |
| TB (μmol/L) | 31.14 | 3.4-17.1 |
| LDH (U/L) | 186 | 109-245 |
| Alb (g/L) | 47.4 | 34-54 |
| Hb (g/dL) | 14.6 | 131-172 |
| Amylase (U/L) | 71 | 30-110 |
| Cr (mmol/L) | 134 | 45-104 |
| WB | 14.29 × 10^9 | 4-10 × 10^9 |
| Lymphocytes (%) | 17.7 | 20-40 |
| N (%) | 72.3 | 50-70 |
| PLT | 365 × 10^9 | 86-303 × 10^9 |
| $Na^+$ | 135 | 135-145 |
| $K^+$ | 3.5 | 3.5-5.5 |
| $Cl^+$ | 103 | 96-110 |
| PH | 7.382 | 7.35-7.45 |
| CRP (mg/L) | 69.2 | 0-3 |
| PT (s) | 10.3 | 9.4-12.5 |
| APTT (s) | 40.1 | 25.1-36.5 |
| D-D dimer (μg/mL) | 7.059 | 0-0.5 |

scan (**Figure 1C**). All these suggest the presence of a splenic arteriovenous fistula (SAVF). Then, CT angiography (CTA) clearly shown SAVF between the splenic artery and the dilated splenic vein (**Figure 2**). Color Doppler Ultrasound (US) examination revealed the increased arterial flow and pulsatile venous flow with increased velocity, which was consistent with AVF of the splenic vessels.

For his treatment, a surgical excision of the fistula was performed by ligating the splenic artery. The patient underwent an uneventful postoperative course and he was discharged 7 days afterwards. US examination and abdominal CTA scan performed 1 and 3 months later showed no recurrence of SAVF.

## Discussion

SAVF were usually reported with the symptoms of abdominal discomfort and bleeding of upper or lower digestive tract [6, 7]. In this case, the patient mainly experienced abdominal pain, vomiting and watery diarrhea. However, due to the common symptoms, the patients were often diagnosed as acute gastroenteritis or pancreatitis at first. Then, the symptoms could not be improved after the treatment with the regular fluid support or anti-inflammation. As a rare disease, SAVF was characterized with portal hypertension, which occurs as a result of hyperdynamic portal circulation [8, 9]. Our patient showed significant portal hypertension with diffusely thickened small bowel and colonic walls in CT scan. In a patient with the above

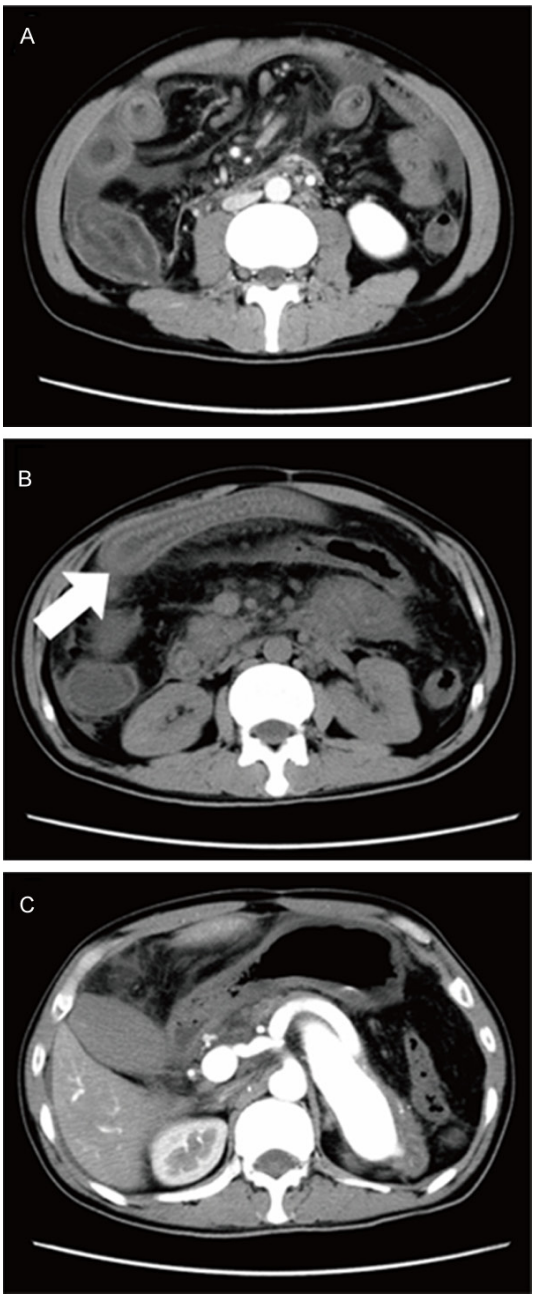


**Figure 1.** Contrast-enhanced abdominal computed tomography. A. Varicose veins manifested on the portal phase. B. Black arrow refers to the thickened colonic walls. C. Significantly enhanced splenic vein on the arterial phase.

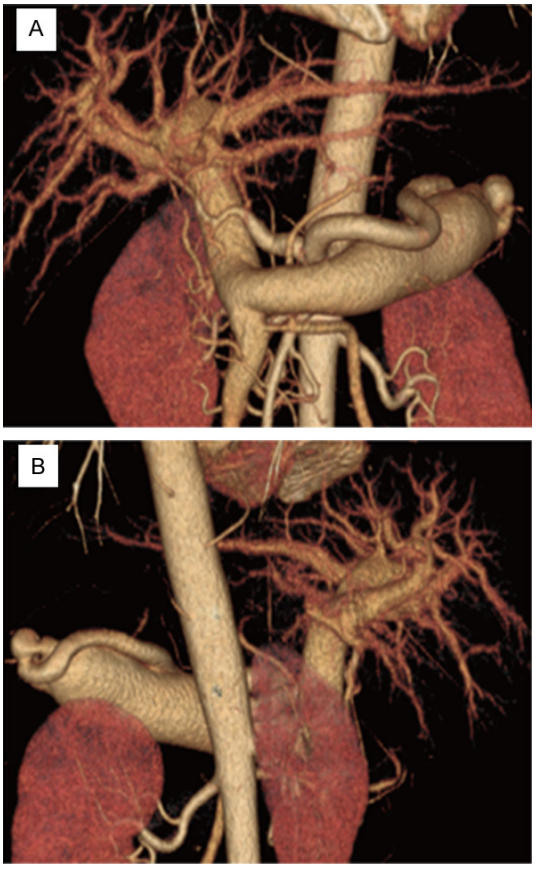


**Figure 2.** Splenic arteriovenous fistula manifested by 3D reconstruction in CT scan.

symptoms and the presence of portal hypertension not related to chronic liver disease, we doctors should not neglect splenic arteriovenous fistula.

SAVF could be caused by the rupture of a splenic artery into the splenic vein. Before that, the degeneration of the artery wall may be the first requirement for SAVF. Arterial fibrodysplasia, repeated pregnancies, atherosclerosis and arterial fibrodysplasia constitute the main conditions for it [4, 10]. As for our case, due to the mass ligation of splenic artery and vein, splenectomy may cause SAVF. But the development of a SAVF after 6 years makes it difficult to be associated with the common symptoms of abdominal discomfort. On closer inspection, the high intensity of the splenic vein on the arterial phase of a contrast enhanced CT scan suggested the diagnosis of SAVF, which could be often easily overlooked. Then, CTA and US clearly displayed the SAVF's 3D morphology and established the diagnosis.

To prevent complications of portal hypertension, mesenteric ischemia and congestive heart failure from venous shunting was recommended in the treatment of SAVF. Then, endovascular treatment, surgical excision of the fistula with aneurysmal repair and splenectomy were the main choices to manage the disease [11, 12]. This patient has not experienced the symptoms of SAVF after surgical ligation of the splenic artery.

## Disclosure of conflict of interest

None.

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## References

[1] Deshpande A, Wolfson D and Madanick RD. Clinical challenges and images in GI. Splenic arteriovenous fistula. Gastroenterology 2008; 135: 19-329.

[2] Law ST, Wong CK, Chow KC and Loo KT. Splenic arteriovenous fistula: unusual cause of portal hypertension complicated with gastric variceal bleeding. J Dig Dis 2012; 13: 549-552.

[3] Oguz B, Cil B, Ekinci S, Karnak I, Akata D and Haliloglu M. Posttraumatic splenic pseudoaneurysm and arteriovenous fistula: diagnosis by computed tomography angiography and treatment by transcatheter embolization. J Pediatr Surg 2005; 40: e43-46.

[4] Siablis D, Papathanassiou ZG, Karnabatidis D, Christeas N, Katsanos K and Vagianos C. Splenic arteriovenous fistula and sudden onset of portal hypertension as complications of a ruptured splenic artery aneurysm: Successful treatment with transcatheter arterial embolization. A case study and review of the literature. World J Gastroenterol 2006; 12: 4264-4266.

[5] Yang T, Zhang H, Lau WY, Shen F and Wu MC. Liver disease in China: A long way to go. Hepatology 2015; [Epub ahead of print].

[6] McClary RD, Finelli DS, Croker B and Davis GL. Portal hypertension secondary to a spontaneous splenic arteriovenous fistula: case report and review of the literature. Am J Gastroenterol 1986; 81: 572-575.

[7] Strassburg CP, Bleck JS, Rosenthal H, Meyer HJ, Gebel M and Manns MP. Diarrhea, massive ascites, and portal hypertension: rare case of

a splenic arterio-venous fistula. Z Gastroenterol 1996; 34: 243-249.
[8] Chen B, Tang CW, Zhang CL, Cao JW, Wei B and Li X. Melena-associated regional portal hypertension caused by splenic arteriovenous fistula. World J Gastroenterol 2012; 18: 1996-1998.
[9] Orrego M, Vargas HE, Balan V, Wells C, Harrison ME, Larson J, Huettl E and Liu PT. Portal hypertension due to a splenic arteriovenous fistula: a case report. Dig Dis Sci 2006; 51: 1113-1116.
[10] Trastek VF, Pairolero PC, Joyce JW, Hollier LH and Bernatz PE. Splenic artery aneurysms. Surgery 1982; 91: 694-699.
[11] Hung CF, Tseng JH, Lui KW, Wan YL, Tsai CC, Shem CH and Wu CS. Intractable oesophageal variceal bleeding caused by splenic arteriovenous fistula: treatment by transcatheter arterial embolization. Postgrad Med J 1999; 75: 355-357.
[12] Gartside R and Gamelli RL. Splenic arteriovenous fistula. J Trauma 1987; 27: 671-673.