—Case Reports—

Primary Volvulus of the Small Intestine Exhibiting Chylous Ascites: A Case Report

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Background: Primary volvulus of the small intestine associated with chylous ascites is very rare, with only four reported cases. In this paper, we report a new case of primary volvulus associated with chylous ascites.

Case Presentation: The patient was a 70-year-old man. After experiencing bloating and abdominal pain for several hours, he called an ambulance and underwent an emergency examination at our hospital. Abdominal distension, pressure pain, and rebound tenderness were observed throughout his entire abdomen. The patient had a history of hypertension for which he was receiving oral treatment. Abdominal contrast-enhanced computed tomography (CT) revealed an edematous change in the intestinal membrane and volvulus of the small intestine. As findings suggestive of ischemia were observed in part of the intestines, emergency surgery was performed on the day of admission. Open surgery revealed approximately 500 mL of chylous ascites in the abdominal cavity. The small intestine had twisted 180° in a counter-clockwise direction at the root of the superior mesenteric artery, and the mesentery appeared milky white with edematous changes extending 75 to 240 cm from the ligament of Treitz. There was no evidence of intestinal necrosis; therefore intestinal resection was not performed. The volvulus of the small intestine was corrected. Moreover, because there was no other underlying disease observed, surgery was completed. The ascites collected during surgery revealed high levels of triglycerides at 332 mg/dL, and chylous ascites was diagnosed. An abdominal CT performed on the third day after surgery showed an improvement in intestinal edema, and primary volvulus of the small intestine associated with chylous ascites was diagnosed. Postoperative progress was good, and the patient was discharged on hospital day 10. (J Nippon Med Sch 2017; 84: 83–86)

Key words: chylous ascites, volvulus, superior mesenteric artery, edema

Background

Primary volvulus of the small intestine in adults is a relatively rare condition. Mesenteric twisting can lead to the appearance of various gastrointestinal symptoms, including nausea, vomiting, abdominal distention, and abdominal discomfort[1]. We treated a case of chylous ascites retention in the abdominal cavity. We believe that volvulus of the small intestine caused lymphatic vessel displacement and impaired lymph flow, which led to chyle leakage and the retention of chylous ascites in the abdominal cavity. Since the first case of chylous peritonitis described by Renner in 1910, there have been only a few anecdotal reports in the literature[2]. In this paper, we report a case of volvulus of the small intestine associated with chylous ascites.

Case Presentation

A 70-year-old man presented with a chief complaint of abdominal distension and pain at our hospital. He had a medical history of hypertension, with no relevant family history. In March 2015, the patient suddenly developed abdominal distension 5 hours after eating lunch. Subse-

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Table 1 Laboratory findings on admission

WBC ($mm^3/\mu L$)	7,600
Hb (g/dL)	13.1
Plt (mm^3)	13.0
TP (g/dL)	6.6
Alb (g/dL)	4.0
T-Bil (mg/dL)	1.7
AST (IU)	25
ALT (IU)	18
LDH (IU)	43
ALP (IU)	82
γ-GTP (IU)	63
CK (IU)	294
BUN (mg/dL)	17.2
Cr (mg/dL)	0.79
Na (mEq/L)	143
K (mEq/L)	4.4
Cl (mEq/L)	105
CRP (mg/dL)	0.04
PT-INR	1.00

Abbreviations: WBC, white blood cell; Hb, hemoglobin; Plt, platelet; TP, total protein; Alb, albumin; T-Bil, total bilirubin; AST, aspartate aminotransferase; ALT, alanine aminotransferase; LDH, lactate dehydrogenase; ALP, alkaline phosphatase; γ-GTP, γ-glutamyltranspeptidase; CK, creatine phosphorus kinase; BUN, blood urea nitrogen; Cr, creatinine; Na, natrium; K, kalium; Cl, chlorine; CRP, c-reactive protein; PT-INR, international normalized ratio of prothrombin time.

quently, abdominal pain appeared and the patient consulted our hospital by ambulance. On initial examination at presentation, the patient was alert and conscious with a body temperature of 36.4°C, blood pressure of 142/96 mmHg, and a heart rate of 104 bpm. Abdominal distension was observed, with pressure pain and rebound tenderness throughout the entire abdomen. Laboratory findings (**Table 1**): Therefore, only a mild elevation of CK levels was observed.

Abdominal X-ray findings revealed enlargement of the small intestine and niveau formation. Abdominal contrast-enhanced computed tomography (CT) findings showed edematous changes of the mesentery and whirl sign in the frontal plane. The contrast effect of the intestinal wall was poor due to edematous changes in part of the mesentery, which was suggestive of intestinal ischemia (**Fig. 1**). On the basis of the above findings, volvulus of the small intestine and intestinal ischemia were diagnosed, and emergency surgery was performed. Open surgery revealed approximately 500 mL of chylous ascites in the abdominal cavity (**Fig. 2**). The small intestine had twisted 180 degreeds in a counter-clockwise direction at the root of the superior mesenteric artery, and the mesentery appeared milky white with edematous changes extending 75 to 240 cm from the ligament of Treitz (**Fig. 3**). The abdominal cavity was searched, but adhesions of another organic disease were not discovered, and ileus caused by primary volvulus of the small intestine was diagnosed. However, there were no findings of intestinal necrosis, and therefore, intestinal resection was not performed. The volvulus of the small intestine was corrected, and surgery was completed. The ascites collected during surgery revealed high levels of triglycerides at 332 mg/dL, and chylous ascites was diagnosed. The postoperative progress was good, and the patient was discharged on hospital day 10. Written informed consent was obtained from the patient for publication of this case report and accompanying images.

Discussion

Volvulus is a condition wherein the mesentery rotates in a clockwise or counter-clockwise direction. The most common site of volvulus onset is the sigmoid colon (70%−80%), followed by the cecum (10%−20%). Onset in the small intestine is rare[1]. Moreover, onset can be broadly divided into two types: primary and secondary[1]. Secondary volvulus is characterized by a secondary factor, including mesenteric causes (e.g., intestinal malrotation and incomplete mesenteric fixation), intestinal tract causes (e.g., tumors and diverticulum), and physiological causes (e.g., cord-like structures and adhesions)[3,4]. Due to the absence of any secondary factors, we believe that the present case was primary volvulus.

In diagnosing the present case, abdominal contract-enhanced CT revealed mesenteric looping in a whirlpool arrangement, which is known as a whirl sign[5]. In the present case, the whirl sign was not observed in the coronal plane but in the frontal plane. There are an increasing number of reports indicating that preoperative diagnosis can be determined on the basis of these findings[4].

Chylous ascites are caused by a rupture of lymphatic vessels in the abdominal cavity. Causes of chylous ascites include the following: 1) congenital lymphatic malformation; 2) increased internal pressure associated with lymph vessel obstruction caused by intestinal malrotation or

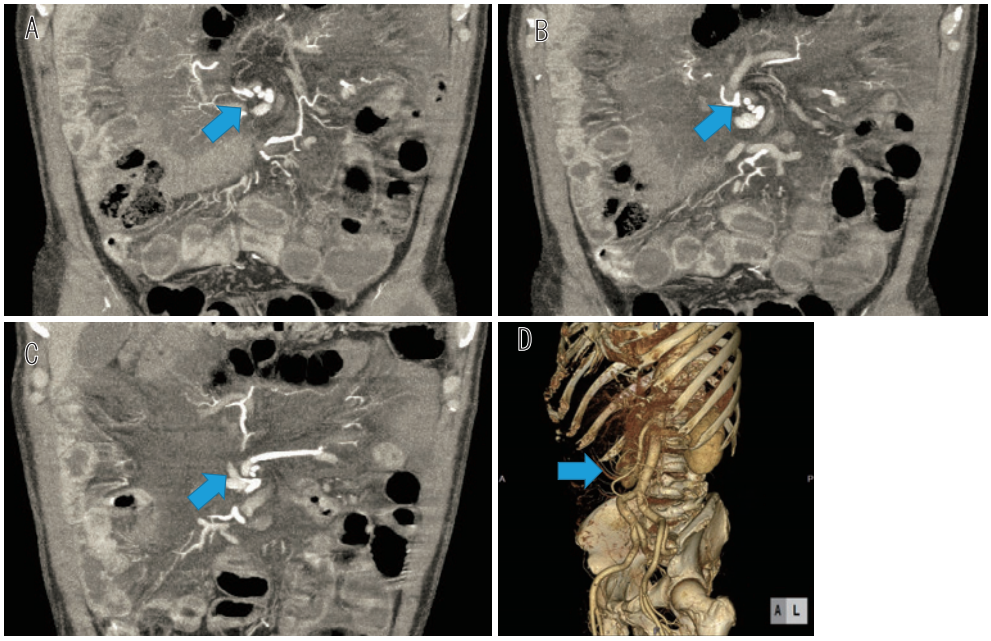

Fig. 1 Abdominal CT (frontal plane)
Slices are moved in dorsal to ventral direction (A–C). The whirl sign (**arrow**) is observed. Superior mesenteric artery (SMA) angiogram exhibits clockwise twisting of blood vessels (D).

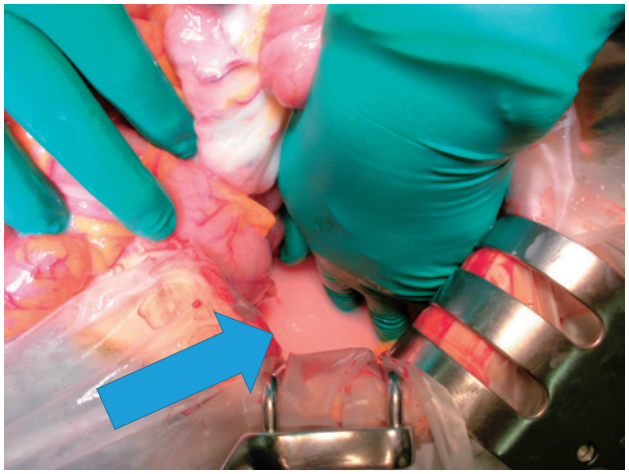

Fig. 2 Intraoperative photograph
White, cloudy ascites can be seen (**arrow**).

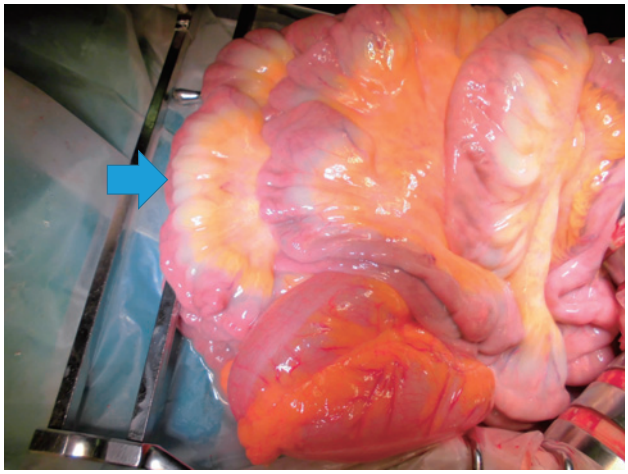

Fig. 3 Intraoperative photograph
The mesentery exhibits white edematous changes (**arrow**).

strangulated ileus; and 3) traumatic injury, such as surgery. The flow of lymphatic fluid in the abdominal cavity converges with the chyle absorbed from the intestines into the root of the superior mesenteric artery, drains into the chyle cistern, and then flows out into the thoracic duct. In the present case, we believe that the chylous ascites appeared because during this process, the volvulus caused increased pressure to the lymphatic vessels. On searching the PubMed database (1950–2015) with the keywords "chylous ascites," "adult," and "intestinal volvulus," we found only four previously reported cases of primary volvulus of the small intestine with chylous ascites in adults[7–10]. In the present case, no intestinal necrosis was observed. Therefore, we believe that the superior mesenteric vessels were not completely blocked, but only the lymphatic vessels with low pressure were completely blocked, leading to the appearance of chylous ascites. There have been 12 reported cases of chylous ascites, including that by Koh et al.[10] and Japanese reports of strangulated ileus with chylous ascites[11], all of which involved strangulation that did not require intestinal resection. And oozing plasma from capillaries, the 90% is reab-

sorbed in venules side capillary, 10 percent is circulated is absorbed by the lymphatic vessels[12]. Lymph for artery becomes lower blood flow in the vein and the occlusion is no longer produced. Therefore, it is believed that chylous ascites do not appear when the superior mesenteric artery is completely blocked; rather, they arise when pressure is applied that completely obstructs the lymphatic vessel near the root of the superior mesenteric vessels. Lymph because it is produced from venous blood, the fact that the lymph come leak means that there is arterial blood flow. The presence of lymph means that there is arterial blood flow, since the it is likely that means that there is blood flow of the intestinal tract. It is rare for subtle pressure to be applied near the root of the superior mesenteric vessels, and thus, there are very few case reports of such an occurrence.

The mean flow of chyle into the thoracic duct is 1 mL/kg/h, which can increase to 200 mL/h with the ingestion of fats[13]. Moreover, it has been reported that in chylous peritonitis cases, onset occurs 4 to 6 h after a meal[14]. Indeed, in the present case, our patient developed abdominal distention 5 h after eating lunch. Thus, it appears that meal intake and lymph vessel obstruction led to the appearance of chylous ascites in this patient.

Usually, emergency surgery is performed to treat volvulus. Correction of the volvulus results in the repair of ileus, vascular, or lymphatic obstruction, and if intestinal necrosis is suspected, intestinal resection is required. In the present case, chylous edema of the mesentery was considered to intestinal ischemia was suspected in contrast-enhanced CT cause. Intestinal resection was not performed as the patient's intestines had a good color tone. We believe that the appearance of chylous ascites is a finding suggestive of a high likelihood that intestines can be preserved.

Conclusions

There are very few reports of volvulus of the small intestine with chylous ascites. On the basis of available findings, after the diagnosis of volvulus of the small intestine, the observation of chylous ascites in open surgery suggests that the preservation of the strangulated intestine is possible and is therefore clinically significant.

Conflict of Interest: The authors have no competing interests to declare.

Acknowledgments: We are grateful to Dr. Takeshi Shioya for helpful discussions.

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(Received, April 15, 2016)
(Accepted, October 17, 2016)