Intestinal Obstruction Due to Mesenteric Inflammatory Veno-occlusive Disease : A Case Report and Summary of the Literature

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Mesenteric inflammatory veno-occlusive disease (MIVOD) is an ischemic disorder caused by inflammation of the mesenteric veins without involvement of the arterial vessels. Lacking specific diagnostic findings, MIVOD is difficult to confirm until surgical resection and histological analysis. We herein describe the clinical outcome of an 82-year-old woman admitted to our hospital for abdominal pain, abdominal distention, and other symptoms unresponsive to conservative medical treatment. No specific laboratory findings were noted apart from slightly elevated C-reactive protein. Abdominal contrast-enhanced computed tomography (CT) revealed wall thickness in the small intestine without abnormalities of the major trunk mesenteric vessels or free air in the abdominal cavity. Conservative therapy with levofloxacin and streptomycin was given considering the possibility of intestinal infection. The drugs were discontinued once her symptoms improved, but abdominal pain recurred along with exacerbation of small intestinal niveau at 21 days of admission. A stenotic lesion on the anal side of the small intestine detected in a gastrointestinal series was surgically resected. The excised tissue showed histopathological evidence of ulceration and inflammation along with thrombus formation and luminal stenosis and recanalization in the mesenteric vein, but not in arterial vessels, which confirmed the diagnosis of MIVOD. She was later discharged with a favorable postoperative clinical course. Clinicians should bear in mind MIVOD when encountering patients with unexplained abdominal pain or stenosis of the small intestine who are refractory to conservative treatment. *Shinshu Med J 69 : 141—147, 2021*

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Key words : mesenteric inflammatory veno-occlusive disease, ileus, small intestine, thrombosis, mesenteric vein

I Introduction

Firstly reported as a phlebitis phenotype, mesenteric inflammatory veno-occlusive disease (MIVOD) is an ischemic disorder caused by inflammation occurring exclusively in the mesenteric veins[1)2)]. Although the etiology of MIVOD is unknown, the involvement

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of drug effects, cytomegalovirus infection, and antiphospholipid syndrome has been reported[1)3)-5)]. MIVOD-related inflammation is histopathologically observed in veins of all sizes, without arterial involvement, along with such secondary changes as necrotizing phlebitis, granulomatous phlebitis, and thrombus formation[6)-8)]. However, it is difficult to diagnose the disease due to its rarity, lack of specific clinical findings, and frequent confusion with other disorders[9)].

We herein describe the rare case of an elderly woman with the clinical phenotype of intestinal obstruction who was diagnosed as having MIVOD, surgically treated, and ultimately cured.

Ⅱ Case Presentation

An 82-year-old woman was initially admitted to our hospital for seven days for the treatment of ileus symptoms, which were relieved by ileus tube management. She had a history of surgery for gastric ulcer perforation and conservatively treated ileus. She was receiving medical treatment for hypertension, hyperuricemia, and osteoporosis. Six days after discharge from the first admission, she began experiencing abdominal pain, abdominal distention, and vomiting. Although her abdominal pain resolved spontaneously, she visited a critical care center

Table 1 Laboratory data on admission

Blood test			Chemistry/serology		
White blood cells	3,700	/μL	Total protein	6.7	g/dL
Neutrophils	68.5	%	Albumin	3.2	g/dL
Lymphocytes	23.7	%	AST	20	U/L
Monocytes	5.4	%	ALT	11	U/L
Eosinophils	1.9	%	Total bilirubin	0.5	mg/dL
Basophils	0.5	%	GGT	10	mg/dL
Red blood cells	407×10^4	/μL	ALP	182	mg/dL
Hemoglobin	12.4	g/dL	Amylase	101	U/L
Hematocrit	38.1	%	Blood urea nitrogen	21.1	mg/dL
Platelet count	31.8×10^4	/μL	Creatinine	0.76	mg/dL
			Sodium	139	mEq/L
			Potassium	4.3	mEq/L
			Chlorine	105	mEq/L
			C-reactive protein	0.83	mg/dL

Abbreviations : AST, aspartate aminotransferase ; ALT, alanine aminotransferase ; GGT, gamma-glutamyl transpeptidase ; ALP, alkaline phosphatase

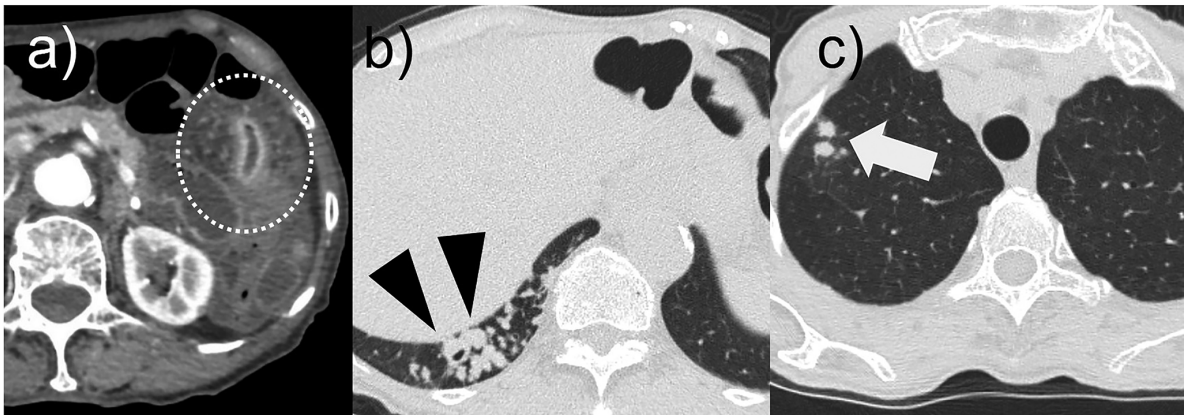

Fig. 1 Contrast-enhanced computed tomography (CT) in the early phase showed localized wall thickness (while dotted circle) in the left upper abdominal small intestine (a). Chest CT revealed irregular nodules in the right lower lung field (black arrowheads) (b) and small nodules in the right upper lung field (white arrow) (c).

on the following day with the chief complaints of persistent abdominal distention and difficulty with food intake. No remarkable findings were noted on physical examination. Laboratory results were all within normal limits apart from slightly elevated C-reactive protein **(Table 1)**. Abdominal contrast-enhanced computed tomography (CT) revealed wall thickness in the small intestine localized at the left upper abdomen **(Fig. 1a)**, with no abnormalities of the mesenteric vessels or free air in the abdominal cavity. Chest CT disclosed bronchial wall thickness, small nodules in the lower right lung field, and irregular nodules in the right upper lung field **(Fig. 1b, c)**, which suggested the recurrence of small intestinal obstruction and possible complicating tuberculosis in the lungs. Since intestinal tuberculosis was also suspected as a cause of the obstruction, repeated Pap smear and acid-fast bacteria testing of the gastric fluid was performed, although the results were negative. *Mycobacterium intracellulare* was later detected by a smear test taken during bronchoscopy, and levofloxacin and streptomycin were administered considering the possibility of *Mycobacterium intracellulare*-induced intestinal obstruction. As normal bowel sounds were detected along with the absence of abdominal tenderness, the drugs were discontinued and she resumed oral food intake on hospital day 13. However, intake was stopped five days later due to a recurrence of abdominal pain. Additionally, small intestine niveau formation had progressively worsened in sequential abdominal radiographs during admission. Small intestine endoscopy revealed no mucosal lesions or stenosis from the duodenal Vater papilla to the deepest insertion point, although a gastrointestinal series detected stenosis on the anal side of the small intestine **(Fig. 2)**. We performed surgical small intestinal resection on admission day 27. Inflammatory intestinal wall thickness and a stenosis of 5 cm in length were observed 240 cm distal to Treitz's ligament and were adhered to the surrounding small intestine and mesentery **(Fig. 3)**. The affected site was excised after ligating and cutting the mesentery. Histopathological examination of a tissue sample showed UL-IIIs ulceration and inflammation

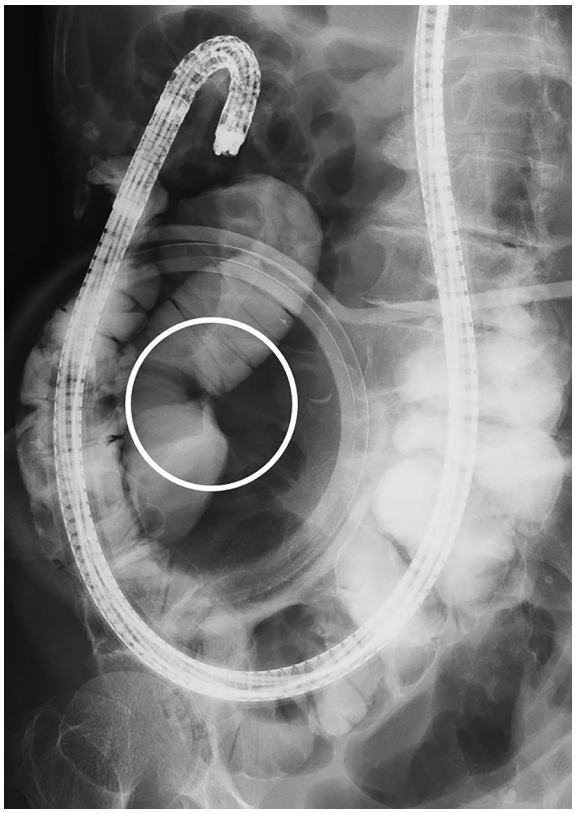

Fig. 2 Gastrointestinal series by small intestinal endoscopy detected a stenosis on the anal side of the small intestine (white circle).

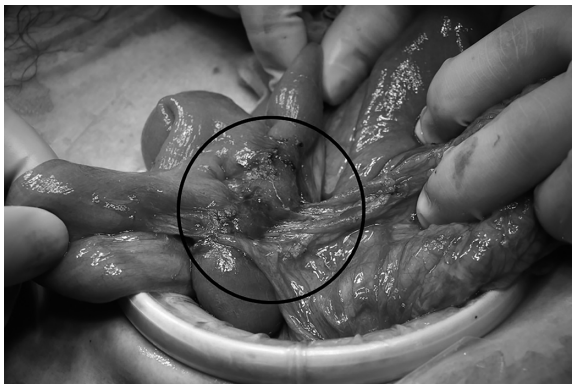

Fig. 3 Intraoperatively, 5 cm of inflammatory intestinal wall thickness and stenosis were observed (black circle).

in the small intestinal wall and mesentery **(Fig. 4a, b)**. Thrombus formation and luminal stenosis and recanalization were evident in the mesenteric vein along with edema, congestion, and lymphocyte infiltration **(Fig. 4c)**. The arterial vessels remained intact **(Fig. 4c)**. In the small intestinal mucosa, nonspecific inflammatory findings mainly including lymphocytes and plasma cells in the absence of a granuloma ex-

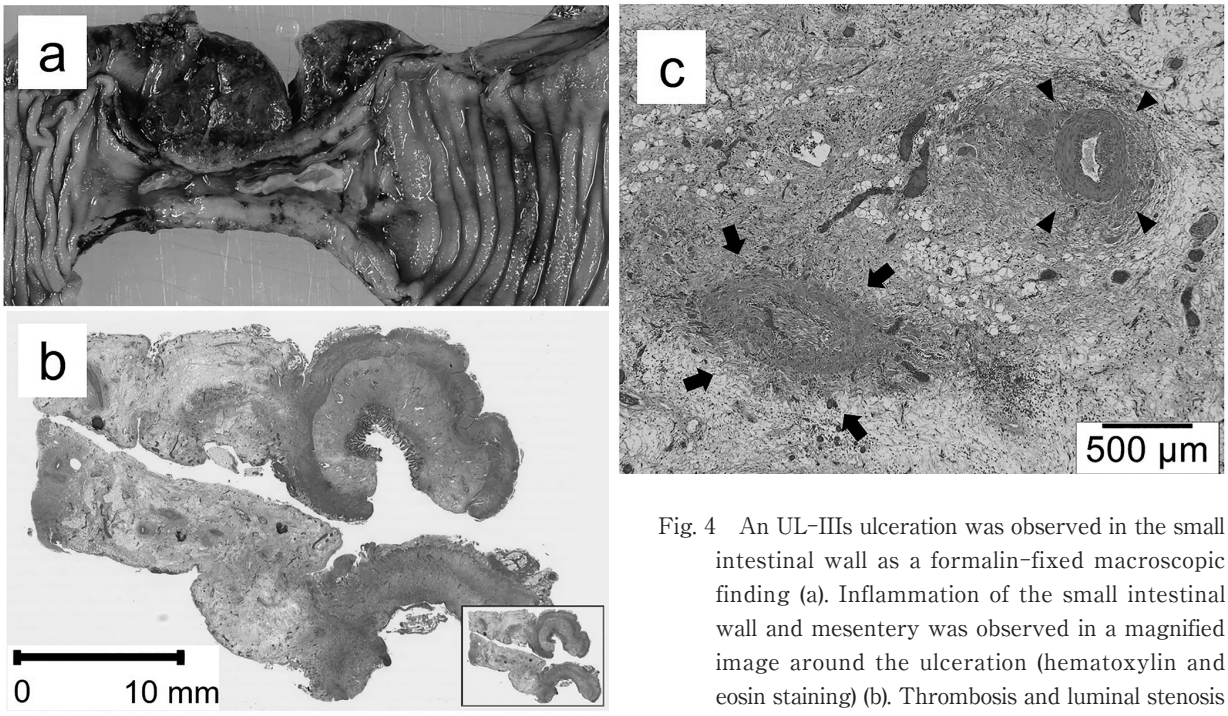

Fig. 4 An UL-IIIs ulceration was observed in the small intestinal wall as a formalin-fixed macroscopic finding (a). Inflammation of the small intestinal wall and mesentery was observed in a magnified image around the ulceration (hematoxylin and eosin staining) (b). Thrombosis and luminal stenosis were detected in the mesenteric vein (arrows), while the artery was intact (arrowheads) (c).

cluded the possibility of tuberculosis, Crohn's disease, and ulcerative colitis while confirming the diagnosis of MIVOD. She was discharged on day 41 with a favorable postoperative clinical course.

Ⅲ Discussion

Since the first described case of MIVOD in 1976[2], several terminologies, including MIVOD and enterocolic lymphocytic phlebitis, have been used to describe the pathological findings of this entity[10)11)]. Due to its rarity, only 41 cases of MIVOD were reported between 1980 and 2020 when searched by PubMed/MEDLINE, Embase on Ovid, and Ichushi-web, as summarized in **Table 2**[1)5)-9)12)-25)]. Although a relationship between MIVOD onset and drug effects, cytomegalovirus infection, and antiphospholipid syndrome has been reported[1)3)-5)], no report was found in terms of involvement of *Mycobacterium intracellulare* infection as detected in this case. The initial clinical symptoms of MIVOD are generally nonspecific and include acute abdomen, nausea, abdominal pain, and vomiting, all of which are also consistent with intestinal perforation, strangulation ileus, and other abdominal disorders. Among reported cases, one case commenced intravenous corticosteroid therapy since she was initially diagnosed as having severe ulcerative colitis. However, she showed no improvement in clinical symptoms or laboratory findings. Afterward, she received colectomy and was finally diagnosed as having MIVOD with histological assessment[13)]. Thus, it is difficult to make a clear diagnosis of MIVOD before surgical treatment and a final histopathological examination. Moreover, the duration between the first onset of symptoms and clinical findings ranges from a day to months[8)], but commonly lasts a week. As evidenced in this case, blood tests have little diagnostic significance for MIVOD, although several reports have shown contrast-enhanced CT and angiography as potentially helpful in identifying MIVOD[12)13)]. A benefit of CT over histopathology is the ability to evaluate both small pericolonic vessels and large mesenteric veins[12)]. In our patient, however, contrast-enhanced CT showed small intestine wall thickening, but was unable to detect the mesenteric vein abnormalities. The above observations support the idea that neither subjective symptoms nor objective findings are specific for MIVOD in the absence of surgery and a careful differential diagnosis.

Table 2　Summary of MIVOD cases reported to date

Case	Diagnosis	Age (years)	Gender	Clinical symptoms at onset	Diagnosis before surgery	Obstruction	Duration*
1)[1]	MIVOD	29	Male	ND	Intestinal ischemia	Jejunum	10 days
2)[5]	MIVOD	24	Male	Abdominal pain, purpuric skin lesion on the leg	Gangrene of small bowel	Ileum	2 days
3)[6]	MIVOD	39	Male	Epigastric pain, nausea	Ischemic enteritis	Ileum	6 days
4)[7]	MIVOD	78	Female	Abdominal pain, nausea	Ischemic enteritis	Sigmoid colon	ND
5)[7]	MIVOD	34	Male	Abdominal pain, nausea, vomiting	Ischemic enteritis	Jejunum	ND
6)[7]	MIVOD	27	Female	Abdominal pain, nausea, vomiting, bloody diarrhea	Ischemic enteritis	Jejunum	ND
7)[7]	MIVOD	46	Male	Abdominal pain, nausea, vomiting, bloody diarrhea	Ischemic enteritis	Sigmoid colon	ND
8)[7]	MIVOD	36	Female	Abdominal pain	Ischemic enteritis	Right colon	ND
9)[7]	MIVOD	60	Female	Abdominal pain	Ischemic enteritis	Right colon	ND
10)[7]	MIVOD	35	Male	Abdominal pain, rectal bleeding	Ischemic enteritis	Sigmoid colon	ND
11[8]	MIVOD	72	Female	Acute abdomen	Intestinal perforation, strangulation ileus	Jejunum	5 days
12[8]	MIVOD	75	Female	Acute abdomen	Intestinal perforation, strangulation ileus	Terminal ileum	6 days
13[8]	MIVOD	31	Female	Acute abdomen	Appendicitis	Appendix	1 day
14[8]	MIVOD	68	Male	Acute abdomen	Intestinal perforation, strangulation ileus	Jejunum	7 days
15[8]	MIVOD	53	Male	Acute abdomen	Intestinal perforation, strangulation ileus	Ileum	3 days
16[9]	MIVOD	24	Male	Acute abdomen, nausea, vomiting, bloody diarrhea	Ischemic enteritis	Jejunum	ND
17[9]	MIVOD	65	Female	Ischemic enteritis	Ischemic enteritis	Jejunum	ND
18[9]	MIVOD	76	Female	Acute abdomen, nausea, vomiting, bloody diarrhea	Ischemic enteritis	Jejunum	ND
19[9]	MIVOD	46	Male	Acute abdomen, nausea, vomiting, bloody diarrhea	Ischemic enteritis	Colon	ND
20[9]	MIVOD	49	Male	Acute abdomen, nausea, vomiting, bloody diarrhea	Ischemic enteritis	Jejunum	ND
21[9]	MIVOD	59	Male	Acute abdomen, nausea, vomiting, bloody diarrhea	Ischemic enteritis	Jejunum	ND
22[9]	MIVOD	39	Male	Acute abdomen, nausea, vomiting, bloody diarrhea	Ischemic enteritis	Colon	ND
23[9]	MIVOD	68	Male	Recurrent acalculous cholecystitis	Cholecystitis	Gallbladder	ND
24[9]	MIVOD	61	Male	Abdominal pain	Peritonitis	Omentum	ND
25[9]	MIVOD	42	Male	Acute abdomen, nausea, vomiting, bloody diarrhea	Ischemic bowel disease with perforation and peritonitis	Jejunum and colon	ND
26[12]	MIVOD	34	Male	Lower abdominal pain	Ulcerative colitis	Transverse colon and sigmoid colon	ND
27[12]	MIVOD	65	Male	Abdominal pain	ND	From transverse colon to rectum	ND
28[13]	MIVOD	54	Female	Left lower abdominal pain	Inflammatory bowel disease	Sigmoid colon	ND
29[14]	MIVOD	52	Male	Diarrhea, abdominal discomfort	Segmental colitis	Sigmoid colon	ND
30[15]	ELP	65	Male	None	Gastric cancer	Stomach	ND
31[16]	ELP	78	Male	Acute abdomen	Strangulation ileus	Ileum	ND
32[17]	MIVOD	74	Male	Acute abdomen	Non-occlusive mesenteric ischemia	Transverse colon	1 day
33[18]	MIVOD	49	Male	Abdominal pain, fever	Ileus	Ascending colon	8 months
34[19]	ELP	26	Male	Abdominal pain	Upper gastrointestinal tract perforation	Ascending colon	8 days
35[19]	ELP	32	Female	Nausea, abdominal pain	Strangulation ileus, inner inguinal hernia	Ileum	5 days
36[20]	MIVOD	70	Female	Nausea, abdominal pain	Mesenteric venous thrombosis	Jejunum	1 month
37[21]	MIVOD	32	Male	Severe diarrhea, epigastric pain	Perforation peritonitis	From transverse colon to rectum	35 days
38[22]	MIVOD	64	Female	Acute epigastric pain	Intestinal ischemia	Ileum	ND
39[23]	MIVOD	65	Male	Proctalgia, rectal bleeding	Colonic ischemia	Sigmoid colon	30 days
40[24]	MIVOD	32	Male	Bloody diarrhea, crampy left iliac fossa pain	Pancolitis	Transverse colon and descending colon	12 days
41[25]	MIVOD	65	Male	Abdominal pain	Colonic stenosis and bowel obstruction	From descending colon to rectum	57 days
This case	MIVOD	82	Female	Abdominal pain, ileus symptoms	Ileus	Ileum	6 days

* : Duration between clinical symptom onset and exacerbation
Abbreviations : MIVOD, mesenteric inflammatory veno-occlusive disease ; ELP, enterocolic lymphocytic phlebitis ; ND, not described

No improvements in clinical symptoms were observed when we treated the patient conservatively for her ileus symptoms. At that point, we established MIVOD as a differential diagnosis and proceeded to surgical therapy. As evidenced by this case, the diagnosis of MIVOD can only be confirmed by the histological examination of resected specimens, indicating that surgery is needed for a definitive histological diagnosis[14]. The characteristic histopathological features of MIVOD are lymphocytic, necrotizing, granulomatous, and mixed inflammatory infiltrates of mesenteric veins and their intramural tributaries, with the secondary development of thrombosis as a major and immediate cause of ischemic intestinal damage[6]. Another important histopathological distinction is that the arterial vessels remain intact and uninvolved. Although MIVOD seems to predominantly affect the colon, it has also been reported in the small intestine, omentum, and gall bladder[6]. The present case had a history of intestinal obstruction, but its exact cause was unknown. Indeed, it is difficult to diagnose MIVOD at an early stage due to its nonspecific symptoms and clinical findings ; a definitive diagnosis can only be made from histological findings after surgical resection.

Ⅳ Conclusion

We present a case of intestinal obstruction diagnosed as MIVOD following surgical treatment. MIVOD diagnosis is very difficult in light of the absence of specific clinical findings prior to histologic identification from resected intestinal tract samples. Clinicians should bear MIVOD in mind when encountering patients with unexplained abdominal pain or stenosis of the small intestine and clinically unfavorable conservative treatment results. More cases are needed to clarify the clinical features, pathophysiology, and cause of MIVOD.

Declarations

Ethics approval and consent to participate

Ethics committee approval was not required for this case report.

Consent for publication

Written informed consent was obtained from the patient for the publication of this report and all accompanying images.

Availability of data and material

N/A

Conflict of interest

The authors declare that they have no conflicts of interest.

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