□ CASE REPORT □

Anorexia Nervosa with Ischemic Necrosis of the Segmental Ileum and Cecum

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Abstract

A 41-year-old woman with long-standing anorexia nervosa showed paralytic ileus and serum creatine kinase elevation. Surgical treatment showed necrosis of the segmental ileum and cecum with perforation. She died of septic shock 3 days after the operation. Postmortem examination revealed no occlusion of the superior mesenteric artery or its main branches, and no arteriosclerotic changes. Histological examinations confirmed non-occlusive mesenteric infarction. This case suggested that necrosis of bowels might have been caused by poor blood supply due to severe malnutrition and dehydration for many years, which could be one of the fatal complications of anorexia nervosa. (Internal Medicine 40: 304–307, 2001)

Key words: malnutrition, mesenteric infarction, non-occlusive, sepsis

Introduction

Patients with anorexia nervosa show many complications in various organ systems (1, 2). In the gastrointestinal tract, constipation and laxative abuse are common complications of anorexia nervosa (1–3), and in some cases, acute gastric dilatation and rupture by refeeding (1–4) or duodenal ileus due to superior mesenteric artery compression were reported (5). However, the organic lesions of the small intestine are very rare and, to our knowledge, ischemic necrosis of bowels has not been reported as a complication of anorexia nervosa. The present case with anorexia nervosa showed paralytic ileus due to necrosis of the segmental ileum and cecum and peritonitis induced by cecal perforation, and subsequently showed septic shock. This case may shed light on the understanding of the different facets of fatal complications in long-standing anorexia nervosa.

Case Report

On September 23, 1999, a 41-year-old woman was admitted to our hospital for the treatment of paralytic ileus and dehydration. She had been healthy until she was 24 years old, although she was brought up by a foster mother in complicated familial surroundings. After the age of 24, she started the restriction of eating food without any apparent reason, particularly carbohydrates and fat. Her body weight decreased markedly, from 48 kg to 32 kg, and menstruation stopped. In 1986, at the age of 28, she was admitted to a university hospital for close examinations of emaciation and hypopotassemia. She was diagnosed as anorexia nervosa and pseudo-Bartter syndrome due to diuretics abuse, and no other organic lesions were pointed out. In 1993, she was referred to the department of psychiatry of our hospital. However, she accepted only medications of tranquilizers and hypnotics, rejecting any other psychiatrical support, and she came to our division for the treatment of constipation, epigastralgia and anemia. She showed iron deficiency anemia and hyperuricemia, accompanying gouty arthritis, though she strongly denied the use of diuretics. She was admitted to our hospital several times because of dehydration with infection. In March of 1999, multiple colon polyps were detected, and 18 polyps were removed endoscopically, some of which were non-invasive adenocarcinoma within a mucosal layer. After the polypectomy, she was discharged and she ate even less food. Three days prior to her last admission, she had not eaten anything, she had a high fever and she complained of visual and hearing disturbances.

On physical examination, she was markedly emaciated and dehydrated. Her height was 154.5 cm and body weight was 29.1 kg. Body mass index was 12.2. Consciousness was drowsy. Her pulse rate was 72 per minute and her blood pressure was 88–54 mmHg. She was slightly anemic but jaundice was not observed, and her breast and pubic hair were preserved. Her abdomen was distended and tympanitic, and bowel sound was weak. There was no tenderness or resistance in her abdomen and no pitting edema in her lower extremities. Diffuse muscle atrophy was observed.

Laboratory data on admission are shown in Table 1. Blood

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Received for publication April 17, 2000; Accepted for publication September 4, 2000
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Table 1. Laboratory Date on Admission

Chemistry		Occult blood in feces	(–)
Aspartate aminotransferase	27 U/*l*	Peripheral blood	
Alanine aminotransferase	50 U/*l*	Red blood cell count	360x10⁴/μl
Alkaline phosphatase	620 U/*l*	Hemoglobin	10.4 g/dl
γ-Glutamyl transpeptidase	22 U/*l*	Hematocrit	32%
Lactate dehydrogenase	766 U/*l*	White blood cell count	25,200/μl
Total protein	6.7 g/dl	Platelet	59.9×10⁴/μl
Total bilirubin	0.2 mg/dl	Coagulation test	
Creatine kinase	68 U/*l*	Activated partial thromboplastin time	47.1 sec
Total cholesterol	192 mg/dl	Prothrombin time	11.5 sec
Blood urea nitrogen	116 mg/dl	Serological test	
Creatinine	5.7 mg/dl	C-reactive protein	61.5 mg/dl
Uric acid	10.4 mg/dl	Endocrinological test	
Na	128 mEq/*l*	Thyroid stimulating hormone	0.57 μU/ml
K	5.1 mEq/*l*	Free 3, 5, 3'-Triiodothyronine	1.4 pg/ml
Cl	74 mEq/*l*	Free Thyroxine	0.8 ng/dl
Plasma glucose	117 mg/dl	Growth hormone	38.9 ng/ml

urea nitrogen concentration was 116 mg/dl, serum creatinine level was 5.7 mg/dl, and serum uric acid level was 10.4 mg/dl, suggesting severe dehydration. Serum potassium level was slightly increased, which has been always low, 2.5–3.5 mEq/*l* before the admission. C-reactive protein (CRP) was markedly high, and white blood count was increased. Serum creatine kinase (CK) activity was not elevated on admission. Endocrinological examinations revealed a high serum growth hormone and a low free triiodothyronine level, which are consistent with anorexia nervosa. The abdominal roentgenogram showed dilatation of bowels and niveau formation, diagnosed as paralytic ileus. After admission, drip infusion of isotonic solution and antibiotics therapy were started. Dehydration was gradually improved in a few days, and serum creatinine level and CRP was normalized within a week. Paralytic ileus, and visual and hearing disturbances were improved and her general conditions recovered to the same degree before admission. Visual disturbance was the result of 4 contact lenses in each eye, and hearing disturbances was due to abnormality of otosalpinx function. She strongly refused any psychiatric support and examinations of upper or lower gastrointestinal tract, including barium studies, fiberscopes, and computerized tomography. She only accepted abdominal ultrasonography, which showed no particular findings.

She had always had many complaints, such as epigastralgia, nausea, vomiting, constipation, subfever, and arthralgia. She continued to eat less. On October 21, she complained of a more severe epigastralgia attack than usual. Serum CK was elevated to 1,354 U/*l* on the next day, and leukocytosis was observed. The attack was improved within a day by analgesics and drip infusion of isotonic solution, and serum CK level was decreased linearly to a normal range in a week. We concluded at the time that intramuscular injections of analgesics several times were contributing to the rise of serum CK level.

On December 31, she complained of epigastralgia and vomiting as usual. Since she refused an adequate amount of infusion, she was treated by analgesics and a small amount of infusion. On January 1, her symptoms deteriorated. On the following day, her blood pressure declined with marked abdominal fullness, and an abdominal roentgenogram revealed distinct extension of both small and large bowels, indicating ileus (Fig. 1). She vomited brown-black fluid, strongly suggesting bleeding of the upper gastrointestinal tract. No tenderness was found in the abdomen. Anemia progressed, and serum CK and lactate dehydrogenase (LDH) levels were markedly elevated, 5,106 U/*l* and 1,520 U/*l*, respectively. Arterial blood examinations showed low pH and a decreased bicarbonate level, which indicated metabolic acidosis. There were no signs or data of myocardial infarction or congestive heart failure. Intensive treatments, including infusion from the central venous line, transfusion, antibiotics, sodium bicarbonate, medications to maintain her blood pressure and insertion of a tube to lower the pressure of gastrointestinal tract, were started, since she accepted them at last. Her vital signs were recovered, but ileus was not improved. On January 3, metabolic acidosis did not improve, and serum CK and LDH levels were markedly increased at 9,410 U/*l* and 2,313 U/*l*, respectively, which suggested massive necrosis of bowels. Platelet count was decreased to 105,000/μl and fibrinogen degradative products were increased, suggesting a preclinical state of disseminated intravascular coagulation (DIC). Conservative treatments could not relieve her and surgical treatment was performed on January 3 under generalized anesthesia. About 20 cm oral side from the ileocecal junction, the ileum was necrotized segmentally, about 60 cm in length (Fig. 2). With an interval of apparently intact ileum, a part of the cecum was also necrotized and a pinhole perforation was found. A small amount of brown cloudy ascites was observed in her abdominal cavity, which was due to peritonitis from infection of klebsiella pneumoniae and enterococcus faecalis elucidated later. The necrotized ileum and cecum

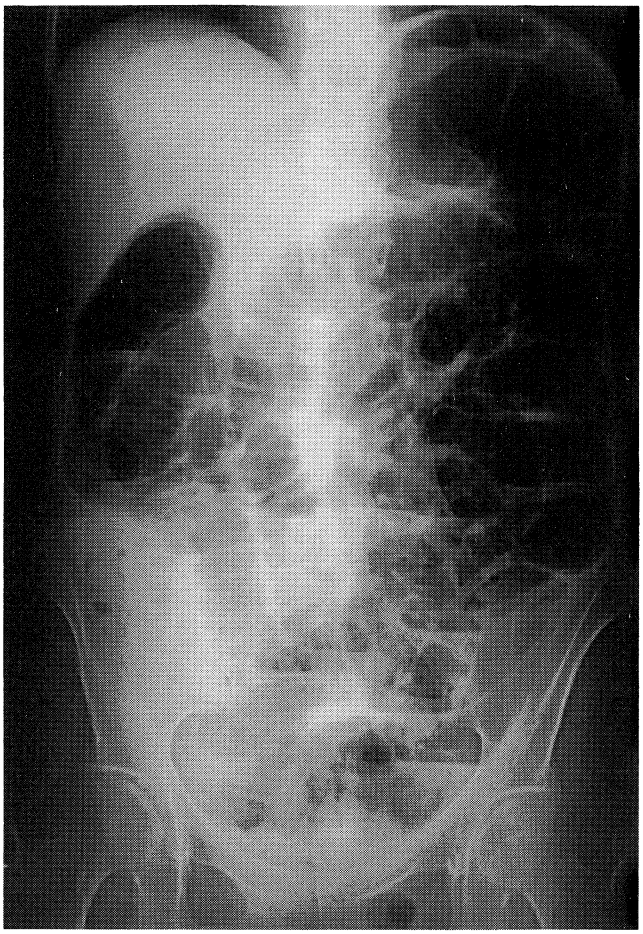

Figure 1. A plain abdominal roentgenogram showed marked extension of bowels, including small intestine and colon, diagnosed as ileus.

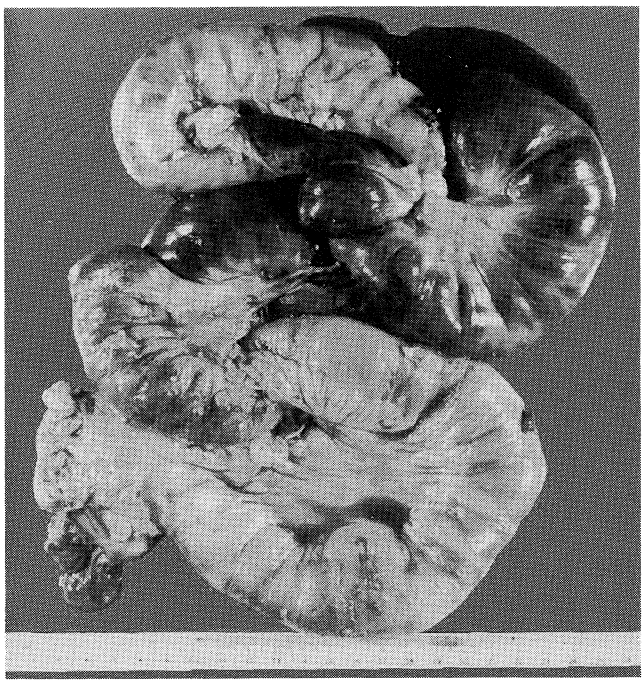

Figure 2. Terminal ileum and ileocecal portion resected surgically. About 20 cm oral side from the ileocecal junction, the ileum was necrotized segmentally for about 60 cm in length, and a part of the cecum was also necrotized with an interval of intact ileum, and a pinhole perforation was found.

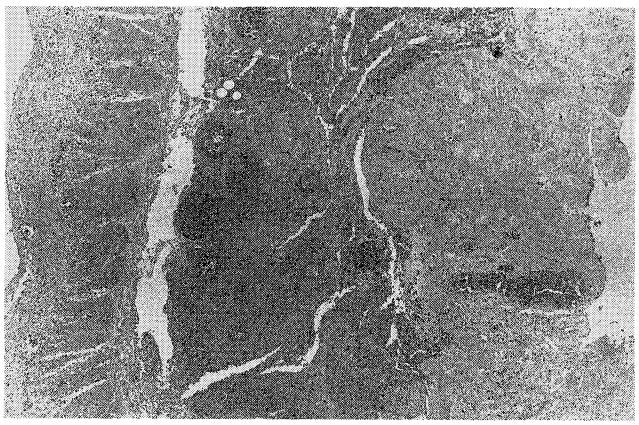

Figure 3. This picture is from the most severely affected site (transmural infarction) of the ileum. The mucosal and submucosal layers show severely hemorrhagic necrosis, and the muscle layer is also degenerated (HE stain, ×5).

were removed and ileostomy was placed at the right lower abdomen.

After the operation, she regained consciousness, but her general condition did not improve and she had a high fever. The dose of catecholamine to maintain her blood pressure was increased gradually and the platelet count declined to 25,000/μl, strongly suggesting septic shock and progression of DIC. Intensive treatments for sepsis and DIC were in vain and she died on January 6.

Postmortem examination revealed ascites, pleural effusion and bleeding in gastrointestinal tracts. There were no new necrotic lesions of bowels. In the residual colon, no pathological lesions were observed except for one small polyp in the ascending colon. The superior mesenteric artery and its main branches, and the portal vein were not occluded and arteriosclerotic changes were not observed at all. In the heart, there was no thrombus.

Histological examinations of resected ileum and cecum showed transmural infarction. The mucosal and submucosal layers showed severely hemorrhagic necrosis, and the muscle layer was also degenerated (Fig. 3).

Discussion

Although this patient is older than typical patients with anorexia nervosa, she met a criteria of diagnostic and statistical manual of mental disorders, fourth edition (DSM-IV) for the diagnosis of anorexia nervosa from her history in which she has shown marked emaciation, amenorrhea, intense fear of weight gain, denial of the seriousness of low body weight, and rejecting any psychiatric support (6). She has been living in a extremely malnutritional state for nearly 20 years. At the age of 41, she died of septic shock induced by ileal and cecal necrosis and peritonitis due to the perforation of the cecum. Necrosis of the ileum and cecum is a rare condition. To our knowledge, this is the first report of a patient suffering from anorexia nervosa with ischemic necrosis of bowels. Histologically, the cause of ileal and cecal necrosis was not due to inflammatory bowel diseases, such as Crohn's disease or tuberculosis, or bacterial infection but was due to hemorrhagic infarction.

Generally, infarction of the small intestine is thought to be result from thrombo-embolic obstruction of the mesenteric vessels, showing total necrosis of the jejunum and ileum. However, this was not true of the present case, because the necrosis was limited to the segmental ileum and cecum, no thrombus was seen in her superior mesenteric artery, and no arteriosclerotic change was observed. Furthermore no thrombus was found in the distal portion of branches of the superior mesenteric artery or portal vein on postmortem examinations. The necrosis of the segmental ileum and cecum in this case could be classified as non-occlusive mesenteric ischemia (7). Non-occlusive mesenteric ischemia is a low flow syndrome of mesenteric circulation brought by heart failure, hypotension or hypovolemia, followed by vasoconstriction (7). In about half of the patients with non-occlusive mesenteric ischemia, infarction was reported to be segmental (8). In this case, there were two skip necrotic lesions, in the segmental ileum and cecum. This fact also suggested that the bowel necrosis was not due to occlusion of the main vessel but due to disturbances of microcirculation near the bowel walls.

Many factors were thought to be responsible for the non-occlusive mesenteric infarction in this patient. First, less food intake and malnutrition for long years decreased the blood supply of the intestinal walls, which was easily compressed by a trifling event. Second, chronic dehydration and hypotension might also exaggerate mesenteric ischemia. Third, reduced blood supply due to bowel extension by severe constipation, paralysis of bowels by hypopotassemia, and recurrent paralytic ileus also played an important role in deterioration of mesenteric ischemia. It is suggested that paralytic ileus observed at the admission, a slight peak of serum CK activity with abdominal pain in October, and frequent attacks of epigastralgia and vomiting were incomplete forms of ischemic attack of bowels. To our regret, we could not diagnose these because of her refusal of any examination. Whether the first event was necrosis of the bowels or not, ischemic lesions of the bowels subsequently induced paralytic ileus and perforation, which in turn resulted in peritonitis, sepsis and DIC.

Many surprising, life-threatening complications, including hypoglycemic coma, cardiac failure and cerebral hemorrhage, have been reported to accompany anorexia nervosa (1, 2, 9). In the gastrointestinal tract, esophageal ulcer and rupture due to recurrent vomiting, acute gastric dilatation and rupture by refeeding, duodenal ileus due to compression of the duodenum by superior mesenteric artery and paralytic ileus due to refeeding pancreatitis were reported (1–5). Two cases of anorexia nervosa with necrotizing colitis caused by the infection of gas productive bacteria were also reported (10, 11). In a patient of anorexia nervosa with necrotizing colitis, necrotic lesions of the colon extended to the distal third of the ileum with gas bubbles in the retro-colic tissues (10). Ischemic lesions in the small intestine have not been reported. In this case, ileus was paralytic one, the perforation site was the cecum, and necrosis was observed in the segmental ileum and cecum, which were different from those of previously reported cases.

The mortality of patients with anorexia nervosa is about 15–20%, which is the most lethal of all the psychological disorders (12, 13). Most of the causes of death were inanition itself, physical consequence of inanition and suicide. Ischemic infarction of the bowels and subsequent events, peritonitis and sepsis, could be added to one of the fatal complications of anorexia nervosa. The possibility of bowel necrosis should be considered when patients with anorexia nervosa show severe abdominal symptoms with the elevation of serum CK and LDH.

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