

## Case Report

## A Case of a Resected Ileosigmoid Knot in an Older Schizophrenic Patient

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### Abstract

The ileosigmoid knot (ISK) is a rare cause of intestinal obstruction in which the ileum wraps around the base of the sigmoid colon and forms a pseudo-knot of the intestine. Herein, we report a case of 76-year-old female with schizophrenia who presented with pan-peritonitis and shock. A 76-year-old female with shock was brought to our hospital. She had a history of schizophrenia and a yearlong stay in a mental hospital before this admission. She was diagnosed with strangulation ileus by computed tomography (CT). The CT scan specifically showed that a loop of ileum was wrapped around the base of the sigmoid colon in anticlockwise direction, leading to the formation of a knot. The patient underwent emergent laparotomy soon after admission. Gangrenous portions of the ileum and sigmoid colon were resected, and an end-to-end anastomosis with a covering stoma was performed. We report a case of ileosigmoid knot in which the patient had schizophrenia, and discuss the relationship between psychiatric disorder and dietary habits which may be associated with the patient's led to the development of the ISK.

### Article Information

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### Introduction

Intestinal knots are a rare cause of intestinal obstruction. An ileosigmoid knot (ISK) consists of either an intertwining or a knot formed between a loop of ileum and the sigmoid colon, causing a complex intestinal obstruction and leading to strangulation of one or both of the segments.<sup>1</sup> In general, the condition is serious, because of rapidly progressing to intestinal gangrene. Awareness of this condition is essential for prompt diagnosis and optimal management. We experienced a rare case of an ISK in an older patient with schizophrenia who underwent emergent surgery for an acute abdomen.

### Case report

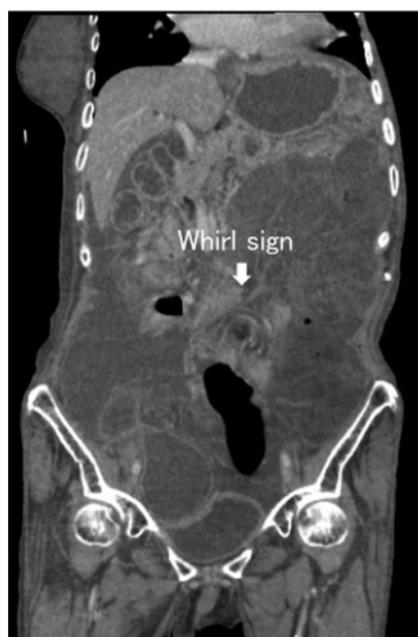
The patient was a 76-year-old female who was brought to our hospital from a mental hospital for pan-peritonitis and shock. She had a history of a long stay at the hospital for schizophrenia. The patient's body temperature was 37.0°C, her BP was 80/44 mmHg, and PR was 100/minute, and her BMI was 14.27. On physical examination her abdomen was distended with muscular defense in the abdomen but the patient did not complain of abdominal pain due to decreased consciousness. Laboratory data at admission indicated a low white blood cell count (1,300/mm<sup>3</sup>). A plain X-ray of the abdomen indicated a few loops of small bowel that were mainly in the splenic flexure, and a few large bowel shadows were mainly present in the sigmoid colon (Fig. 1). Abdominal contrast-enhanced computed tomography (CT) revealed significantly dilated ahaustral sigmoid



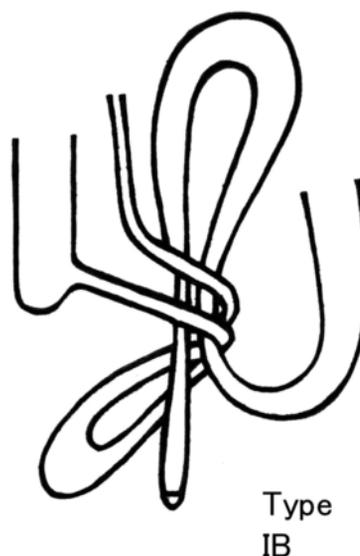
**Fig. 1** Abdominal radiograph in the upright position. A few loops of small bowel that were mainly in the splenic flexure and a few large bowel shadows that were mainly in the sigmoid colon were observed.



**Fig. 2** Computed tomography findings. In A, the dilated loop of the ileum and the sigmoid colon is shown, along with signs of bowel ischemia. In B, the 'whirl sign' created by the twisted mesentery and bowel is shown.



**Fig. 3** Intraoperative findings. The loops of small bowel were distended and gangrenous. The sigmoid colon was also partly gangrenous. In addition, the sigmoid volvulus was surrounded by a gangrenous loop of small bowel.



colonic loops with an air-fluid level. The ileal loops were wrapped around the central whirl, resulting in a knot (Fig. 2). The patient underwent emergent laparotomy soon after admission. There was large volume of hemorrhagic fluid in the peritoneal cavity and that the loops of the small bowel were distended and gangrenous. The sigmoid colon was also partly gangrenous. Additionally, the sigmoid volvulus was surrounded by a gangrenous loop of small bowel (Fig. 3). We repositioned the knot by twisting the volvulus in

the clockwise direction. The gangrenous portion of the ileum, which was approximately 80 cm long, and the gangrenous sigmoid loop, which was approximately 50 cm long, were resected. An end-to-end ileo-ileal anastomosis by layer-to-layer method, at approximately 5 cm proximal to the ileocecal junction; and we only made a covering stoma at sigmoid colon without performing a colo-colic anastomosis. The postoperative course was uneventful, and the patient was discharged on 21 days after the surgery.

## Discussion

ISK is a rare cause of intestinal obstruction in which the ileum wraps around the base of the sigmoid colon.<sup>1</sup> Double-loop intestinal obstruction leads to a loss of fluid volume in the obstructed loops, in addition to bacterial translocation and toxin absorption from the lumen.<sup>2</sup> As a result, ISK can lead to shock, peritonitis, and endotoxemia over a short period of time. A patient in this condition requires early and effective resuscitation, including re-establishment of the fluid-electrolyte balance, respiratory support if needed, nasogastric aspiration, parenteral nutrition, and antibiotic therapy followed by emergency surgical treatment.<sup>2</sup>

The risk factors for ISKs include anatomical factors and a dietary factor. The specific anatomical factors that lead to ISKs are long small intestinal mesentery with freely mobile small intestine and long sigmoid colon on a narrow pedicle.<sup>3</sup> The dietary factor involves the consumption of a high-bulk diet in the presence of an empty small intestine, which can predispose to ISK.<sup>4,5</sup> When a bulky food enters the proximal jejunum, it increases the motility and the heavier segments of proximal jejunum falls into the left lower quadrant. This is followed by clockwise twist of the empty loops of ileum and jejunum around the base of the narrow sigmoid colon.<sup>5</sup> Therefore, there is a relatively high incidence of ISK formation in individuals who are with the habit of consuming a single daily meal like areas of African and the Middle-Eastern Muslim countries.<sup>3</sup> In our case, the elderly patient had been schizophrenic since her youth, and she had not been able to communicate with anyone for a long time. Her chronic psychiatric disorder led her to dementia and it caused her habitual overeating.<sup>6</sup> It is possible that such dietary habits led to the development of the ISK.

Alver *et al.*<sup>7</sup> classified the ISK into 3 types based on the mechanism of formation of the knot. In Type I, which is the most common, the ileum is the active component, and it wraps itself around the sigmoid colon as the passive component to form the knot in the clockwise or anticlockwise direction. In Type II, the sigmoid colon of the active component wraps itself around a loop of ileum as the passive component in the clockwise or anticlockwise direction. In Type III, the ileocecal segment of the active component wraps itself around the sigmoid colon as the passive component. Types I and II can be further classified into A and B, depending on whether the knot is clockwise or anticlockwise, respectively. According to Alver's classification, our case was defined as Type IB.

Although preoperative diagnoses are currently being made more often, the preoperative diagnosis of ISK is not easy. ISK is diagnosed preoperatively in less than 20% of the patients,<sup>3</sup> because it is so infrequent and is associated with atypical radiographic findings.<sup>1</sup>

Raveenthiran<sup>8</sup> suggested a useful triad consisting

of (1) clinical features of small bowel obstruction; (2) radiological features of large bowel obstruction; and (3) the inability to insert a sigmoidoscope. By this triad 71% of the patients with ISK could be diagnosed. Additionally, the CT scan findings that are suggestive of ISK include the 'whirl sign' created by the twisted intestine and the sigmoid mesocolon in ISK, medial deviation of the cecum, descending colon and signs of bowel ischemia.<sup>1,9</sup> In our case, although we suspected that this patient had strangulation ileus or ISK, we were not confident enough to make a definitive diagnosis of ISK preoperatively.

At laparotomy, prolonged attempts to undo the knot are not recommended because this may lead to perforation of the fragile gangrenous bowel or to septic shock due to the release of toxins from the gangrenous loops. Therefore, en bloc resection of the gangrenous loops bearing the knot is recommended.<sup>1</sup> In our case, although the knot was difficult to release, the gangrenous areas of the ileum and colon were fortunately not extensive. Moreover, the sigmoid colon did not appear to be completely necrotic. However, we performed a sigmoidectomy to avoid recurrence of ISK.<sup>3,4</sup>

ISKs are associated with poor prognosis. Machado<sup>10</sup> reported a 30.0% overall mortality rate in 280 patients with ISKs, including patients from 14 different series published from 1967 to 2008. The factors related to ISK mortality are the presence of shock, bowel gangrene (and particularly double-segment bowel gangrene), late admission or diagnosis, major comorbidities, advanced age, and pregnancy. In our case, we were able to perform surgical resection soon after admission. Therefore, the patient fortunately made a quick recovery.

In conclusion, even when it is difficult to diagnose an ISK preoperatively, in the case of an abdominal CT scan that suggests intestinal ischemia, emergency surgery must be performed. However, in case of ISKs, in which intertwining or formation of a knot between a loop of ileum and the sigmoid colon causes a complex intestinal obstruction, intestinal injury can be avoided by considering the possibility of an ISK as part of an adequate preoperative differential diagnosis.

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