

**A LOOP FORMATION OF MECKEL'S DIVERTICULUM:  
A CASE WITH OBSTRUCTION OF THE ILEUM**

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**ABSTRACT**

An adult case of obstruction of the ileum caused by a loop formation of Meckel's diverticulum is described. The patient, having severe abdominal pain and vomiting, was diagnosed as having ileus. A roentgenogram with a contrast medium showed severe obstruction at the mid part of the ileum. From findings of elective laparotomy, adhesion between the inflammatory end of Meckel's diverticulum and the corresponding mesenterium had formed a loop, which had clasped the distal part of ileum. We here warn that Meckel's diverticulum forming a loop is a cause of obstruction of the ileum in adults.

**Key words:** Meckel's diverticulum, Obstruction of the ileum, loop formation

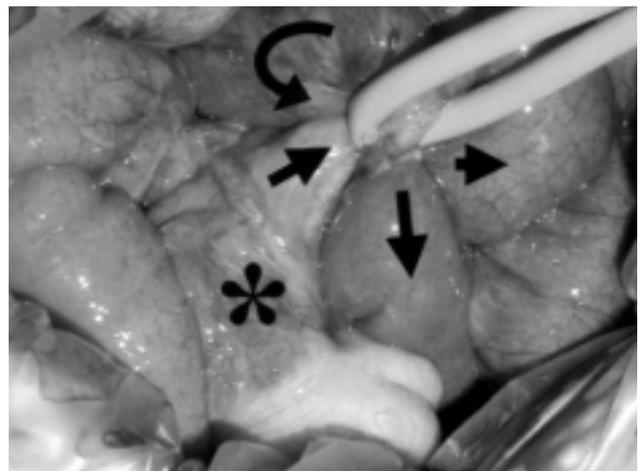
**THE CASE**

A 20 year-old male who had no history of previous surgery was admitted with a sudden onset of severe abdominal pain and vomiting to the National Kyushu Medical Center Hospital, Fukuoka, Japan, on November 2, 1999. The body temperature was 36.6°C and the vital signs were stable. Physical examination showed a flat and relatively soft abdomen and an increased bowel sound. No signs of peritoneal irritation were found, and hematological examination suggested no inflammation in the peritoneal cavity (WBC 7,400 / $\mu$ L, CRP 0.3 mg/dl). An abdominal plain roentgenogram that showed an air fluid level of the small intestine, however, suggested a complete obstruction of small intestine, and computed tomography that showed marked dilatation of the stomach and small intestine suggested the obstruction was near the end of the ileum. The patient was diagnosed as having ileus. Evidence was not shown of either mass lesion or intussusception. A nasal decompression tube was immediately inserted into the jejunum, so that the tube advanced to the ileum and decompressed the entire small intestine. Gastrografin meal and follow-through study was immediately performed, and contrast appeared in the large bowel in 6 hours. Therefore, a complete mechanical intestinal obstruction was excluded, and conservative treatment was continued.

A barium enema study on the seventh hospitalization day showed two segments with severe stenosis 70 cm proximal to the end of the

ileum, which looked decompressed from its outside structure. We observed the condition for a further three days, but it did not improve.

On the tenth hospitalization day, a laparotomy was made in the lower abdomen. The distal part of the ileum was markedly dilated and formed a loop, clasped at its base by a loop-like structure located 70cm proximal to the end of the ileum (Picture 1). After separating the structure from the mesenterium, it proved to be Meckel's diverticulum, the end of which was adhered to the corresponding dorsal



**Picture 1a.** Ileum clasped ileum by the loop-like structure of Meckel's diverticulum. The diverticulum is retracted by the rubber band. Arrows: the direction of the extension of the distal ileum. The deformed ileocecal area (\*) is withdrawn into the loop formed by the diverticulum.

surface of the mesenterium. Because of no infarction,



Picture 1b. Schema of the pathology.

the ileal loop was released from the diverticulum with just a resection of a tiny part of the ileum that included the diverticulum. The diverticulum was 6.5 cm long and 5.5 cm wide, and was confirmed as Meckel's diverticulum by histological examination. The end of the diverticulum was covered with gastric fundic glands that are unique to Meckel's diverticulum. Neither ulceration nor hemorrhage was found in the diverticulum. Mild chronic active inflammatory cells infiltrated the hyperemic mucosa and submucosal layers at the end of the diverticulum. Patchy chronic active inflammatory cells infiltrated and stromal fibrosis was in the serosal tissue.

Obstruction of the ileum caused by an ileal loop extending through a loop-formation of Meckel's diverticulum was the conclusive diagnosis. The patient recovered well, and left the hospital in good condition on the tenth postoperative day.

## DISCUSSION

Meckel's diverticulum is a common abnormality of the gastrointestinal tract, which is a remnant of the omphalomesenteric duct that is assumed to disappear at birth. The incidence of Meckel's diverticulum is about 0.5 to 2 per cent; most cases are asymptomatic and are found during laparotomy or autopsy.<sup>1</sup> During a lifetime, however, Meckel's diverticulum has a 4.2 per cent likelihood of causing disease, such as intestinal obstruction, bleeding and perforation. The older people become, the closer the incidence is to zero percent.<sup>2</sup>

Rutherford and Akers<sup>3</sup> described the variety of mechanisms by which Meckel's diverticulum can produce intestinal obstruction:

1. volvulus around a vitelloumbilical cord;
2. intussusception;

3. bulging in an inguinal hernia;
4. inflammation and cord formation with adhesions;
5. a cord or band extending between the diverticulum and the base of the mesenterium.

Because our case had inflammation at the end of the diverticulum, No. 4 was considered to be the main cause of the ileal obstruction. However, our case had a unique form that was still worth reporting, and a similar case was also reported, recently.<sup>4</sup>

Correct diagnosis of Meckel's diverticulum before an operation is often difficult, because a complicated Meckel's diverticulum simulates many other abdominal pathologies, such as intestinal obstruction. In a large series of 600 cases in which Meckel's diverticulum was found during operations, diagnosis was made before the operation in only 6 percent of the cases.<sup>5</sup> To find the cause of intestinal obstruction, a contrast medium study is the usual examination following insertion of a decompression tube. Because we expected a better quality of roentgenogram to find the cause of the intestinal obstruction, we performed a barium enema study in our case. However, Gastrografin meal and follow-through study may be helpful in the diagnosis and treatment of intestinal obstruction.<sup>6</sup> Although the roentgenogram suggested an extraluminal decompression in our case, we were unable to reach the correct diagnosis. Technetium 99m-pertechnetate scintigraphy is the most accurate diagnostic examination, because the radioisotope is taken up selectively by the ectopic gastric mucosa in the diverticulum. However, false-positive and false-negative scans have been noted frequently in adults, and the overall diagnostic accuracy for adults is less than 46 percent.<sup>7</sup> We may have reached the correct diagnosis in our case, when we performed the scintigraphy.

Our policy in the treatment of mechanical intestinal obstruction is primarily to perform conservative treatment, unless there is suspicion of strangulation. We usually perform Gastrografin meal and follow-through study, and contrast that appeared in the large bowel within 24 hours is regarded as a partial obstruction, then we continue conservative treatment. Patients showing no clinical and radiologic improvement in 7 to 10 days undergo surgery. In our case, a laparotomy was performed on day 10 of hospitalisation. The operation should always include resection of the diverticulum or a segment of the bowel affected by the pathology, because just to separate surrounding tissue of the diverticulum will affect a blood supply to the Meckel's diverticulum

and may lead to necrosis of the ileum.<sup>8</sup>

Although the ileoileocolic type of childhood intussusception is a common mechanism of intestinal obstruction caused by Meckel's diverticulum, we experienced an adult case of intestinal obstruction without intussusception. The distal part of the ileum was clasped by a loop-

like structure 70cm proximal to the end of the ileum. The structure was proven to be Meckel's diverticulum. This rare case might have faced a danger of ileal strangulation and then infarction of a considerable part of the ileum. We here warn that Meckel's diverticulum forming a loop is a cause of obstruction of the ileum in adults.

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