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Kono-S Anastomosis for Crohn's Disease: Report of 2 Cases

Shohei Eto[1], Kozo Yoshikawa[1], Takashi Iwata[1], Jun Higashijima[1], Takuya Tokunaga[1], Masaaki Nishi[1], Hideya Kashihara[1], Chie Takasu[1], Mitsuo Shimada[1], Toru Kono[1,2]

[1]*Department of Digestive and Pediatric Surgery, University of Tokushima, Tokushima, Japan*

[2]*Advanced Surgery Center, Sapporo Higashi Tokushukai Hospital, Sapporo, Japan*

Crohn disease (CD) is a chronic inflammatory bowel disease that affects the entire gastrointestinal tract. The standard treatment for CD is medication to control the inflammation and relieve the symptoms. CD patients often require surgery at some point in their life for complications, treatment resistance, and side effects of medication. However, postoperative recurrences are common. To reduce anastomotic troubles, several types of anastomosis were investigated. Kono-S anastomosis, an antimesenteric, functional, end-to-end handsewn anastomosis, was introduced in order to prevent the restenosis caused by recurrence of CD in 2010. Kono-S anastomosis is expected lower susceptibility to mechanical distortions due to the stability provided by the "supporting column." We herein report 2 cases of CD performed with a Kono-S anastomosis. The importance of these cases is that Kono-S anastomosis is useful for preventing restenosis caused by recurrence. The first patient was a 26-year-old man who suffered from CD for 9 years. Computed tomography (CT) showed inflammation and stenosis at the ileocecum, a fistula between the terminal ileum and sigmoid colon, and an intraperitoneal abscess. We performed an ileocecal resection and a Kono-S anastomosis. The second patient was a 25-year-old woman who suffered from CD for 8 years. CT showed inflammation and stenosis at the ileocecum, and a retroperitoneal abscess. We performed an ileocecal resection and Kono-S anastomosis. Both patients showed no recurrence after surgery. Kono-S anastomosis may be effective for preventing recurrence at anastomotic sites in CD patients.

Key words: Crohn disease – Kono-S anastomosis – Postoperative recurrence – Functional end-to-end handsewn anastomosis – Gambee's single layer

Reprint requests: Shohei Eto, MD, Department of Surgery, University of Tokushima Graduate School, University of Tokushima, 3-18-15 Kuramoto-cho, Tokushima, Tokushima. 770-8503, Japan.
Tel.: +81-88-633-7139; Fax: +81-88-631-9698; (E-mail) shohey440@yahoo.co.jp

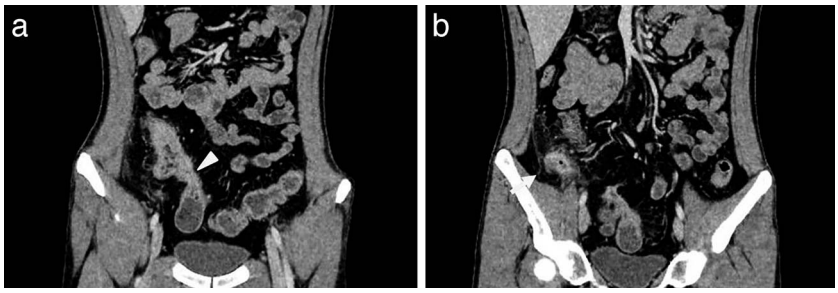

Fig. 1 CT finding of case 1: (a) inflammation and stenosis at ileocecum, fistula (arrowhead) between terminal ileum and sigmoid colon and (b) 3 cm of intraperitoneal abscess (arrow).

Crohn disease (CD) is a chronic inflammatory bowel disease that affects the entire gastrointestinal tract. It is a relapsing disease with large variability in clinical presentation. The incidence of CD is 5 to 10 per 100,000 people per year in the world,[1] and 1.4/100,000 people per year in Japan. The standard treatment of CD is medication. However, 70% of the patients with CD required surgery at some point in their life, and underwent bowel resection.[3] Surgical indications include complications (acute or chronic); treatment resistance; and side effects (or adverse reaction) to medication.[1] Postoperative recurrence is common, and the reoperation rate range was 11% to 32% at 5 years, 20% to 44% at 10 years, and 46% to 55% at 20 years, respectively.[4,5] Reoperation is needed in the case of stenosis at the anastomotic site, anastomotic leakage, or intraperitoneal abscess.[5,6] With the aim of reducing anastomotic complications, several types of anastomoses were investigated. However, there is no consensus for the superiority of the anastomotic configuration.[7]

Kono-S anastomosis, an antimesenteric, functional, end-to-end handsewn anastomosis, was introduced in order to prevent restenosis caused by the recurrence of CD in 2010.[3] Recently this anastomotic technique was accepted and performed in the United States, where 700,000 patients suffer from CD.[8]

Kono-S anastomosis is expected to result in lower susceptibility to mechanical distortions by the stability provided by the "supporting column." We herein report 2 successful cases of CD that underwent Kono-S anastomosis.

A Case Report

Case 1

The patient was a 26-year-old man, who suffered from Crohn disease (CD) for 9 years and administered mesalazine and adalimumab. He had right lower quadrant abdominal pain. Computed tomography (CT) showed inflammation and stenosis at the ileocecum, a fistula between the terminal ileum and sigmoid colon (Fig. 1a), and a 3-cm intraperitoneal abscess (Fig. 1b). Laboratory tests were as follows: leukocyte count 9300/μL, hemoglobin 12.3 g/dL, albumin 3.0 g/dL, total bilirubin 0.5 mg/dL, aspartate aminotransferase 15 U/L, C-reactive protein 13.52 mg/dL.

We performed an ileocecal resection and Kono-S anastomosis. Intraabdominal adhesion was formed around the ileocecum. We identified the fistula between the terminal ileum and sigmoid colon (Fig. 2). The stenosis was found 10 cm oral from the ileocecal lesion. No obvious endoscopic abnormality was shown on the oral side of the stenotic ileum. The bowel was divided transversely, placing the linear stapler perpendicular to the intestinal lumen and the mesentery, exactly 90° opposite to a conventional anastomosis that the mesentery is located in the middle of the staple lines (Fig. 3a). The 2 stapled lines were sewn together with 3-0 polyglactin sutures, thus creating the so-called "supporting column" (Fig. 3b). Next, an antimesenteric longitudinal enterotomy was performed on each stump, to allow a transverse lumen of more

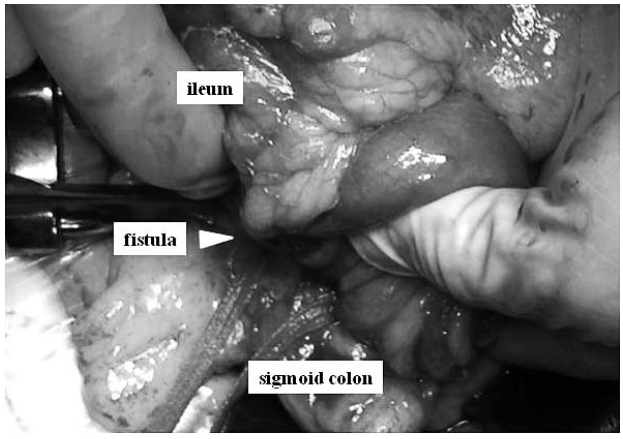

Fig. 2 Intraoperative finding of case 1: fistula between terminal ileum and sigmoid colon (arrowhead).

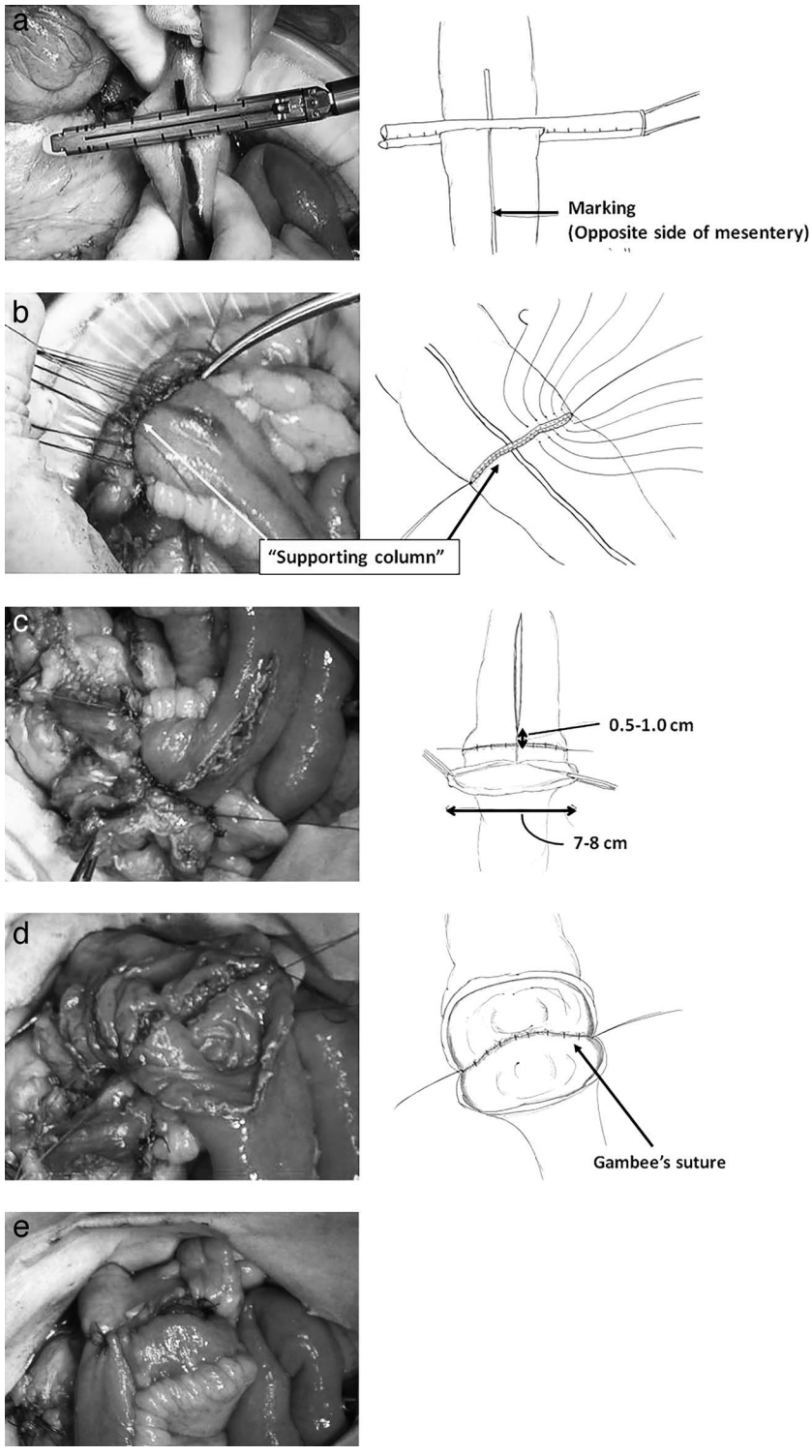

Fig. 3 Kono-S anastomosis. (a) Placing the linear stapler perpendicular to the intestinal lumen and the mesentery. (b) Creating the supporting column. (c) An antimesenteric longitudinal enterotomy. (d) Handsewn fashion using a single-layer Gambee manner. (e) Completed Kono-S anastomosis.

than 8 cm on the small bowel, starting 0.5 cm or more less than 1 cm away from the staple line (Fig. 3c). The anastomosis was made transversely in handsewn fashion using a single-layer Gambee manner (Fig. 3d), with 3-0 polyglactin running sutures, and completed Kono-S anastomosis (Fig. 3e). The operative time was 359 minutes; the estimated blood loss was 64 mL. Postoperative pathologic examination revealed the features of Crohn colitis with inflammatory infiltration involv-

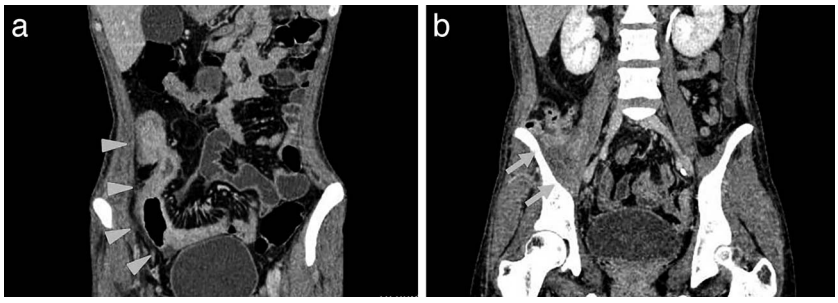

Fig. 4 CT finding of case 2. (a) Inflammation and stenosis at ileocecum (arrow head). (b) Retroperitoneal abscess behind ileoceal lesion (arrow).

ing the entire bowel wall. The postoperative course was uneventful, and he was discharged on day 28. He started oral administration of mesalazine on day 48. Stenosis was not observed 24 months after surgery.

Case 2

The patient was a 25-year-old woman who suffered from CD for 8 years and was administered adalimumab. She had exacerbating abdominal pain. Computed tomography showed inflammation and stenosis at the ileocecum (Fig. 4a), and retroperitoneal abscess (Fig.4b). Laboratory tests were as follows: leukocyte count 11,700 /μL, hemoglobin 9.2 g/dL, albumin 2.2 g/dL, total bilirubin 0.2 mg/dL, aspartate aminotransferase 10 U/L, C-reactive protein 4.13 mg/dL.

We performed an ileocecal resection and Kono-S anastomosis. The greater omentum was found adhered to the left lower quadrant abdominal wall. The small amount of ascites present was serous. There was a penetration into the retroperitoneum from the ileocecal lesion (Fig. 5a), and fat wrapping at 80 cm oral side from the terminal ileum (Fig. 5b). Intraoperative endoscopy showed longitudinal ulcer and stenosis. Reconstruction was performed by Kono-S anastomosis in the same manner as case 1 (Fig. 5c). The operative time was 357 minutes, and the estimated blood loss was 110 mL. Pathologic findings showed ulcer and abscess in the ileocecum, and a small granuloma in the ileum. The postoperative course was uneventful. And she was discharged on day 21. She started the oral administration of mesalazine on day 20. Stenosis was not observed 19 months after surgery.

Discussion

This report showed 2 cases of Kono-S anastomosis for CD. Despite steady progress in the medical treatment for CD including antibody therapy and immunotherapy, 74% to 80% of the patients with CD required surgery.[2,4,5] Postoperative recurrences are likely unavoidable, histopathological postoperative recurrence were seen within 1 week after the operation, and the endoscopically findings of the recurrence were detected in 70% to 90% of cases at 1 year after surgery.[10,11] Clinical postoperative recurrence rates, assessed by conventional clinical activity indexes, vary between 17% and 55% at 5 years, 32% and 76% at 10 years, and 72% and 73% at 20 years. And surgical postoperative recurrence rates (patients requiring reoperation) vary between 11% and 32% at 5 years, 20% and 44% at 10 years, and 46% and 55% at 20 years.[4,5]

Many factors that contribute to postoperative recurrence have been investigated in CD. Smoking is a definite risk factor for postoperative recurrence; however, no other factor has been recognized yet, including type of anastomosis.[5,9,13–17]

Kono-S anastomosis is an antimesenteric, functional, end-to-end handsewn anastomosis that was reported in 2010.[3] This anastomosis is intended to avoid the restenosis caused by recurrent CD. The comparison between Kono-S anastomosis and conventional anastomoses was investigated. The percentage of patients with Kono-S anastomosis who remained free of surgical recurrence at 5 years was significantly higher than those with conventional anastomoses (100% versus 80%). Kono-S anastomosis was comparable to conventional anastomosis as it relates to postoperative endoscopic changes. And, anastomotic recurrence that required reoperation was not found in Kono-S anastomosis. In contrast, 15% of the patients required reoperation for anastomotic restenosis in conventional anastomosis.[3] Recently, The data published and showed that the new Kono-S anastomosis was superior to standard anastomotic techniques.[8] In light of these results, since May 2012 the Kono-S anastomosis was adopted as a standard technique for restoring the intestinal continuity after bowel resection of CD.

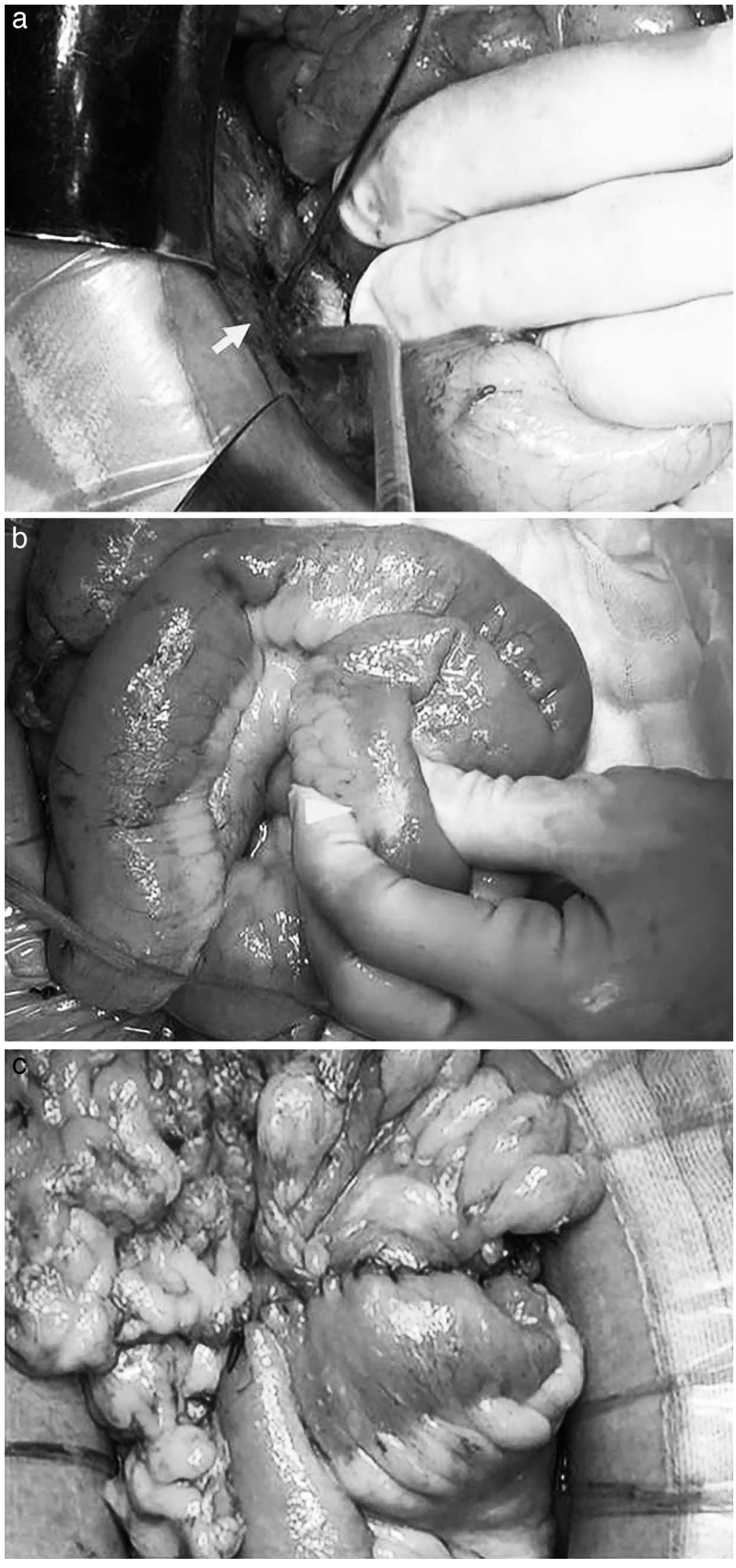

Fig. 5 Intraoperative finding of case 2. (a) Penetration into retroperitoneum from ileocecal lesion (arrow). (b) Fat wrapping at proximal terminal ileum (arrow head). (c) Kono-S anastomosis.

One possible reason restenosis is avoided with Kono-S anastomosis is that the supporting column maintains the diameter and dimension of anastomosis and prevents distortion and stenosis.[3] Especially on the mesenteric side, the intestine is the original site of anastomotic CD recurrence. The mesenteric side is positioned at the center of the supporting column in the Kono-S anastomosis. Therefore, even if CD recurrence develops at the mesenteric side, the supporting column prevents the distortion. Previous surgical efforts for preventing restenosis focused on the size of the anastomosis site, not on the site of the recurrence. Structural support of the anastomosis may contribute to prevent the restenosis.

In these 2 cases, both patients don't have the recurrence after surgery. Surgeons should consider Kono-S anastomosis in patients with CD. Kono-S anastomosis may be effective for preventing recurrence at the anastomotic site. A larger series of prospective randomized control trials is needed to clarify the feasibility of Kono-S anastomosis.

Acknowledgments

The authors declare that they have no conflict of interest.

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