Strictureplasty In Diffuse Intestinal Crohn’s Disease: Report Of A Case
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Introduction
Multiple or massive resections of the small bowel may subsequently lead to short bowel syndrome in patients with Crohn's disease (CD). Although terminal ileum is the most commonly affected site, a few patients may have multiple segments of disease in the jejunum and proximal ileum that refer to diffuse jejunoileal disease. Diffuse jejunoileitis (DJ) is one of the most challenging courses in the management of CD patients because of the high rates of failure with both medical or endoscopic treatments and surgical treatment with extensive resections, especially in the past decades, that may lead to short bowel syndrome (1,2). Strictureplasty (Sxpl) offers an excellent alternative for the management of such patients (3,4).

Gastrointestinal surgeons have been searching for alternative surgical techniques to overcome some disadvantages of conventional Sxpls (Heineke-Mikulicz, Finney). Side-to-side isoperistaltic strictureplasty (SSIS) has emerged as a bowel-sparing surgical alternative to resection for the treatment of extensive CD. This technique differs from other conventional Sxpls, in that it may be used to treat longer segments of disease with multiple strictures by carrying out a longitudinal enterotomy and subsequent side-to-side enterointerostomy. Therefore, SSIS widens the diameter of the involved bowel without sacrificing any mucosal absorptive area (5).

Case Report
A 21-year-old male patient was admitted to our hospital with obstructive intestinal symptoms. He has been followed by a gastroenterologist with the diagnosis of CD for nearly 5 years, and has been managed with medical treatment (for the first two years, the initial dose of azathioprine was 100 mg/day po, which was later tapered down to 50 mg/day po for maintenance, and prednisolone 40 mg/day po during the first three months were administered). Barium swallow meal study revealed multiple stenotic segments in the small bowel. Obstructive symptoms did not resolve in spite of intensive medical therapy, and surgical treatment was considered. A total of 13 strictures were found in enteroclysis imaging preoperatively and during the surgical exploration, as shown in Figure 1. The first three strictures which were shorter than 7cm in length were managed with Heineke-Mikulicz (HM) Sxpl. The next involved area of small bowel that included 8 strictures in 90cm was divided at its midpoint with its mesentery. Then, the intestinal ends were spatulated triangularly to avoid blind stumps. While approximating the two intestinal loops, care was taken not to place the stenotic segments adjacent to each other. The two intestinal loops were then anastomosed by one layer interrupted sutures in order to create a side-to-side isoperistaltic enterointerostomy (Figure 2). Resection and end-to-end enterointerostomy were done for the 20cm
involved area in the terminal ileum that included 2 strictures. The patient was discharged on the 8th postoperative day without any complications, and was referred to the gastroenterologist for the maintenance of the medical treatment. Azathioprine 100mg po and budesonide 6mg po have been administered post-operatively. No obstructive symptoms have occurred during the 54-month follow-up period.

**DISCUSSION**

Diffuse jejunoileitis (DJ) is an uncommon clinical entity that accounts for 3-10% in the entire CD population (1,2). Unfortunately, medical treatment is not effective in most patients with DJ. Furthermore, duodenal involvement usually accompanies this form of CD (46%) (6,7). The most common indication for surgery in DJ is recurrent intestinal obstruction. Since DJ has a poor prognosis due to its resistance to medical treatment and high recurrence rates, bowel-sparing surgical procedures have become popular in order to reduce the incidence of short bowel syndrome. Regarding the current data, many authors suggest that Sxpl procedures are safe and effective for CD patients with multiple strictures (5,8,9).

Sxpl was first proposed by Katariya et al. in order to treat ileal strictures secondary to intestinal tuberculosis (10). In the late 1970s, Lee and Papanioannou used Sxpl to treat fibrostenotic strictures in CD (11). The main goal of developing the Sxpl procedures is the attempt to prevent resective procedures that may eventually lead to short bowel syndrome. Since patients with CD usually need multiple surgical interventions for complications such as strictures, fistulae etc., short bowel syndrome occurs at a rate of 5-10% depending on the disease process, as well as its medical and surgical treatment (5,6,12,13).

Sxpl techniques have gradually gained popularity because of their clear advantages for the last two decades (11). Indications for Sxpl were reviewed and widened with increasing experience. According to present data, several important indication have been considered as a routine surgical treatment option for the strictures in CD (14,15,16).

Heineke-Mikulicz and Finney Sxpls, the first performed techniques for Sxpl, and both named for similar pyloroplasty techniques, are simple and effective for short segment strictures (17). The former is suitable for shorter segment strictures that are 0-7cm in length, while the latter may be used for longer segment strictures up to 15cm in length (11,18). However, HM Sxpl should not be used for multiple strictures that are in close proximity to each other because of possible tensioning at the suture line (19). In addition, Finney Sxpl has the disadvantage of creating a blind diverticulum that may lead to bacterial overgrowth (20). Finally, both of these Sxpl techniques have limited utility for longer segment strictures (>15cm) and DJ with multiple strictures (21).

SSIS, since its inception in 1992, has ultimately overcome the limitations, and offers a bowel-sparing surgical treatment alternative for patients with multiple strictures over a long segment of intestine (5). This procedure is based on a simple concept, but its performance is technically challenging. A reasonable scepticism and fear has come out about the procedure because the possibility of a high rate of complications such as dehiscence of a suture line on an inflamed or fibrotic intestine (14). However, the worldwide rate of septic complications (related to the leakage of Sxpl) reported in the literature reaches 8% with a reoperation rate.
of 5% (22). This rate of septic complications does not seem to be different from the incidence of those associated with other resective surgical procedures (6,22). Moreover, Yamamoto et al. reported that most of the complications such as leakage and dehiscence of the suture line were at the resection sites, rather than the Sxpl sites (6).

The post-operative complications associated with SSIS may be attributed to both nutritional and surgical factors (explorative findings and technical factors). Since the patients with the fibrostenotic form of CD usually have a poor nutritional status, appropriate alimentation strategy is necessary to reduce the likelihood of post-operative complications (14). Besides, explorative findings play an important role for rational decision making to perform the correct procedure. The presence of septic complications such as free perforation, abscess formation, fistulae, and fragility of the intestinal walls to be sutured due to deep ulcerations may be considered as relative contraindications for the procedure (23,24). Suspicion of malignancy, presence of a large amount of pus, phlegmonous aspect of intestinal wall, and urgent surgery are the real contraindications for SSIS (16).

Technical details of the procedure are well-recognized but modified by some authors with increasing experience in order to reduce the rate of post-operative complications. Several technical factors including the overlooked or misjudged strictures and adhesions distal to the Sxpl site (8, 25), ischemia at the Sxpl site due to technical difficulty in dividing the thickened mesentery (19), and difficulty of application of approximating two different intestinal segments that have unproportional wall thicknesses may cause anastomotic leakage.

Current data confirms that surgical recurrence after the Sxpl procedures is not more frequent than that after resective procedures (26, 27). Moreover, a surgical recurrence rate of 23% with SSIS appears to be favorable when compared with the total cumulative rates of surgical recurrence 5 years after HM and Finney Sxpls ranging between 28% and 41% (17, 27, 28). In this case, no recurrence has been observed during a 52-month follow-up period.

In conclusion, we consider that SSIS is a safe and effective bowel-sparing surgical procedure for the strictures related to CD. However, the procedure should be performed by or with the guidance of an experienced surgeon because of its technical difficulty. Besides, careful selection of patients is also important. Finally, the risk of malignant transformation at the SSIS site is still needed to be assessed.

References
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