

Original Article

Application of a spontaneously closed protective stoma in an ileal pouch-anal anastomosis: a preliminary study

Jinhai Wang, Bingxin Ke, Jianjiang Lin, Jiahe Xu, Wenbin Chen

Department of Anorectal Surgery, First Affiliated Hospital, College of Medicine, Zhejiang University, Hangzhou, China

Received October 22, 2014; Accepted January 7, 2015; Epub January 15, 2015; Published January 30, 2015

Abstract: Background: To evaluate the application value of a spontaneously closed protective stoma (SCPS) in an ileal pouch-anal anastomosis, which is a novel procedure first performed in our hospital in 2008. Materials and methods: Two males cases with ulcerative colitis and one female with familial adenomatous polyposis were treated with colorectal surgery at the First Affiliated Hospital of Zhejiang University since March 2010. The surgery was designed as total proctocolectomy with an ileal pouch-anal anastomosis and SCPS. The surgical plan and procedure was determined with the patients after analyzing their hospitalized records and follow-up information. Results: No operation-induced death or anastomotic leakage occurred. One patient had a persistent fever and another patient presented with postoperative urinary retention. The average time until flatulence occurred post-SCPS was 26 days, and the average time until the removal of the postoperative stomal tube was 46 days that healed well. Conclusions: An SCPS can effectively protect the anastomosis with a simple operation and avoid the second surgery. Patients with ulcerative colitis require a two-stage operation, those who were in poor health and had a long history of hormone treatment even requiring a three-stage operation. However, a one- or two-stage operation could help alleviate pain for patients who require multiple surgeries and reduce economic burden.

Keywords: Ileostomy, ulcerative colitis, ileal pouch anal anastomosis

Introduction

Since 1978, Parks et al. [1] first reported that a total proctocolectomy with an ileal pouch-anal anastomosis has become a standard operation for the treatment of familial adenomatous polyposis and ulcerative colitis. Currently, familial adenomatous polyposis usually requires surgical treatment, occasionally in combination with a prophylactic ileostomy; in addition, patients with ulcerative colitis require a two-stage operation, while some patients in poor health that have had long-term hormone use require a three-stage operation [2-4]. Patients who endure multiple surgeries experience the pain of complications and the economic pressure. Since March 2010, at the First Affiliated Hospital of Zhejiang University, two cases with ulcerative colitis and one with familial adenomatous were treated with colorectal surgery. They had total proctocolectomy with an ileal pouch-anal anastomosis and spontaneously closed protective stoma (SCPS). An SCPS has been performed by creating an appropriate block of the distal bowel by using a TL60 sta-

pler with a purse string approximately 10 cm from the diversion, inserting a No. 7 endotracheal tube into the proximal lumen through the lower right abdominal wall and then affixing the tube. According to an analysis of the patients' hospitalization and discharge follow-up records, the procedure was discussed with the patients.

Patients and methods

Clinical data

Two males with ulcerative colitis and one female with familial adenomatous polyposis were included in this study (**Table 1**). The mean age was 43.7 years (range: 37-53 years). All patients had a history of bloody stools. A preoperative colonoscopy was performed, and no malignant tumor was found.

Surgical procedures

After preoperative examination, the female patient with familial adenomatous polyposis and one male patient with ulcerative colitis had

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Table 1. Clinical data of three enrolled patients

	Patient 1	Patient 2	Patient 3
Age (y)	37	53	41
Gender	Male	Male	Female
Disease duration	2 months	5 years	2 years
Colonoscopy	Hundreds of colorectal polyps of unequal sizes	Intestinal mucosal hyperemia, edema, erosion, and multiple ulcers mostly in the sigmoid colon and rectum	Intestinal mucosal hyperemia, edema, erosion, and multiple ulcers.

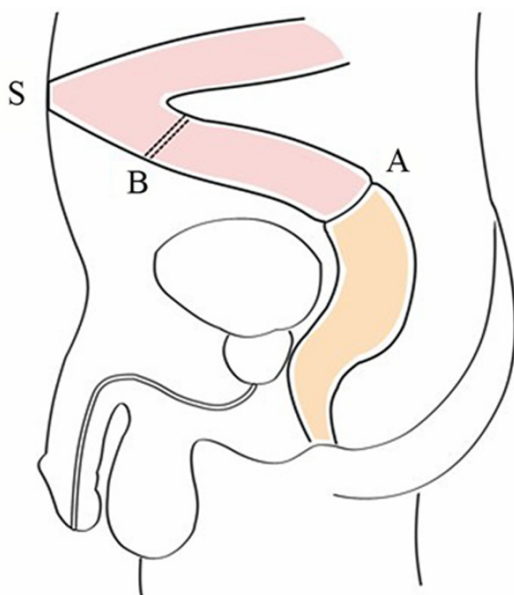


Figure 1. Abdominal stoma into which the tube was inserted (S). Distal bowel blocked by stapling (B). Ileal pouch-anal anastomosis (A).

a total proctocolectomy with an ileal pouch-anal anastomosis and SCPS. A total proctocolectomy was a routine resection of the intestine along the bowel wall, reversed omentum, right colon, and ileocecal vessels. The residual rectal mucosa was completely removed. An ileal pouch-anal anastomosis was performed using a J-type anastomosis. An SCPS was recently performed according to a conventional method (**Figure 1**) in our hospital: perform an appropriate diversion of the distal bowel, which was utilized to provide temporary diversion which could recanalize on its own, by using a TL60 (Johnson & Johnson) stapler with a purse string approximately 10 cm from the diversion; insert a No. 7 endotracheal tube into the proximal lumen through the lower right abdominal wall; and affix the tube. The female patient with ulcerative colitis had severe malnutrition, anemia, and hypoproteinemia. Intraoperative find-

ings included pelvic effusion and bowel wall edema. She agreed to undergo a total proctocolectomy and an ileostomy. Seven months later, she agreed to undergo a second proctocolectomy, including an ileal pouch-anal anastomosis and SCPS. The operative time of two male patients was 6 h and 6.5 h and 4 h for the female subject. The average intraoperative blood loss was 320 mL. The average time for the SCPS was 22 minutes. Prior to pulling the tubes, j-pouch was studied with contrast enema for detecting anastomotic strictures (**Table 2**).

Surgical indications

J-pouch proctocolectomy is applicable for those patients with a distance of < 8 cm between anastomosis site and anal verge, especially those with a distance of < 4 cm. Those patients with mesenteric hypertrophy, pelvic stenosis and insufficient length of proximal colon were excluded from J-pouch proctocolectomy.

Results

No death or pouch anastomotic leakage was observed during perioperative period. One patient presented with a persistent fever for 8 days with the highest temperature of 40.2°C. Negative outcomes were obtained for routine blood, urine, sputum and other bacterial tests. The patient recovered to normal status after receiving anti-inflammatory treatment, which was considered to result from surgical trauma and inflammatory absorption. One patient had postoperative urinary retention that gradually improved after 5-week catheterization. The time of postoperative tube drainage for the three patients was 3, 4, and 4 days respectively, with the average being approximately 3.7 days. After surgery, the patients began to have flatulence at 19, 32, and 27 days respectively, with an average of 28 days. The tubes were removed at 37, 52, and 49 days respectively

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Table 2. Surgical information of three enrolled patients

	Patient 1	Patient 2	Patient 3
Surgery duration (h)	6	6.5	4
Ileostomy duration (min)	20	25	21
Intraoperative blood loss (mL)	330	410	220
Intraoperative anesthesia	Well	Well	Well
Days to flatus	19	32	27
Days of tube withdrawal	37	52	49

after surgery, with an average of 46 days. The stomas healed well. The three patients had no postoperative pouch- or stoma-related complications.

The follow-up time for the three patients was 2, 5, and 9 months respectively. No ostomy pouch anastomotic leakage, obstruction, serious incontinence, intestinal fistulas at the stoma or delay stomal healing after tube removal was observed during the follow-up. The three patients were satisfied with current quality of life.

Discussion

A total proctocolectomy with an ileal pouch-anal anastomosis has become the standard operation for the treatment of familial adenomatous polyposis and ulcerative colitis because of complete resection of lesion and high degree of satisfaction with the postoperative quality of life, as well as other advantages [5-7]. In recent years, with a greater understanding of the rectal anatomy, advancements in surgical technique, as well as the invention of the anti-reverse peristalsis "J" pouch and improvements in the surgical stapler, have resulted in progressive improvements, including the ileal pouch-anal anastomosis surgery. Although the ileal pouch-anal anastomosis has been widely used clinically worldwide and has also revolutionized the treatment of ulcerative colitis, certain problems still exist [8, 9]. Whether an ileal protective stoma should be performed remains a highly controversial issue. Albeit many scholars made bold attempts, but for ulcerative colitis patients with severe malnutrition, hypoproteinemia, and long-term corticosteroid usage, most doctors view one-stage surgery as follows: a one-stage surgery with a total colectomy and a temporary colostomy of the ends of the proximal ileum and rectal fistula, along with the end of the distal rectal, which is pulled out of the abdominal cavity. Until the situation of the

patient has been improved, the hormone levels are gradually reduced [10]. A two-stage surgery is performed about six months later, during which the proximal rectal is resected with the rectal fistula; thus, an ileal pouch-anal anastomosis is completed, along with completion of a transverse ileostomy above the ileal pouch. About 6-12 weeks later, a three-stage surgery is performed with the closure of the transverse ileostomy. Obviously, a multi-stage surgery not only is physically and mentally painful with potential surgical risk, but also poses an economic burden for patients.

Whether the new surgical procedure can simplify operations safely and subsequently reduce the patient's pain, surgical risk, and economic burden remains unanswered. Clinically, we invented a new process for an SCPS. This surgery involves a small wound with a simple operation, achieves a complete and temporary fecal diversion, which can effectively protect the anastomosis, prevents the formation of an anastomotic leakage and avoids a second surgery. An ileal pouch-anal anastomosis and SCPS can enable patients with ulcerative colitis that would require a two- or even a three-stage operation, particularly those in poor health with long-term hormone usage, to have a one- or two-stage surgery.

During the construction of an SCPS, the distal bowel is completely blocked (**Figure 1B**) by stapling. A blocked intestine can be completely re-passed in 4 weeks that means a temporary and complete diversion. A postoperative anastomotic leakage in an ultralow anastomosis usually occurs 2 weeks or less after the operation, so having an SCPS for a period of 3 to 4 weeks helps prevent an anastomotic leakage. In the three patients, the time of postoperative tube drainage was 3-, 4-, and 4-days, with an average time of about 3.7 days. Flatulence occurred 19 days, 32 days, and 27 days postoperatively, with an average of 28 days. The tube was removed 37 days, 52 days, and 49 days, with an average of 46 days. After tube removal, the stoma healed without a second operation. Two patients who originally required a two-stage operation eventually had a one-stage operation, while the other patient who required a three-stage operation actually had a two-stage

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operation. No pouch fistulas, anastomotic leakages, pelvic abscesses, or other complications occurred. After the tube was removed, stomal recanalization occurred. Malcarney et al. [11] also successfully performed small intestine submucosal grafts in porcine models and found that non-specific inflammatory reaction can occur in the early postoperative period. Which category of patients are susceptible remains uncertain. The surgical treatment of intestinal deep infiltrating endometriosis has an associated risk of major complications such as dehiscence of the intestinal anastomosis, pelvic abscess, and rectovaginal fistula. The management of postoperative rectovaginal fistula frequently requires a reoperation and the construction of a stoma for temporary fecal diversion. Kondo et al. [12] described a 27-year-old woman undergoing laparoscopic treatment of deep infiltrating endometriosis (extramucosal cystectomy, resection of the uterosacral ligaments, resection of the posterior vaginal fornix, and segmental bowel resection) complicated by a rectovaginal fistula, which healed spontaneously with nonsurgical conservative treatment. Hamada et al. [13] created temporal umbilical loop colostomy in patients with anorectal malformations by constructing a circumferential skin incision made at the base of the umbilical cord and the skin problems were minimal, stoma care could easily be performed and healing of umbilical wounds after closure was excellent.

Most patients with familial adenomatous polyposis and ulcerative colitis, especially ulcerative colitis, have a long-term history of diarrhea and bloody stools with anemia and malnutrition that lower their resistance, yield more postoperative complications and have a higher rate of anastomotic leakage [14, 15]. Therefore, most doctors believe an ileal pouch-anal anastomosis and a postoperative protective ileal stoma are necessary for patients in poor health. An SCPS has many advantages such as a smaller wound, fewer complications, more convenient postoperative care, and avoidance of a second surgery, as compared to those of a standard surgery [16-18]. Clinically, we also found that after patients had an SCPS, they presented with an intestinal obstruction after the tube was blocked, tube prolapse after balloon rupture, delayed abdominal healing after tube removal, and the formation of an ostomy sinus and other complications, but no

serious or fatal stoma-related complications occurred. An intestinal obstruction often occurred because of the diet after washing the tube; thus, changing the patient's diet can avoid this complication. For patients who have tube prolapse, the balloon tube can be repositioned through the original sinus. The incision can mostly be healed by dressing. So far, an SCPS may not be perfect, but it has the following advantages: (1) An SCPS and a conventional ileal protective stoma can provide the same protection as that of an anastomosis; (2) An SCPS can enable the stoma to automatically heal after tube removal in order to avoid a second surgery, thus reducing the number of surgical stages; and (3) In comparison with other ileal protective stoma techniques, it generates a smaller wound and involves more convenient postoperative care, with less complications.

Acknowledgements

The study is supported by Medicine and health science and technology plan projects in Zhejiang Province in 2010 (2010KYB043).

Disclosure of conflict of interest

None.

Address correspondence to: Dr. Wenbin Chen, Department of Anorectal Surgery, The First Affiliated Hospital of Medical School of Zhejiang University, 79, Qingchun Road, Hangzhou 310003, Zhejiang, China. Tel: +86-13396553806; Fax: +86-5718723688; E-mail: wenbin11@fexmail.cn

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