

Clinical study of use of large C suture in procedure for prolapse and hemorrhoids for treatment of mixed hemorrhoids

Jia-He Yu, Xiang-Wu Huang , Ze-Jiang Wu, Hui-Zhong Lin and Feng-Wu Zheng

Abstract

Objective: To investigate the clinical use of a large C suture in the procedure for prolapse and hemorrhoids (PPH) for treatment of mixed hemorrhoids.

Methods: Patients with mixed hemorrhoids (grade III or IV) who underwent treatment with a large C suture during PPH in the Affiliated Hospital (Group) of Putian University from 1 April 2018 to 31 March 2019 were enrolled in this retrospective study. The incidences of anastomotic stenosis and anastomotic hemorrhage after the operation were observed.

Results: The study population comprised 126 patients (46 men and 80 women) ranging in age from 30 to 78 years (mean, 46.1 ± 2.5 years). Of these patients, 60 had circular mixed hemorrhoids, 36 had grade III circular internal hemorrhoids, and 30 had grade IV circular internal hemorrhoids. The onset time among all patients ranged from 0.5 to 25 years. All patients underwent 6 months of postoperative follow-up. None of the patients with mixed hemorrhoids developed anastomotic stenosis, although two patients developed secondary anastomotic bleeding.

Conclusion: Placement of a large C suture during PPH is a reliable technique for treatment of mixed hemorrhoids. It is simple, effective, and applicable and can be helpful for a large number of patients in primary hospitals.

Keywords

Mixed hemorrhoids, large C suture, procedure for prolapse and hemorrhoids, anastomotic stenosis, anastomotic bleeding, retrospective study

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Department of Anorectal Surgery, the Affiliated Hospital of Putian University, Fujian Province, China

Corresponding author:

Xiang-Wu Huang, Department of Anorectal Surgery, the Affiliated Hospital of Putian University, No. 999 Dongzhen East Road, Licheng District, Fujian Province 351100, China.

Email: huangxw74125@163.com



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Introduction

Hemorrhoids are the most common benign disease in anorectal surgery, and their incidence is increasing in association with changes in the living and eating habits of younger people. Hemorrhoids are often not taken seriously by patients, who may be ashamed to seek medical treatment because of the intimate nature of the disease site. The perception of hemorrhoids is also influenced by the traditional notion that they are a minor problem; therefore, patients do not follow regular treatment, resulting in repeated occurrence. As such, the condition of many patients is severe by the time they seek treatment. For example, patients may have mixed hemorrhoids and prolapse with incarcerated edema as well as severe pain. Although the pathogenesis of hemorrhoids is not fully understood, two main theories have been recognized: (1) increased varicosity and (2) downward movement of the anal pad (first proposed by Thomson¹ in 1975).

Hemorrhoids are among the most common and frequently encountered diseases in anorectal surgery.² Hemorrhoids recurrently bleed, potentially resulting in severe anemia and thus seriously affecting patients' health and well-being; as such, they usually require surgical treatment. In 1998, Longo³ first described the procedure for prolapse and hemorrhoids (PPH). Since then, PPH has been widely used in the treatment of grade III and IV hemorrhoids. However, long-term clinical research has shown that this procedure is associated with postoperative anastomotic stenoses and other problems; in particular, the incidence of anastomotic stenosis is higher in patients with scar constitutions. Ravo et al.⁴ reported that the incidence of postoperative anastomotic stenosis after PPH was 0.8%, whereas Petersen et al.⁵ reported that the incidence of postoperative complications was 3.1%. Petersen et al.⁵ also

found that most hemorrhoids occurred within 3 months of the operation and were often complicated by rectovaginal fistulas and rectal perforation.

In recent years, the Affiliated Hospital (Group) of Putian University has treated mixed hemorrhoids (grade III or IV) with PPH using a large C suture, replacing the traditional PPH technique. The incidence of complications, such as postoperative anastomotic stenoses and anastomotic bleeding, in association with this new technique is significantly decreased, and the clinical effect is good. This study was performed to investigate the use of a large C suture during PPH for the treatment of mixed hemorrhoids.

Methods

Patients

This retrospective study involved patients with mixed hemorrhoids (grade III or IV) who underwent treatment with a large C suture during PPH in the Affiliated Hospital (Group) of Putian University from 1 April 2018 to 31 March 2019. The study was approved by the hospital's ethics committee, and all patients provided written informed consent.

Inclusion and exclusion criteria

Inclusion criteria. Satisfaction of the following inclusion criteria were required for this study. (1) The grade of all hemorrhoids was identified in accordance with the clinical and grading criteria of mixed hemorrhoids described in the 2012 *Guidelines for the Diagnosis and Treatment of Common Diseases in the Anorectal Department* by the Chinese Association of Traditional Chinese Medicine. (2) All patients provided written informed consent to undergo the procedure. (3) Preoperative routine electron enteroscopy and measurement of the

carcinoembryonic antigen concentration were performed in patients with mixed hemorrhoids and hemorrhage. (4) The patients were followed up and observed for 6 months after the operation. (5) The procedure was approved by the ethics committee of the hospital.

Exclusion criteria. The exclusion criteria were as follows: (1) severe mental illness, such as severe depression; (2) severe systemic diseases, including portal hypertension, Budd–Chiari syndrome, and severe primary diseases (such as cardiac, cerebrovascular, hepatic, renal, or hematopoietic system diseases); (3) other anorectal diseases, such as rectal cancer, pelvic tumors, inflammatory bowel disease, anal stenosis or incontinence, intractable constipation, or rectal/anorectal fibrosis leading to anorectal mucosal immobility; (4) breast-feeding mothers, pregnant women, and children; and (5) an allergic constitution.

Preoperative preparation

Preoperative examinations and tests included blood, urine, and routine fecal occult blood tests; complete biochemical tests; and a complete set of coagulation tests. Prior to blood transfusion, the patients underwent plain chest scans, electrocardiograms, and other necessary imaging. Severe anemia was corrected, and the preoperative hemoglobin concentration was ensured to reach >70 g/L. Preoperative hypertension was corrected, adjusting all patients' blood pressure to $<150/90$ mmHg. Patients with diabetes prior to the operation required adjustment of their blood glucose concentration to <11.1 mmol/L. The patients were given a fluid diet 1 day before the operation, fasted for 8 hours, and prohibited from drinking water for 4 hours. The routine preoperative preparation included cleaning the perineum and anus.

Intestinal preparation was performed as follows. All patients received two tubes of a glycerin enema at around 6:00 AM to assist in defecation. All patients underwent sub-arachnoid block anesthesia (lumbar anesthesia), and all adopted a prone jackknife position. The surgical instruments used were disposable anorectal staplers (Changkang; Changzhou Zhiye Medical Instruments Research Institute Co., Ltd., Jiangsu, China), a 36-mm stapler, a dilator, a gatherer, a threader, a lower hook, non-absorbable surgical sutures (with needles), and self-made brain spatulas (Figure 1).

Surgical procedures (Figure 2)

The patient was placed in the prone jackknife position. Wide tape was used to pull both sides of the hips to expose the anus. The operative field was routinely disinfected and covered with a surgical sheet.

A transparent annular anal canal dilator coated with iodophor was placed into the anal canal under the guidance of an internal suppository gatherer. The vascular varicosity was then observed. The internal suppository gatherer was removed and the dilator was fixed by an assistant. Subcutaneous sutures were placed at the 1 o'clock and 7 o'clock positions, about 1.5 cm from the margin of the anal orifice (two #7 sutures at each site). The dilator was fixed in the anus again, and the anal canal and lower rectum were sterilized with iodophor. In female patients, the vagina was also disinfected. A self-made brain spatula with a smooth edge (20 cm in length and 2 cm in width, with a marked scale line) was gently inserted into the gap between the dilator and the anal canal with the assistance of a finger. The brain spatula was inserted into the anal canal to a length of about 6 cm and blocked the rectal mucosa, 2 cm of which was retained. Careful attention was given to the rectal mucosa to avoid injury.

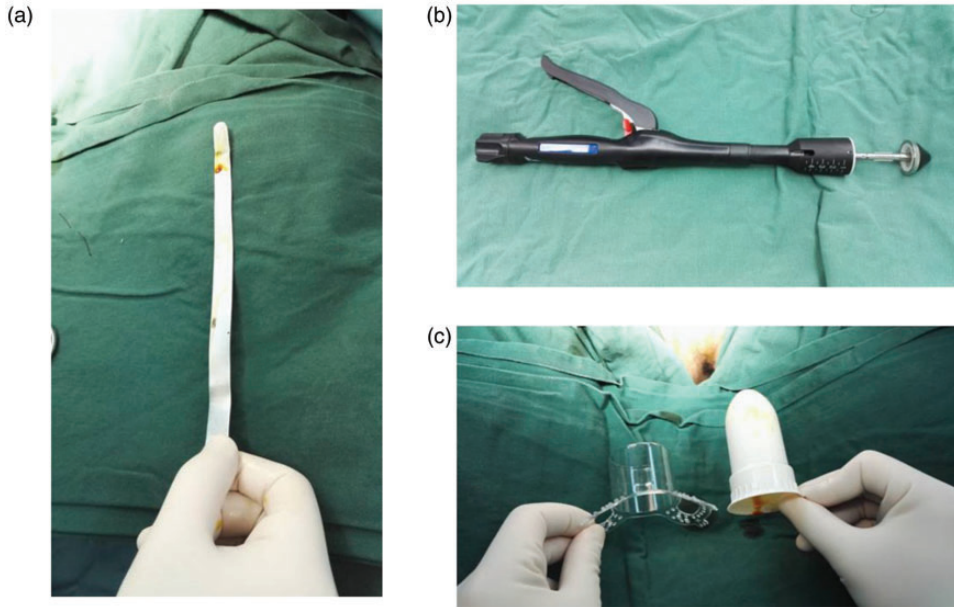


Figure 1. Surgical instruments. (a) Self-made brain spatula. (b) Surgical staples. (c) Stapler assemblies

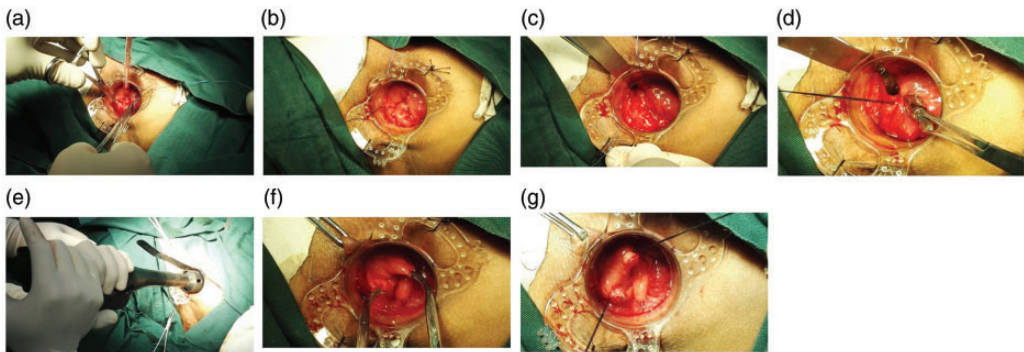


Figure 2. Surgical procedures. (a) Large C suture. (b) After placement of large C suture. (c) Placement of brain spatula. (d) Placement of low nail seat. (e) During suturing. (f) After suturing. (g) Sewing or ligating the stump

Purse-string sutures (2-0 Prolene; Johnson & Johnson, New Brunswick, NJ, USA) were placed 3 to 4 cm above the tooth line around the submucosa of the rectum. The suture depth was controlled, and the suture was kept at the same level. Suturing to the site blocked by the brain spatula was avoided. The site at which the needle entered and exited was located 0.5 cm to

each side of the brain spatula. A 36-mm Changkang stapler was unscrewed to its maximum. Iodophor was applied to the end of the head, which was then placed at the top of the purse-string sutures. The purse-string sutures were pulled out from the holes on both sides with a lead hook and tightened. After the stapler had been slowly screwed to the safety scale, the

safety device was turned on. After locking, the stapler was kept closed for 10 s. It was unscrewed for 2.5 laps and slowly withdrawn from the anal canal. Before the stapler was moved, the motion of the brain spatula was checked to prevent the anastomotic stapler groove from becoming embedded in the top of the brain spatula, which would result in an incomplete anastomosis, excision, and nailing. For female patients, the integrity of the posterior vaginal wall was routinely checked before purse-string suture placement and stapler locking to avoid the development of a postoperative rectovaginal fistula.

The anastomotic nail tower bridge was then opened with large bending forceps, and the mucosal tissue of the nail tower bridge was cut with an electric knife. After removing the brain spatula, the protruding tissue at both ends was ligated with sutures. If bleeding occurred, further suturing was performed. After confirming the absence of bleeding at the anastomotic stoma, the anal canal dilator was removed. If bleeding was present, two #0 absorbable sutures (Ethicon; Johnson & Johnson) were used for figure-of-eight suturing and hemostasis. Mucosal bleeding was stopped using electric coagulation.

Before finishing the operation, moist exposed burn ointment and diclofenac suppositories were placed in the anus to relieve swelling and pain. An iodophor gauze was placed at the anastomotic site for local compression and drainage. Gauze tape was applied to the outside of the anus for fixation. Any complications of severe external hemorrhoids, anal papilloma, anal fissures, or other anal diseases were treated together.

Postoperative treatment

The patients received a routine intravenous drip with first-generation antibiotics for 2 days after the operation. They received a fluid diet for 6 hours postoperatively, a

semi-fluid diet on the first day postoperatively, and a general diet on the second day postoperatively. The patients were able to perform normal defecation and could take lactulose and other medications orally when necessary to assist bowel movements. They also took a sitz bath with PP powder in warm water (40°C) at least twice a day for 10 to 15 minutes after defecation or in the morning and evening. Iodophor was used to gently disinfect and clean the operation site four to five times a day. Oral analgesics were given for postoperative pain. If urinary retention occurred after lumbar anesthesia, the indwelling catheter remained in place for 1 to 2 days.

Results

General information

In total, 126 patients were enrolled in the study (46 men and 80 women). The patients ranged in age from 30 to 78 years, with a mean age of 46.1 ± 2.5 years. Sixty patients had circular mixed hemorrhoids, 36 had grade III circular internal hemorrhoids, and 30 had grade IV circular internal hemorrhoids. The onset time among all patients ranged from 0.5 to 25 years. All patients underwent 6 months of postoperative follow-up after discharge. None of the patients with mixed hemorrhoids (grade III or IV) developed anastomotic stenosis.

Postoperative conditions

Two female patients developed secondary anastomotic bleeding. One developed massive bleeding on postoperative day 4 when forcibly defecating; an approximately 800-mL bright red blood clot was discharged from the anus over a period of 1 hour. An emergency operation was performed, and the site of active bleeding was found at the anastomotic nail tower bridge because one end of the tissue ligature had come

loose. Three #0 absorbable sutures were used for ligation and hemostasis. Partial mucosal bleeding was stopped by electric coagulation. The patient received symptomatic treatment after the operation and was discharged from the hospital. The other patient had frequent defecation at home on postoperative day 10 (4 days after discharge). After a bowel movement, dark red blood accompanied by black blood clots was repeatedly discharged from the anus. After readmission, a Vaseline gauze was placed in the anastomotic stoma for local compression and hemostasis, and symptomatic treatment was given. The patient was then discharged. These cases indicate that postoperative anastomotic bleeding was associated with abnormal defecation, local tissue edema, and increased tension.

Discussion

Clinical research has shown that traditional PPH, in which all normal rectal mucosa is removed, can cause unnecessary local tissue damage.⁶ Surgeons have therefore updated their surgical instruments and procedures to achieve better surgical results and reduce complications. Clinical studies have shown that the use of a large C suture during PPH is one of the most reliable clinical methods for the treatment of mixed hemorrhoids.

In the present study, a large C suture and a self-made brain spatula were used during PPH to treat grade III and IV mixed hemorrhoids. During the procedure, the brain spatula that is placed in the anal canal is bent and adjusted so that it does not affect the rest of the operation; it is then attached to the outer side of the anal dilator, shielding the rectal mucosa that needs protection. The use of a large C suture reduces postoperative anastomotic tension and stenosis.⁷ With the patient in the jackknife position, the mucosal tissue of the nail tower bridge at the 6 o'clock or 12 o'clock position is usually chosen for preservation, avoiding the

primary hemorrhoid area at the 1 o'clock, 5 o'clock, and 9 o'clock positions. With the help of the brain spatula, damage to the normal anatomical structure of the anus is reduced, and anal regulation and fine sensory functions⁸ are preserved. The anastomosis is in a non-ringed C shape, avoiding a postoperative anastomotic stenosis ring due to scar contracture; the procedure is therefore especially suitable for patients with a scar constitution. Clinical studies have found that the retention of some normal mucosa can significantly reduce the tension of stools through an anastomotic stoma because the pressure on the 12 o'clock position in the jackknife posture is greatest during a bowel movement.⁹⁻¹⁶ The mucous membrane at 12 o'clock is preserved with the patient in the jackknife position during the operation, which can effectively reduce the occurrence of bleeding caused by the increase of anastomotic tension during postoperative defecation.

Some female patients have a weak rectovaginal septum. If the mucous membrane at 6 o'clock with the patient in the jackknife position is retained during the operation, intestinal perforation and rectovaginal fistulas can be avoided. For some male patients, this can reduce prostate irritation and postoperative urinary retention caused by anastomotic edema.

The main limitation of this study is its small sample size. Further experiments should be carried out with larger sample sizes.

Conclusion

The use of a large C suture during PPH is one of the more reliable clinical techniques for the treatment of mixed hemorrhoids. It is simple, effective, and applicable and can be used for many patients in primary hospitals. It also reduces the incidence of anastomotic stenosis and is especially suitable for patients with a scar constitution.

These findings will help primary hospitals to popularize and apply this technique.

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ORCID iD

Xiang-Wu Huang  <https://orcid.org/0000-0001-5441-9833>

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