· clinical research ·

Clinical observation of ATH ligation for circular mixed hemorrhoids in stages iii and iv

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Clinical effects of automatic quantitative tightening elastic thread ligator in treatment of stage Ⅲ or Ⅳ circular mixed hemorrhoids *Yu Chunbo. Department of General Surgery, Anting Hospital, Shanghai 201805, China*

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【 Abstract】

Objective To evaluate the clinical value of automatic quantitative tightening elastic thread ligator for hemorrhoids (ATH) in the treatment of stage Ⅲ or Ⅳ circular mixed hemorrhoids.

Methods One hundred and eight patients diagnosed with stage Ⅲ and Ⅳ circular mixed hemorrhoids were enrolled at our hospital from January 2018 to July 2019. They were divided into two groups based on the treatment: 58 cases treated with ATH and 50 cases treated with tissue-selecting therapy stapler (TST). Operative time, intraoperative hemorrhage, postoperative hemorrhage, and therapeutic effects of the two groups were compared.

Results There were no significant differences in the demographics of patients between the two groups. The effective rates of both groups were 100% ($P > 0.05$). The ATH group was significantly superior to the TST group in operative time [(18.2±3.4) min *vs* (31.4±5.4) min, t=-14.93, $P < 0.0001$] and intraoperative bleeding (0 *vs* 31, χ^2=28.569, $P < 0.05$).

Conclusion ATH and TST can effectively treat stage Ⅲ or Ⅳ circular mixed hemorrhoids, and ATH has the advantages of shorter treatment time, simpler operation, and less complications.

【Key words】 Hemorrhoids; Therapeutics; Clinical effect

Hemorrhoid surgery, its common diseases are mainly prolapse, anal pain, hematochezia, rectal tenesmus. Currently often band procedure for hemorrhoid, procedure for prolapsed and hemorrhoids (PPH), tissue-selecting therapy stapler (TST), etc. Each therapy has its advantages and disadvantages. The General Surgery Department of Anting Hospital, Jiading District, Shanghai used auto-quantitative tight elastic thread ligator for hemorrhoids (ATH) to treat stage Ⅲ and Ⅳ annular mixed hemorrhoids, and the effect was satisfactory. Compared with TST, the report is as follows:

Data and methods

1. Object

A total of 108 patients with stage Ⅲ and Ⅳ annular mixed hemorrhoids hospitalized in the Department of General Surgery, Anting Hospital, Jiading District, Shanghai from January 2018 to July 2019 were selected. All patients met the diagnostic criteria of the "Guidelines for Clinical Diagnosis and Treatment of Hemorrhoids (2006 Edition)" by the Colorectal Surgery Group of the Surgery Branch of the Chinese Medical Association. According to patients' wishes, they were divided into ATH group and TST group.

ATH group: 58 cases, 28 males, 30 females, average age (43.0±13.1) years, disease duration (11.6±8.9) years, 19 cases in stage III, 39 cases in stage IV, treated with ATH;

TST group: 50 cases , 24 males and 26 females, mean age (43.0±12.4) years old, course of disease (11.4±7.5) years, 15 cases of stage Ⅲ, 35 cases of stage Ⅳ, treated with TST. There was no significant difference in gender, age, course of disease and stage between the two groups ($P > 0.05$), which were comparable. This study was carried out after being approved by the Ethics Committee of our hospital.

Exclusion criteria: (1) Patients with anal fissure, perianal abscess, anal fistula, Crohn's disease, ulcerative colitis, malignant tumor, etc., which affect the prognosis of the disease; (2) Patients with severe insufficiency of vital organs who cannot tolerate anesthesia or surgery.

2. Method

(1) Preoperative preparation

Both 2 group have checked coagulation function, liver and kidney function, electrocardiogram, etc. Oral polyethylene glycol electrolyte powder or enema was used to clean the intestinal tract before the operation, and the operation was arranged on the day of hospitalization. Group 2 received spinal anesthesia or sacral anesthesia.

(2) Surgical method

1. ATH group: The equipment used is disposable ATH ligation device, manufactured by WellCare Wuhan Medical Technology Co., Ltd. Routine disinfection and draping, dilating the anus, inserting an anoscope, checking the distribution of hemorrhoids and mucosal relaxation (Fig. 1a), and planning the level and quantity of ligation.

Firstly, 2-3 rectal mucosa 4-6 cm above the dentate line were ligated (Fig. 1b, 1c); then the hemorrhoids were ligated above the dentate line (≥ 0.5 cm). When ligation, align the suction chamber of the ATH head end with the tissue to be ligated, start the suction device, and when the negative pressure reaches -0.08～-0.10 MPa and stabilizes, press the trigger and release the pressure, and the elastic thread automatically tightens the ligated tissue , cut the elastic thread and remove the ATH device. Carry out the next operation in the same way. The maximum number of ligatures is 8, no more than 3 on the same plane, and the distance between 2 adjacent ligatures should be > 1 cm. Partial treatment of external hemorrhoids: according to the effect of lifting, simplified Milligan Morgan procedure were performed [1], the wound was covered with Vaseline gauze, and the operation was completed after the gauze was bandaged and fixed.

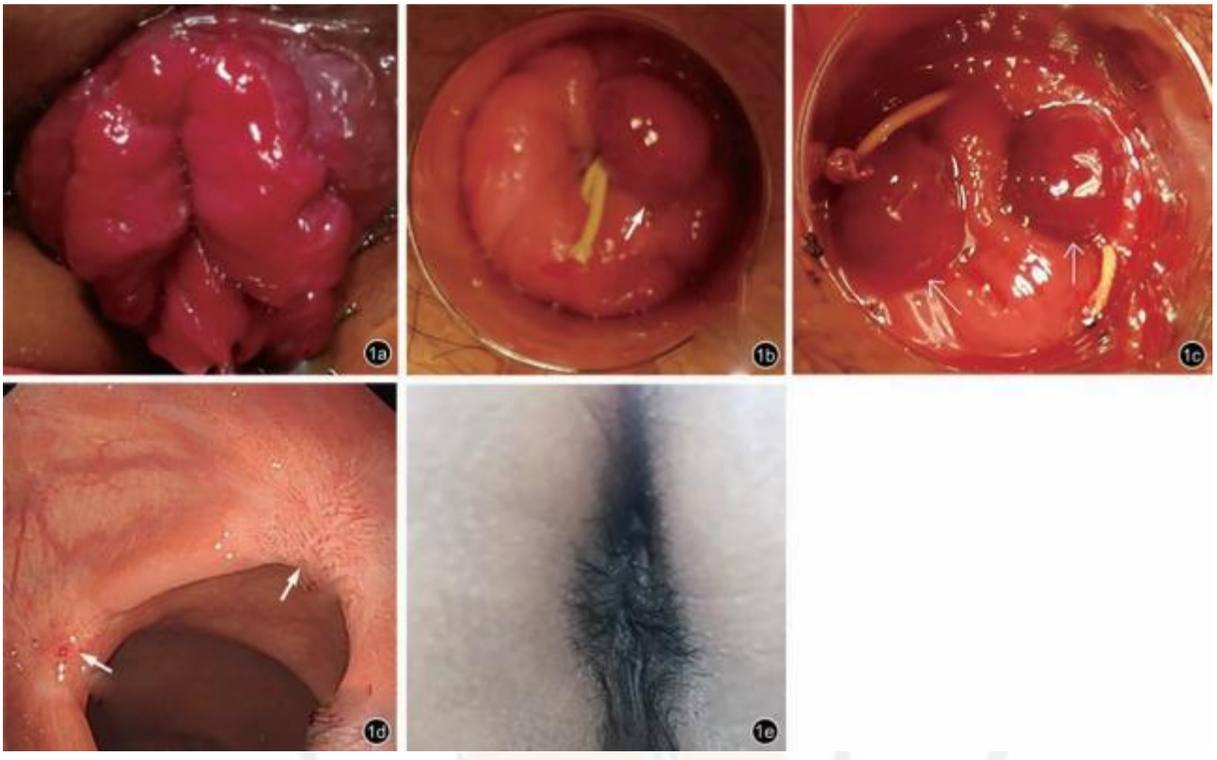

Fig. 1 Ligation of ATH hemorrhoids; Fig. 1a is stage Ⅳ annular mixed hemorrhoid; Fig. 1b is ligation of suprahemorrhoidal mucosa at location 1 (arrow); Fig. 1c is ligation of suprahemorrhoids mucosa at location 2; Fig. 1d is 3 months after operation Colonoscopy showed mucosal scar healing (arrow); Figure 1e is the curative effect observation at 6 months after operation

2. TST group: Routine disinfection and draping, according to the distribution of hemorrhoids and mucosal relaxation (Figure 2a), select anoscopes with different numbers of windows, insert the anoscope, pull out the inner core, and rotate it moderately to fully expose the hemorrhoids to be removed Put it in the window of the anoscope and fix it. At about 2-4 cm above the dentate line, segmented submucosal purse-string suture was performed with 1-0 suture,

Then insert the tip of the TST stapler (Fig. 2b), tighten and tie the suture thread, and fix it on the central rod. Then pull the suture out of the anus from the side hole, tighten it outward, and tighten the stapler knob, fire it, leave it for about 45 s, unscrew it counterclockwise, and take out the stapler. Check the anastomosis for active bleeding or detaching, as well as excised rectal mucosal tissue (Fig. 2d), double-channel ligation or suturing at the "cat's ear" [2] (Fig. 2c). The treatment of external hemorrhoids and wounds was the same as that of the treatment group.

(3) Postoperative treatment

The postoperative treatment of the two groups was the same, with a semi-liquid diet for 6 hours after the operation, and discharged at noon on the second day after the operation. Semi-liquid diet for 2 weeks, postoperative follow-up for 4 weeks (once a week), and postoperative follow-up at 3 months and 6 months, mainly through outpatient follow-up visits, WeChat or telephone, to guide medication and observe curative effects (Fig. 1d, 1e, 2e).

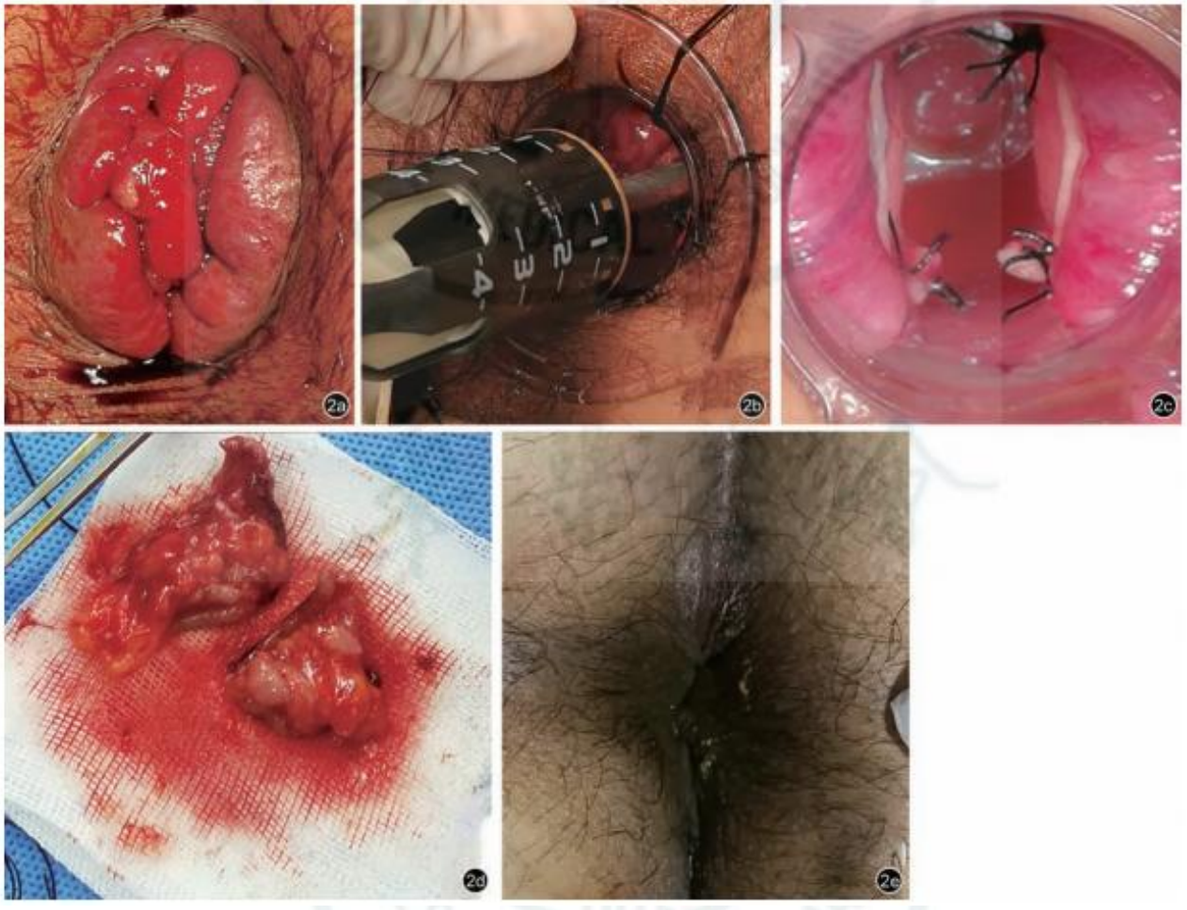

Fig. 2 Tissue-selecting therapy stapler of hemorrhoids; Figure. 2a shows Phase IV annular mixed hemorrhoids; Figure. 2b shows segmental submucosal purse string suture with stapler inserted; Figure 2c shows the wound after removing the stapler and ligating the "cat"; Figure. 2d shows mucosa and submucosal tissue resected by stapler; Figure. 2e shows the effect observation 6 months after operation

(4) Observation indicators

Operation time, number of cases of intraoperative bleeding (soak a small gauze about 5 ml, total blood loss > 5 ml included in the statistics), number of postoperative bleeding cases (when the amount of bleeding > 60 ml/h was included in the statistics).

(5) Evaluating Criteria for Efficacy

Refer to the "Provisional Criteria for Diagnosis of Hemorrhoids" formulated by the Colorectal and Anal Surgery Group of the Surgery Branch of the Chinese Medical Association at the Chengdu Conference [3]. (1) Healed: symptoms and signs disappeared after treatment, and the wound healed completely without complications; (2) Improved: Symptoms and signs improved or improved after treatment, and the wound healed; (3) Ineffective: Symptoms and signs did not improve after treatment Or although there is improvement, the wound is not completely healed. The total effective rate = (the number of cured cases + the number of improved cases) / total number of cases × 100%.

3. Statistical analysis

SAS9.1 statistical analysis software was used. The measurement data were expressed as x ± s, and the t test was applied, the rank sum test of two independent samples was used for the comparison between groups, and the R×C table χ2 test was used for the comparison of count data between groups. P < 0.05 means the difference is statistically significant..

Result

The two groups of patients successfully completed the scheduled surgery, average length of stay1.5 days , similar hospitalization expenses, similar post-operation pain, and no anal shrink and complications appeared. The average of usage of the bands are 4.8. And Both groups have 100% effective rate(Table 1). In terms of surgery time ratio, there was a statistically significant difference between the ATH group [(18.2±3.4) min] and the TST group [(31.4±5.4) min] (t=-14.93, P ＜ 0.00). Ratio of intraoperative bleeding cases: There was no intraoperative bleeding in the ATH group, and there were varying degrees of bleeding in the TST group, with 31 cases > 5 ml, and the maximum bleeding volume was about 25 ml. Both groups had statistically significant bleeding during surgery (χ2=28.569, P<0.05). Comparison of postoperative bleeding: there was no postoperative bleeding in the ATH group, and 2 cases in the TST group had bleeding on the 7th day and 25th day after the operation. The amount of bleeding was about 400 ml and 200 ml respectively. There was no statistically significant difference in the ratio of bleeding cases after group technique (χ2=2.272, 0.>5).

Table 1 Comparison of two groups of patients with annular mixed hemorrhoids (cases)

Groups	Cases	Healed	Improved	Ineffective
ATH group	58	56	2	0
TST group	50	48	2	0

Discussion

Hemorrhoids are common clinical and frequently-occurring diseases. The pathogenesis of hemorrhoids mainly includes the theory of varicose veins and the theory of anal cushion downward movement. Based on the above theories, surgical methods such as Ligation and TST etc. have been derived clinically. In Ligation, internal hemorrhoids are ligated to directly eliminate the varicose venous plexus, and the mucosa on the hemorrhoids is ligated to lift and suspend the anal cushion [4] . ATH hemorrhoidal ligation is improved on the basis of RBL. It adopts elastic thread, and the ligation is automatically completed with trigger operation, which is easy to operate. In the TST operation, some internal hemorrhoids and the mucosa and submucosal tissues above the hemorrhoids are selectively resected, and at the same time anastomosis is performed to lift and suspend the anal cushion tissue. In this group of studies, ATH hemorrhoid ligation and TST in the treatment of stage Ⅲ and Ⅳ annular mixed hemorrhoids, the recent effective rate reached 100%, indicating that these two surgical methods, if performed properly, can effectively treat stage Ⅲ and Ⅳ Circular mixed hemorrhoids.

Compared with the operation time, the average operation time of ATH hemorrhoid ligation was shorter than that of TST group, and the difference was statistically significant. The main reason was analyzed: during ATH hemorrhoidal ligation, suction, ligation, and thread trimming were carried out continuously, with almost no bleeding, and a single person could complete the operation. However, TST requires the cooperation of two persons. When the submucosal layer is sutured with circular purse strings, pinhole bleeding or submucosal hematoma often occurs, which requires compression to stop the bleeding, which affects the operation process. After the anastomosis is completed, some patients have anastomosis bleeding, need time to suture to stop

bleeding. In addition, in order to prevent postoperative bleeding of "cat ears", ligation or suturing is required, and the more the number of windows opened by an anoscope, the more "cat ears" will be produced, and the treatment time will be longer. All of the above factors increase the TST operation time.

Compared with intraoperative bleeding, there is almost no bleeding during ATH hemorrhoidal ligation, but when TST is used for purse-string suture in the submucosal layer, most patients will experience pinhole bleeding, especially when the hemorrhoidal artery is pierced. Anastomotic bleeding occurred. In this group, 31 cases of patients undergoing TST had a bleeding volume > 5 ml, and the difference was statistically significant compared with ATH hemorrhoid ligation.

Compared with postoperative bleeding, there was no bleeding case in ATH hemorrhoidal ligation. The reason is that ATH elastic thread is made of double layer material, outside layer is polymer material and inner layer is silicone material, which has good elasticity and is not easy to age [4]. During ligation, the pore diameter of the elastic coil is extremely tight (close to 0), the ulcer surface is extremely small after shedding, the hemorrhoid vessel is completely occluded, and the risk of postoperative bleeding is reduced [5-7]; the elastic thread has high strength, large friction force, and firm ligation , It is not easy to slip, and also reduces the occurrence of postoperative bleeding complications. In the TST group, there were 2 cases of bleeding, both of which were at the "cat's ears". It was considered that the anal sphincter and levator ani muscles were stretched during defecation, and the "cat's ears" were damaged by dry stool friction. In this study, there was no significant difference in the number of postoperative bleeding cases between the two groups (P>0.05).

Operation experience of ATH hemorrhoid ligation: (1) According to the size and numbers of hemorrhoids, the volume of rectal cavity, and the relaxation of rectal mucosa, individualized operation is performed. (2) For each ligation, the effect of the anal pad lifting should be observed. When the second ligation is performed, use vascular forceps to clamp the stump of the first ligation ball knot and pull against it to prevent the surrounding mucosa from been aspirated into the second ligated ball by mistake, thus causing the mucosa between the two balls to be too short, or the formation of a mucosal bridge. In addition, it can also prevent the stump of the knot from being sucked in, affecting the effect of the second ligation. (3) When the second ligation is completed, an anal examination must be performed, and the distance between the two must be ≥ 1.0 cm, and there is no obvious mucosal bridge formation, so as not to affect the postoperative defecation function. After that, for each additional ligation , to repeat the above check. (4) When performing the third ligation, if the rectal cavity is small, only 2 bands are ligated at each level, and the same level is staggered to continue ligation; if the rectal cavity is large, 3 bands can be ligated to ensure that the rectal cavity is not stenosis (The index finger can easily pass through). (5) Partial treatment of hemorrhoids: large hemorrhoids are ligated first, and the distance between the ligation points is ≥ 1.0 cm to ensure that there is no anal stenosis. Some small internal hemorrhoids are directly ligated with No. 7 silk thread; (6) For female patients with weak posterior vaginal wall, avoid pressing the ATH ligation suction chamber tightly against the anterior rectal wall during ligation to prevent passive insertion of the posterior vaginal wall. In case of rectovaginal fistula after operation, a digital vaginal examination should be performed in time to rule it out after ligation is completed.

In summary, ATH hemorrhoid ligation has the advantages of simple operation, invasiveness, less injury, high safety, and fewer complications, and is worthy of clinical promotion and use.

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