

Clinical comparative study of different kinds of surgery scheme in the treatment of severe mixed hemorrhoids patients without prolapse of non-circular internal hemorrhoids

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Abstract

Objective To investigate the clinical effects and safety differences of PPH and TST in the treatment of severe mixed hemorrhoids patients without prolapse of non-circular internal hemorrhoids.

Methods Clinical data of 159 severe mixed hemorrhoids patients without prolapse of non-circular internal hemorrhoids were retrospectively chosen in the period from May 2016 to May 2018 in our hospital and divided into 2 groups including PPH group (60 patients) with PPH scheme and TST group (60 patients) with TST scheme; and the level of surgery related clinical indicators, symptoms VAS score after surgery, incidence of postoperative complications and recurrence rate of 2 groups were compared.

Results The operation time, intraoperative blood loss and the number of suture needle in operation of TST group were less than PPH group and the differences were statistically significant ($p < 0.05$). There was no significant difference in the hospitalization time and total treatment costs between 2 groups ($p > 0.05$). There was no significant difference in the symptom VAS scores in 3d after surgery between 2 groups ($p > 0.05$). There was no significant difference in the incidence of urinary retention and anastomotic bleeding between 2 groups ($p > 0.05$). The incidence of defecation urgency feeling and rectal stenosis of TST group were lower than PPH group and before treatment and the differences were statistically significant ($p < 0.05$). There was no significant difference in the recurrence rate in 6 months and 12 months after surgery between 2 groups ($p > 0.05$).

Conclusion PPH and TST in the treatment of severe mixed hemorrhoids patients without prolapse of non-circular internal hemorrhoids possess the same clinical effects with short-term and long-term; TST operation application possess the advantages including simple operation, minimally invasive and less postoperative complications.

Keywords: surgery; internal hemorrhoids; mixed hemorrhoids; clinical efficacy; safety

Introduction

Mixed hemorrhoids are one of the common diseases in anorectal department, which is mainly caused by the expansion and flexion of rectal mucosa or anal venous plexus; it has been reported that the incidence of mixed hemorrhoids in normal people is about 4% - 8%. At present, PPH is commonly used in the treatment of mixed hemorrhoids, and the overall efficacy has been widely recognized in clinical practice (Lei et al., 2018); however, it is difficult to avoid complications such as anastomotic bleeding and rectal stenosis after PPH. If not treated in time, even caused

rectovaginal fistula, operation failure, it is difficult to meet the clinical needs (He et al., 2017). In order to solve this problem, foreign scholars improved TST based on PPH, that is, PPH and segmental ligation theory are integrated, and partial resection of the mucosa and submucosal tissue of the downward moving anal cushion is carried out to achieve the purpose of effective disconnection and suspension (Zhang et al., 2019). At present, there are relatively few reports about the above two kinds of surgical treatment for moderate and severe mixed hemorrhoids in China, and it is controversial which one can more effectively increase the clinical benefits of patients. This paper retrospectively analyzed the clinical data of 159 cases of moderate and severe mixed hemorrhoids without prolapse of

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circular internal hemorrhoids in our hospital from May 2016 to May 2018. The purpose of this study was to explore the efficacy and safety differences of PPH and TST in the treatment of moderate and severe mixed hemorrhoids patients without prolapse of non-circular internal hemorrhoids.

1 Materials and Methods

1.1 Clinical Materials

In this study, 159 patients with moderate and severe mixed hemorrhoids without prolapse of annular internal hemorrhoids from May 2016 to May 2018 were included in this study. Among them, 90 cases were treated with PPH and 69 cases were treated with TST. Inclusive criteria: ① meeting the diagnostic criteria for mixed hemorrhoids (Jin and Zhang, 2014); ② not complicated with prolapse of circular internal hemorrhoids; ③ aged 18-65 years old. Exclusion criteria: ① perianal diseases; ② rectal polyps; ③ intestinal inflammatory diseases; ④ rectal and anal malignant tumors; ⑤ uncontrollable systemic infection; ⑥ other surgical contraindications; ⑤ incomplete clinical data. In PPH group, there were 39 males and 51 females, with an average age of (47.64 ± 6.21) years and an average course of disease (8.27 ± 1.03) years. According to the degree of mixed hemorrhoids, 54 cases were grade III and 36 cases were grade IV. In TST group, there were 25 males and 44 females with an average age of (48.30 ± 6.59) years and an average duration of (8.09 ± 0.95) years. According to the degree of mixed hemorrhoids, 47 cases were grade III and grade IV was 22 cases. There was no significant difference in general data between the two groups ($P > 0.05$). The study protocol met the requirements of Helsinki declaration, and informed consent was signed by patients and their families.

1.2 Methods

The patients in both groups were anesthetized by sacral block, and the right lateral position was selected as the routine operation position.

1.2.1 PPH

The PPH stapler was delivered to about 3cm above the junction area of rectum and anal canal to complete the resection of hemorrhoid mucosa and submucosa, the length of the resected tissue was about 3-4cm; at the same time, the blood supply vessels of hemorrhoids were ligated, and the anal cushion tissue was pulled up to restore the normal anatomical structure; after taking out the PPH stapler, we observed whether there was active bleeding in the anastomotic ring area again, and the

bleeding area was sutured with "8" suture, and hemostatic gauze was used to fill the anus. Finally, pressure bandaging was used to complete the operation.

1.2.2 TST

According to the location of hemorrhoids, appropriate specifications of anoscope were selected. After anal expansion, the anoscope was placed. Firstly, the upper hemorrhoid mucosa was removed in the window. For single hemorrhoid, the submucosal suture and lead traction were completed at 3cm above the hemorrhoids. For double hemorrhoids, suture and lead traction were respectively completed at the location, and segmented purse string suture was used for three hemorrhoids. During the operation, the mucosa and submucosa should be sutured, and attention should be paid to avoid muscle layer injury; hit the stapler to complete the cutting and anastomosis of pathological tissue, and the bleeding area was sutured with "8" suture. After the operation, the anus was filled with hemostatic gauze, and the operation was completed by pressure bandage.

1.3 Outcome measures

①The operative related clinical indicators included operative time, intraoperative blood loss, intraoperative needle number, postoperative hospital stay and total treatment cost; ②the VAS method was used to evaluate the postoperative symptom severity, including pain and anal distention, with a total score of 10 points, the higher the score, the more severe the symptoms. ③recorded postoperative urinary retention, bleeding, stool urgency and rectal stricture; ④the patients were followed up for 12-16 months, with a median of 13.0 months and the recurrence was recorded at 6 and 12 months after operation.

1.4 Statistical Methods

SPSS17.0 software was selected to process the data; the statistical methods were t-test, χ^2 test or Fisher exact probability method; the test standard was $\alpha = 0.05$.

2 Results

2.1 Comparison of operation related clinical indexes between the two groups

The operation time, intraoperative blood loss and number of stitches in TST group were significantly less than those in PPH group ($P < 0.05$); there was no significant difference in postoperative hospital stay and total treatment cost between the two groups ($P > 0.05$); see Table 1 for details.

Table 1. Comparison of operation related clinical indexes between the two groups

Groups	Cases	Operation time (min)	Intraoperative blood loss (ml)	Number of stitches (needles)	Postoperative hospital stay (d)	Total treatment cost (RMB)
PPH Group	90	36.12±7.73	16.07±2.40	2.57±0.75	5.48±1.20	12059.55±3796.42
TST Group	69	27.84±5.45△	9.31±1.57△	1.39±0.43△	5.25±1.09	11684.02±3642.91

△compared with PPH group, $p < 0.05$

2.2 Comparison of VAS score of 3 days after operation in the two groups

There was no significant difference in VAS scores between the two groups 3 days after operation ($p > 0.05$); see Table 2.

Table 2. Comparison of VAS scores of the two groups at 3 days after operation (points)

Groups	Cases	Pain	anal bulge
PPH Group	90	3.67±0.60	3.83±0.88
TST Group	69	3.75±0.69	3.64±0.80

2.3 Comparison of the incidence of postoperative complications between the two groups

There was no significant difference in the incidence of urinary retention and bleeding between the two groups ($p > 0.05$); the incidence of stool urgency and rectal stenosis in group TST was significantly lower than that in group PPH ($p < 0.05$); see Table 3.

Table 3 Comparison of the incidence of postoperative complications between the two groups [n, %]

Group	Cases	Urinary retention	Bleeding	Urgent stool	rectal stenosis
PPH Group	90	12 (13.33)	2 (2.22)	18 (20.00)	6 (6.67)
TST Group	69	6 (8.70)	0 (0.00)	3 (4.35) △	0 (0.00) △

△compared with PPH group, $p < 0.05$

2.4 Comparison of recurrence rate between the two groups

There was no significant difference in recurrence rate between the two groups after 6 months and 12 months ($p > 0.05$); See Table 5.

Table 5. Comparison of recurrence rate between the two groups

Groups	Cases	6 months after operation	12 months after operation
PPH Group	90	2 (2.22)	5 (5.56)
TST Group	69	0 (0.00)	2 (2.90)

3 Discussion

The key to the surgical treatment of moderate and severe mixed hemorrhoids is to completely remove the hemorrhoids. However, the previous operation often leads to the destruction of anal cushion structure and the decrease of anal control ability, which makes it easy to have severe pain or fecal incontinence after operation (Lu et al., 2019). According to relevant anatomical studies, the ability of human body to control defecation is closely related to the structure and function of anal cushion, among which the anal cushion can provide a considerable proportion of anal resting pressure, thus avoiding the overflow of rectal contents (Xia et al., 2018). PPH was first proposed by Italian scholars. Compared with the traditional operation, PPH can effectively retain the normal function of

anal pad. During the operation, cutting and stapling machine was used to complete the resection of upper intestinal wall mucosa and submucosal tissue, at the same time, the distal and proximal mucosa anastomosis was realized, the hemorrhoids were suspended and pulled upward, so as to achieve the purpose of anal cushion reduction; at the same time, the blood supply of hemorrhoids can be reduced by blocking the submucosal rectal blood vessels,

making the residual hemorrhoids atrophy continuously. Some scholars reported that lifting the anal pad helps to restore the anatomical structure of anal mucosa and sphincter to normal, improve the self-control function of anal sphincter and internal pressure of anal canal, and avoid bleeding caused by fecal impact on anal pad (Song

and Ni, 2019). In addition, the sensory nerve of the mucosal tissue resected during PPH is very few, and no obvious postoperative pain is induced, which is of great significance for promoting the healing of anastomotic stoma (Hao et al., 2017).

Although PPH has definite curative effect in the treatment of moderate and severe mixed hemorrhoids (Wang et al., 2015), has been reported in recent years. The incidence of postoperative complications can reach 30%-45%, such as severe pain, urinary retention, bleeding, fecal incontinence or rectal stenosis. It has a serious impact on the healing process and quality of life. The European and American guidelines suggest that PPH should be strictly applied to patients with mixed hemorrhoids to improve the long-term prognosis of patients (He et al., 2017). In view of the above problems, scholars at home and abroad continue to explore the optimization of the operation based on PPH. According to the theory of downward displacement of anal pad and varicose vein, some scholars put forward the concept of TST operation, that is, by determining the distribution of hemorrhoids, selectively resecting the upper hemorrhoid mucosa, retaining the normal mucosal tissue to the maximum extent, further reducing iatrogenic trauma and preserving the normal anal function. So as to reduce the postoperative complications and improve the prognosis (Wu et al., 2019).

In the results of this study, there was no significant difference in the VAS score of the two groups at 3 days after operation ($P > 0.05$); there was no significant difference in the recurrence rate of the two groups at 6 months and 12 months after operation ($P > 0.05$), indicating that the effect of symptom control and long-term recurrence risk of moderate and severe mixed hemorrhoids without prolapse of circular hemorrhoids were similar between the two groups. In theory, TST should be better than PPH in relieving pain and anal distension in patients with moderate and severe mixed hemorrhoids. The author thinks that the main reasons for this phenomenon include: 1) small sample size; 2) ethnic differences; 3) external hemorrhoids need to be removed during the operation. The main route of external hemorrhoids is somatic nerve, and the pain after resection is relatively strong. However, the minimally invasive advantages of TST are reflected in the unclear pain score (Scheyer et al., 2015).

In the results of this study, the operation time, intraoperative blood loss and the number of stitches in TST group were significantly less than those in PPH group ($P < 0.05$), indicating that TST

can effectively reduce the difficulty of operation, reduce bleeding and suture during operation; the author thinks that in the process of TST operation, the obvious position of internal hemorrhoids is selected to complete intermittent cutting and suture. It can effectively reduce the tension of anastomotic stoma and increase the density of stapling, so the amount of intraoperative blood loss is significantly reduced; the decrease in the number of suture needles is related to the better amount of anastomotic bleeding and the lower probability of suture hemostasis; in the past, more suture needles were needed in PPH operation to stop bleeding (Zhang et al., 2019).

Some scholars have reported that (Jeong et al., 2017) can induce the irritation of the intestinal and bladder sphincter function after the resection of rectal mucosa, and cause complications such as anal distention and urinary retention. At the same time, too low purse string suture or too many needle insertion points may increase the risk of anastomotic swelling and infection. In the results of this study, the incidence of defecation urgency and rectal stenosis in TST group were significantly lower than those in PPH group ($P < 0.05$), suggesting that TST treatment for moderate and severe mixed hemorrhoids without prolapse of circular internal hemorrhoids is helpful to reduce the risk of defecation urgency and rectal stenosis; previous studies have confirmed (Fan and Zhang, 2017) that the formation of defecation urgency after mixed hemorrhoids surgery may be closely related to rectal compliance changes; TST can maximize the preservation of normal mucosal tissue, which has a relatively small impact on rectal compliance; however, after PPH, due to the high position of anastomotic stoma and the number of suture needles, the anastomotic bleeding and edema are serious, which further increases the risk of rectal stenosis (Leung et al., 2017).

In conclusion, PPH and TST in the treatment of moderate and severe mixed hemorrhoids without prolapse of internal hemorrhoids have similar short-term and long-term prognosis, but TST has the advantages of simple operation, minimally invasive and less postoperative complications. However, due to the relatively small sample size and single center report, the results may have selection bias, which needs to be confirmed by further research.

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