The Comparison of a C-Shaped Partial Stapled Hemorrhoidopexy (C-PSH) Versus Circular Stapled Hemorrhoidopexy (CSH) in Patients with IV Grade Hemorrhoid: A Retrospective Study

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Abstract

Aims

The aims of this study were to present a C-shaped partial stapled hemorrhoidopexy (C-PSH) in the treatment of IV grade hemorrhoid and to assess the clinical outcomes of this technique compared with circular stapled hemorrhoidopexy (CSH).

Methods

Conventional CSH kit matched with an intestinal spatula was used for performing C-PSH. One hundred and fifty eight patients who suffered IV grade hemorrhoid and underwent C-PSH or CSH at Hangzhou Third hospital between December 2017 and July 2019 were retrospected. Intraoperative and postoperative outcomes in both groups were collected and analyzed.

Results

Operative time, estimated blood loss and hospital stay were similar in both two groups (*p* values were 0.238, 0.563 and 0.101 respectively). Pain scores on the first defecation, 1st, 2nd, 3rd and 7th postoperative days in the C-PSH group were respectively lower than those in the CSH group, and the numeric rating scale (NRS) scores were 3.29±1.52 vs. 4.23±1.99 (p=0.001), 3.82±1.49 vs. 4.63±1.17 (p<0.001), 3.12±1.51 vs. 3.71±1.85 (p=0.030), 2.67±1.52 vs. 3.37±1.54 (p=0.005) and 1.34±0.92 vs.1.84±1.14 (p=0.003). Fecal urgency incidences in the C-PSH group were lower than those in the CSH group on the 1st, 2nd, 3rd and 7th postoperative days, and the incidences occurred in the C-PSH group vs. CSH group were 44.7% vs. 61.0% (p=0.041), 30.3% vs. 46.3% (p=0.038), 25.0% vs. 43.9% (p=0.013) and 13.2% vs. 35.4% (p=0.001) respectively. Overall postoperative complications rate occurred in the CSH group was higher than that in the C-PSH group, (16/82 vs. 6/76, p=0.035). Six patients suffered from anal stenosis in the CSH group and no patient suffered from stenosis in the C-PSH group (p=0.047). One year recurrence rate in the C-PSH group and CSH group was 8.0% (6/75) vs. 6.3% (5/79), (p=0.687).

Conclusions

The C-PSH seems to be an efficacy and safety technique in treating IV grade hemorrhoid. It has advantages in alleviating postoperative pain, fecal urgency and anal stenosis compared with CSH. It could be an alternative technique in the treatment of IV grade hemorrhoid.

Introduction

Hemorrhoids are common benign diseases in colorectal surgery. It is difficult to determine its exact incidence in common population. A study of screening colorectal cancer in normal population reported

that the prevalence of hemorrhoids approximated 39% and half of the participants were asymptomatic.[1] The typical symptoms of hemorrhoids are bright red bleeding, prolapse, pain, soiling or itching and so on. According to the extent of prolapse, hemorrhoids are graded from I to IV and the treatments differ from each grade.[2, 3] Ten to twenty percent patients with symptomatic hemorrhoids require surgical treatments.[4] Circular stapled hemorrhoidopexy (CSH) is one of the effective techniques to treat the hemorrhoids.[5, 6] With the popularization of this procedure, however, many unpleasant feelings or complications such as fecal urgency, anal stenosis and massive bleeding pointed to this technique have been recorded.[5, 7, 8] In order to decrease those weaknesses, a C-shaped partial stapled hemorrhoidopexy (C-PSH) which based on the circular stapled hemorrhoidopexy (CSH) has been practiced in our team in recent years.[5] The purposes of this study were to present the C-PSH technique in the treatment of IV grade hemorrhoid and to compare clinical outcomes of this technique with CSH.

Patients And Methods

Patients

The data for analysis were obtained from electronic medical records and clinical archives. One hundred and fifty eight consecutive patients diagnosed with IV grade hemorrhoid and underwent circular stapled hemorrhoidopexy (82 patients) or C-shaped partial stapled hemorrhoidopexy (76 patients) in the Department of Colorectal Surgery at Hangzhou Third hospital during December 2017 to July 2019 were retrospected. Patients with severe diseases (cardiovascular diseases or cerebrovascular diseases), colorectal diseases (thrombosis hemorrhoids, anal fistula, abscess, stenosis, inflammatory bowel disease and tumor) and age less than 18 years old were excluded. The patients were informed of the two techniques and had the privilege of choosing one. This study was approved by the ethics committee of Hangzhou Third Hospital, and every patient had signed an informed consent.

Surgical procedures

All patients had a routinely mechanic bowel preparation with polyethylene glycol electrolytes solution at the night before surgery. After spinal anesthesia, patients were placed in the prone Jack-knife position and surgical area was disinfected.

In the C-PSH group, a disposable hemorrhoid stapler kit (PSHS34, Victor, China) matched with an intestinal spatula (Fig. 1) were used for performing stapled hemorrhoidopexy. After routinely anal dilatation, an anal physical examination was inspected to confirm the number of hemorrhoids and sulcus between hemorrhoids (Fig. 2a). An anoscope was inserted into the anus and fixed with suture. Then, a sulcus between hemorrhoids was selected as an insertion point, and the intestinal spatula was carefully placed into the gap between anus and anoscope (Fig. 2b). The top of the intestinal spatula reached 5 cm above the dentate line. A C-shaped suture was placed approximately 3-4 cm above the dentate line by a 2-0 suture (Vicryl Plus, ethicon, USA), and the depth of the suture within submucosa. The anvil was introduced and positioned above the C-shaped suture, then, the suture was secured to the rod (Fig. 2c). Mucous membrane was pulled into the barrel of the stapler by the traction suture and then the stapler

was fired. A vaginal examination was performed before stapler was fired in women patients. After removing stapler, “dog ears” were ligated by 3-0 suture (Vicryl Plus, ethicon, USA) (Fig. 2d). A routine inspection of anastomosis line was performed and anastomotic bleeding hemostasis was performed by using figure-of-eight suture. Finally, the residual skin tags were removed.

In the CSH group, the disposable hemorrhoid stapler kit (PSHS34, Victor, China) was also used for performing stapled hemorrhoidopexy as the method described by Longo.[9] After CSH procedure, the remaining external piles were also excised.

End points

Intraoperative outcomes included operation time and blood loss were collected. Blood loss was estimated by the number of gauzes (each gauze was represented as 5 ml). Postoperative outcomes included postoperative pain, fecal urgency, hospital stay and complications. Postoperative pain was assessed by NRS (numeric rating scale, scores from 0 to 10; 0 as painless and 10 as worst pain).[10] NRS scores were recorded at first defecation, 1th day, 2nd day, 3rd day and 7th day after surgery. Fecal urgency was defined as unable to defer defecation for more than 15 minutes. It was recorded at 1th day, 2nd day, 3rd day and 7th day after operation.[5] Complications included urine retention, massive bleeding, perianal abscess, rectal or vaginal fistula, anal stenosis, chronic pain, etc.

Follow-up was routinely performed at 1 week, 1 month, 6 month and 1 year after surgery. Follow-up visit included outpatient visit and telephone interview. Any discomfort not limited to chronic pain, anal stenosis and recurrence was recorded and received appropriate treatment. Recurrence was defined as at least one symptom recrudesce after a 2 months symptom-free period.[11]

Statistical analysis

The quantitative data were represented as mean (standard deviation) or median (range). And a two-sample t test or Mann-Whitney U test was used to compare quantitative variables. A Chi-squared test or Fisher exact test was used for qualitative variables. $P < 0.05$ was regarded statistically significant. Statistical analysis was performed on SPSS 25.0 (IBM,USA).

Results

A total of 158 patients were included in this study, and clinical features were shown in Table 1. The basic parameters (gender, age and disease duration) were comparable between the two groups.

Table 1
Clinical features of the included patients performing C-PSH or CSH

Characteristics	C- PSH group (n = 76)	CSH group (n = 82)	*P* value
Age (year)	51.8±15.4	48.9±15.8	0.232
Male/Female	36/40	37/45	0.777
Hemorrhoids duration (year)	8 (0.6-31)	6 (0.5-27)	0.218
Abbreviations: C-PSH, C-shaped partial stapled hemorrhoidopexy; CSH, Circular stapled hemorrhoidopexy.			

Operative time in the C-PSH group (22.5 minutes, range from 12 to 50 minutes) was shorter than that in the CSH group (23 minutes, range from 10 to 45 minutes), however the difference was not statistically significant (p=0.238) (Table 2). The estimated blood loss and hospital stay were similar in both two groups (Table 2). Pain scores on the first defecation, 1st, 2nd, 3rd and 7th postoperative days in the C-PSH group were respectively lower than those in the CSH group, and the NRS scores were 3.29±1.52 vs. 4.23±1.99 (p=0.001), 3.82±1.49 vs. 4.63±1.17 (p<0.001), 3.12±1.51 vs. 3.71±1.85 (p=0.030), 2.67±1.52 vs. 3.37±1.54 (p=0.005) and 1.34±0.92 vs.1.84±1.14 (p=0.003) (Table 3). Fecal urgency incidences in the C-PSH group were lower than those in the CSH group on the 1st, 2nd, 3rd and 7th postoperative days, and the incidences occurred in the C-PSH group vs. CSH group were 44.7% vs. 61.0% (p=0.041), 30.3% vs. 46.3% (p=0.038), 25.0% vs. 43.9% (p=0.013) and 13.2% vs. 35.4% (p=0.001) respectively (Table 4).

Table 2
Intraoperative and postoperative results in the C-PSH and CSH groups

Parameters	C-PSH group (n = 76)	CSH group (n = 82)	*P* value
Operation time (minutes)	22.5 (12-50)	23 (10-45)	0.238
Estimated blood loss (ml)	15 (5-70)	15 (5-55)	0.563
Hospital stay (days)	5 (3-9)	5 (3-10)	0.101
Overall complications	6	16	0.035*
urine retention	6	9	0.509
rectal abscess	0	0	NA
rectal or vaginal fistula	0	0	NA
massive bleeding	0	1	1.0
anal stenosis	0	6	0.047*
chronic pain	0	0	NA
Recurrence (1 year)	6	5	0.687

Abbreviations: C-PSH, C-shaped partial stapled hemorrhoidopexy; CSH, Circular stapled hemorrhoidopexy; NA, not available; *, Statistically significant.

Table 3
The numeric rating scale (NRS) scores of C-PSH and CSH groups in the early postoperative period

Time	C-PSH group (n = 76)	CSH group (n = 82)	*P* value
First defecation	3.29±1.52	4.23±1.99	0.001*
Day 1	3.82±1.49	4.63±1.17	<0.001*
Day 2	3.12±1.51	3.71±1.85	0.030*
Day 3	2.67±1.52	3.37±1.54	0.005*
Day 7	1.34±0.92	1.84±1.14	0.003*

Abbreviations: C-PSH, C-shaped partial stapled hemorrhoidopexy; CSH, Circular stapled hemorrhoidopexy; *, Statistically significant.

Table 4
The fecal urgency incidences of C-PSH and CSH in the early postoperative period

Time	C-PSH group (n = 76)	CSH group (n = 82)	P value
Day 1	44.7% (34/76)	61.0% (50/82)	0.041*
Day 2	30.3% (23/76)	46.3% (38/82)	0.038*
Day 3	25.0% (19/76)	43.9% (36/82)	0.013*
Day 7	13.2% (10/76)	35.4% (29/82)	0.001*

Abbreviations: C-PSH, C-shaped partial stapled hemorrhoidopexy; CSH, Circular stapled hemorrhoidopexy; *, Statistically significant.

Overall postoperative complications rate occurred in the CSH group was significantly higher than that in the C-PSH group, (16/82 vs. 6/76, p=0.035) (Table 2). Sixteen patients had postoperative complications in the CSH group: 9 patients had urinary retention, 1 patient had massive hemorrhage and 6 patients had rectostenosis. Six patients suffered from urinary retention in the C-PSH group and no patient suffered from chronic pain, stenosis and other severe complications. All of the patients who experienced postoperative complications were relieved by conservative therapies.

The follow-up had been lasted for 1 year, and 1 patient was lost to follow-up in the C-PSH group and 3 patients withdrew in the CSH group. One year recurrence rate in the C-PSH group and CSH group was 8.0% (6/75) and 6.3% (5/79) respectively, (p=0.687).

Discussion

The treatment strategies of hemorrhoids include conservative and surgical treatments. Based on clinical experiences, it is assumed that surgical treatment is the most effective strategy for recurrent, symptomatic grade III or IV hemorrhoids.[11] However, conventional surgery (e.g., Milligan-Morgan hemorrhoidectomy) has some disadvantages such as severe postoperative pain and prolonged convalescence.[12] And since anal cushion theory was proposed by Thomson, the treatment of hemorrhoids has been largely changed.[13] In 1998, Longo reported circular stapled hemorrhoidopexy (CSH) to treat hemorrhoids by reduction of mucosa and hemorrhoidal prolapse with circular suturing device.[9] Compared with conventional surgery, CSH significantly enhances postoperative recovery and relieves postoperative pain. Since then, CSH has been spread widely; yet, many side effects such as fecal urgency, anal stenosis, massive bleeding and other complications have been widely reported.[5, 7, 8, 14]

In recent years, partial stapled hemorrhoidopexy (PSH), which characterized by a special designed anoscope, has been introduced in clinical treatment and the decreased drawbacks of stapled hemorrhoidopexy are witnessed.[5, 11, 15] By using this technique, partial rectal mucosas above the hemorrhoids are resected and the mucosal bridges between the mucosectomies are reserved.[5]

Compared to CSH, the incidences of complications are largely reduced and long-term outcomes are comparable.[11, 15] However, the device of PSH (specially designed anoscopes) is not available in some areas compared with CSH device. Therefore, the popularization of this technique is restricted. In this study, we presented a simplified PSH technique which utilized easily accessible instruments (intestinal spatula or tongue spatula) to preserve the mucosal bridge during performing stapled hemorrhoidopexy. The present studies showed that the operation time, intraoperative blood loss, hospital stay and one-year recurrent rate were comparable between the C-PSH group and CSH group, however, C-PSH had advantages in fecal urgency, postoperative pain and overall complications (especially anal stenosis).

Postoperative fecal urgency incidence was reported as high as 40% after CSH.[16] The reason of fecal urgency is not clearly. It was speculated that foreign bodies and inflammation at staple ring may cause this discomfort.[15] In this study, the incidence of urgency in the C-PSH group was much lower than that in the CSH group. That may be interpreted by the reduction of the staples residual and inflammatory response at the staple ring.

Postoperative pain is usually inevitable in hemorrhoidectomy. Compared with conventional hemorrhoidectomy, the posoperative pain is largely reduced in stapled hemorrhoidopexy.[17] In our studies, the postoperative pain in C-PSH group was observed lower than that of CSH group at each evaluated day. The reduced staples, reduced local inflammation response and reserved rectal compliance might be the contributes. It should be noted that we preferred to excise the residual skin tags after stapled hemorrhoidopexy. The reasons were that skin tags were usual existence after CSH or C-PSH, and the aesthetic requirements from patients were considered. Besides, studies demonstrated that postoperative pain between patients with or without skin tags excision were similar.[5, 18]

Morbidity is one of the efficient indicators for assessing the safety of a technique. In this studies, complications occurred in the C-PSH group were observed much lower than that in the CSH group. One case with massive blood loss was observed in the CSH group. The patient had a constipation history and the massive hemorrhage was happened after defecation at postoperative day 5. We postulated anastomotic stoma suffered a excessive tension in defecation was a main reason. Anal stenosis is one of the common postoperative complications and usually occurs within four months after surgery.[19] No patient suffered anal stenosis in the C-PSH group, while 6 patients underwent this complication in the CSH group during the follow-up. It was supposed that excessive annular fibrosis around the staples might be the reason of stenosis.[20] Due to the preserved mucosal bridge, the compliance of anus was remained and anal stenosis incidence in the C-PSH technique was largely decreased.

Although C-PSH has many superiorities in the treatment of IV grade hemorrhoid. The drawbacks of this technique should not be neglected. One of the disadvantages is that majority of staples are retained after stapled hemorrhoidopexy, and it may cause metal artifacts in the magnetic resonance inspection.[20] And the general trauma is more severe than other treatments such as rubber band ligation. Hence, many surgeons are apt to adopt other techniques to relieve hemorrhoids. Being aware of the potential weaknesses, our team have mere applied stapled hemorrhoidopexy in the patients with IV degree

hemorrhoid in recent years. Based on our C-PSH practices, we also want to share some preliminary experiences to operators. Firstly, the insertion point of spatula is not constant. Surgeons could select a sulcus between external hemorrhoids as the insertion point. Secondly, lubrication of spatula with paroline may make the insertion easily. Thirdly, insertion procedure should perform carefully and slowly to avoid anal fissure or mucosal injury.

Our preliminary study has some limitations. This study is a monocentric, small sample size and retrospective research. Those, to some extent, may reduce the quality of our study. Although 1 year recurrence rate between two groups were comparable, long-term efficacy remains uncertain. In the near future, multicenter, large sample size, prospective study and long-term studies should be carried out.

Conclusions

In general, C-PSH seems to be a safe technique for the treatment of IV grade hemorrhoid. By using this technique, the postoperative pain, fecal urgency, anal stenosis are observed to be decreased or eliminated. The outcomes reveal that C-PSH could be an alternative technique in the management of IV grade hemorrhoid.

Declarations

Ethics approval and consent to participate

The study has been approved by the Ethical Committee of the Hangzhou Third Hospital and it has been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki and its later amendments.

Consent for publication

Informed consent was obtained from all individual participants included in the study. Patients signed informed consent regarding publishing their data and photographs.

Data availability

The datasets generated and analysed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests.

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Authors' contributions

Zhong Shen and Qin-Yan Yang contributed to the conception and design of the study. Jun He performed the writing of the manuscript. Wen-Jing Wu and Zhi-Yong Liu performed the data collection. Jun He, Meng-Dan Zhou and Dong Wang performed the data analysis. Wen-Jing Wu and Meng-Dan Zhou participated in the writing of the manuscript. Guan-gen Yang, Qin-Yan Yang and Zhong Shen helped to revise the intellectual content. All authors read and approved the submitted version.

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Figures

Figure 1

Intestinal spatula used for performing C-shaped partial stapled hemorrhoidopexy

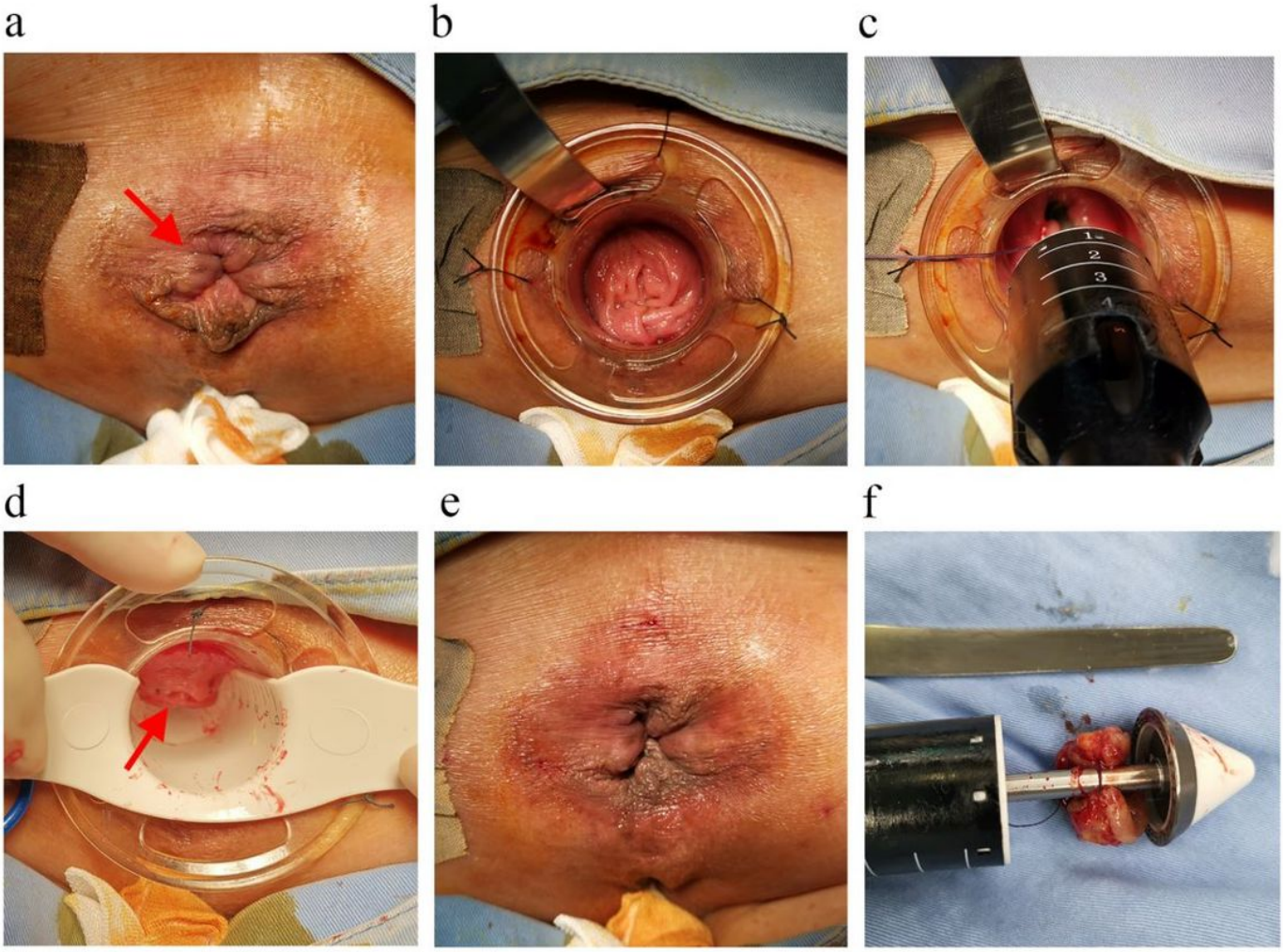

Figure 2

Procedure of C-shaped partial stapled hemorrhoidopexy, 2a. The sulcus between hemorrhoids was selected as an insertion point (red arrow), 2b. An intestinal spatula was placed in the gap between anus and anoscope, 2c. C-shaped suture was secured to the rod, 2d. A mucosal bridge between “dog ears” was presented after the C-shaped partial stapled hemorrhoidopexy (red arrow), 2e. Perianal appearance after C-shaped partial stapled hemorrhoidopexy, 2f. A C-shaped resected specimen