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ORIGINAL ARTICLE

Partial stapled hemorrhoidopexy: a minimally invasive technique for hemorrhoids

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Abstract
Purpose This study was designed to assess the safety, efficacy, and postoperative outcomes of partial stapled hemorrhoidopexy (PSH).
Methods A prospective study was conducted between February and March 2010. PSH was performed with single-window anoscopes for single isolated hemorrhoids, bi-window anoscopes for two isolated hemorrhoids, and tri-window anoscopes for three isolated hemorrhoids or circumferential hemorrhoids. The data pertaining to demographics, preoperative characteristics and postoperative outcomes were collected and analyzed.
Results Forty-four eligible patients underwent PSH. Single-window anoscopes were used in 2 patients, and bi- and tri-window anoscopes in 6 and 36 patients. The blood loss in patients with single-window, bi-window, and tri-window anoscopes was 6.0 ml (range 5.0–7.0 ml), 5.0 ml (range 5.0–6.5 ml), and 5.0 ml (4.5–14.5 ml) ($P = 0.332$). The mean postoperative visual analog scale score for pain was 3 (range, 1–4), 2 (range 1–4), 3 (range 2–6), 1 (range 0–3), 1 (range 0–2) and 2 (range 2–4) at 12 h, days 1, 2, 3, and 7, and at first defecation. The rate of urgency was 9.1%. No patients developed anal incontinence or stenosis. The 1-year recurrence rate of prolapsing hemorrhoids was 2.3%.
Conclusions Partial stapled hemorrhoidopexy appears to be a safe and effective technique for grade III–IV hemorrhoids. Encouragingly, PSH is associated with mild postoperative pain, few urgency episodes, and no stenosis or anal incontinence.

Keywords Hemorrhoids · Minimally invasive technique · Conventional stapled hemorrhoidopexy · Partial stapled hemorrhoidopexy · PSH

Abbreviations

CSH	Conventional stapled hemorrhoidopexy
PSH	Partial stapled hemorrhoidopexy
SW	Single-window
BW	Bi-window
TW	Tri-window
MMH	Milligan-Morgan hemorrhoidectomy
CAD	Circular anal dilator
VAS	Visual analog scale

Introduction

Hemorrhoidal disease is one of the most common benign anorectal problems. Approximately 10–20 percent of patients with symptomatic hemorrhoids require surgery [1].

Throughout the history of traditional hemorrhoidal surgery, the general trend has moved from total excision to partial resection. In 1882, Whitehead introduced the circumferential haemorrhoidectomy around the rectum and anus [2]. In spite of its complete elimination of the hemorrhoidal symptoms, Whitehead's radical hemorrhoidectomy is associated with severe postoperative complications,

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such as mucosal ectopion, stenosis, and postoperative pain [3, 4]. This situation continued until Milligan and Morgan described a technique that partially excised hemorrhoidal tissue, sparing mucocutaneous bridges, in 1937 [5]. Due to the reduction in postoperative anal stenosis, MMH became the procedure of choice in the surgical management of hemorrhoids [6]. However, MMH is still associated with significant postoperative pain due to trauma to the sensitive anal mucosa.

Conventional stapled hemorrhoidopexy (CSH) is characterized by a circumferential resection of the mucosa in the lower rectum [7]. Over the past 13 years, CSH has gained popularity in clinical practice due to its faster recovery rate and much less postoperative pain [8–10]. Based upon the results of more than 2,500 cases from a single surgeon's experience with CSH, we concluded that this technique is effective to treat prolapsing hemorrhoids; however, urgency in the early postoperative period and anal stenosis sometimes occurred in these patients. In fact, the incidence of postoperative urgency and anal stenosis has been reported to be as high as 41% [11] and 6% [12], respectively. These complications are presumably the result of overstapling in the sensitive lower rectum and the whole-circumference nature of CSH.

A partial stapled technique, designed to overcome the limitations and weaknesses of CSH, has recently been developed as an alternative to the whole-circumferential SH. This technique, called partial stapled hemorrhoidopexy (PSH), entails a partial-circumferential CSH using specially designed anoscopes, with which only the rectal mucosa above the prolapsing hemorrhoids is resected to spare the mucosal bridges between the mucosectomies. This study was designed to explore the safety, efficacy, and postoperative outcomes of PSH.

Materials and methods

Patients

A prospective cohort of patients in the Department of Colorectal Surgery at the Sixth Affiliated Hospital of Sun Yat-sen University (Guangdong Gastrointestinal Hospital) between February 2010 and March 2010 was studied. The inclusion criteria were that the patients should have symptomatic hemorrhoidal diseases and be diagnosed with grade III or IV hemorrhoids. The severity of hemorrhoidal disease was classified according to the grading system described by Salvati [13], as grade I (hemorrhoids with bleeding but without prolapse), grade II (hemorrhoids with bleeding and protrusion with spontaneous reduction), grade III (hemorrhoids with bleeding and protrusion that require manual reduction), and grade IV (hemorrhoids that are prolapsed and cannot be replaced). Acute thrombosed or strangulated hemorrhoids were excluded from the present study. Patients with concomitant anorectal diseases (fistula, abscess, fissure, inflammatory bowel disease, polyps, and carcinoma), previous anorectal procedures, coexisting bleeding diathesis, or who were on immunosuppressant therapy were ineligible. Patients were also excluded if they were on anticoagulation therapy. The primary outcome was the rate of recurrent prolapsing hemorrhoids at 1 year. The secondary outcomes were intraoperative blood loss, postoperative pain, fecal urgency, postoperative hemorrhage, anal stenosis, and anal incontinence. Approval was obtained from the Ethics Committee of the Sixth Affiliated Hospital of Sun Yat-sen University, and written informed consent was obtained from each patient prior to his/her inclusion in the study.

Preparations and surgical procedures

Clinical examinations, routine laboratory investigations, colonoscopy, and anorectal manometry were performed in all of the patients. All of the patients were instructed to receive a cleansing enema before the surgery. Anorectal manometry was performed preoperatively and 1 month after the surgery. The anorectal manometry was performed using an 8-channel water-perfused manometry system (Laborie, Williston, VT). The data storage and evaluations were performed with a dedicated software program (USD120/ARM; Laborie, Williston, VT). The manometric probe catheter with an inflatable latex balloon at the tip was inserted into the anus. The inflatable latex balloon was tied 0.5 and 7 cm from the distal end of the water-perfused catheter. One port of a tube in the catheter was placed with the plastic bag and the other was placed into the air injection–aspiration system. The canal resting pressure, length of the anal canal, anal canal maximum squeeze pressure, rectal minimal volume threshold, rectal sensor threshold, and rectal maximum volume threshold were recorded. The surgical procedure was performed largely according to the technique described by Longo [7] with several modifications.

The modifications mainly lie in the use of anoscopes (Touchstone, Suzhou, People's Republic of China). A single-window anoscope for single isolated hemorrhoid (Fig. 1a) was designed; similarly, a bi-window anoscope for two isolated hemorrhoids and a tri-window anoscope for three isolated hemorrhoids and circumferential hemorrhoids were developed (Fig. 1b, c).

All patients were operated on in a prone jack-knife position under combined spinal-epidural anesthesia. The procedures were all performed by a single surgeon who has experience with more than 2,500 cases of CSH (D-L R). The procedure used for the PSH is described below:

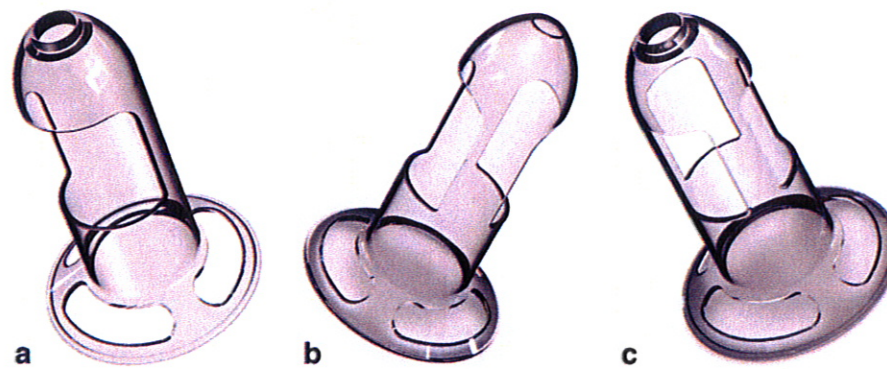

Fig. 1 The single- (**a**), bi- (**b**) and tri- (**c**) window anoscopes used during the partial stapled hemorrhoidopexy

To begin the procedure, anal dilatation was performed with a lubricated circular anal dilator (CAD). After full dilatation, anal exploration was performed, and the number of isolated hemorrhoids or circumferential hemorrhoids was confirmed. According to the number of isolated hemorrhoids, the CAD, together with a suitable anoscope, were inserted into the anus. The anoscope was rotated until the window of the anoscope(s) was situated along the mucous membrane above the prolapsing hemorrhoid(s). The CAD was withdrawn, and the mucous membrane protruded through the window of the anoscope. A suture of 2/0 Vicryl (Ethicon, Cincinnati, OH, USA) was placed approximately 3–4 cm above the dentate line, catching only the mucosa and/or submucosa protruding through the window. The PSH stapler was opened to the maximum. Its anvil was introduced and positioned above the "pursestring", which was tied down to the rod, and pieces of mucous membrane were pulled into the barrel of the stapler by the traction suture to form fan-shaped (1–3 pieces) mucosal flaps (Fig. 2). After firing the gun and removing the stapler, a circumferential inspection was performed. Occasionally, bleeding from the stapled line would occur, and an absorbable suture would be used to ensure hemostasis. Pieces of mucosa, rather than circumferential columns of mucosa, were removed from the stapler. In most cases, the external hemorrhoids did not shrink completely and presented as residual skin tags, so minimal cutaneous excisions would be applied.

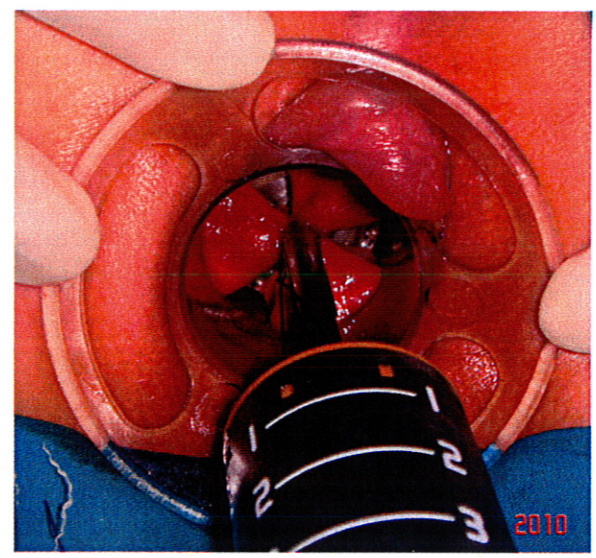

Fig. 2 A representative image illustrating a partial stapled hemorrhoidopexy for prolapsing hemorrhoids. Fan-shaped (3 pieces) mucosal flaps were drawn into the stapled device

Intraoperative and postoperative management

The length of the operation was defined as the interval between the beginning of the operation and the application of the dressing. Blood loss during the operation was estimated by weighing the net weight of the gauze used.

The postoperative management consisted of standard nursing care, dietary modifications, and sitz baths. Postoperative outcomes were evaluated, including pain, fecal urgency, postoperative hemorrhage, anal stenosis and anal incontinence. A visual analog scale (VAS) was used for pain scoring in the postoperative period (0, no pain; 10, most severe pain), and assessed during defecation. In addition, the VAS was compared between the patients with and without the skin tag excision. Urgency was assessed in patients who did not have the ability to defer defecation for more than 15 min [14]. The number of patients who experienced urgency was also recorded. The VAS and urgency were evaluated at 12 h, and on days 1, 2, 3 and 7, respectively, after the operation. The VAS at the first defecation was also recorded. The rate of fecal urgency was defined as the largest number of patients experienced urgency divided by the total number of patients. Anal stenosis was defined as the loss of the compliant natural elasticity of the anal opening, which then became abnormally tight and fibrous [15]. The occurrence of anal incontinence of gas and the stool texture (solid or liquid)

was recorded. The time to resumption of normal activity was recorded when the patient was able to resume all of their normal activities. The overall costs (including surgical expenses, medication expenses, and the costs of the PPH device) were calculated.

Follow-up

Return visits to the hospital for follow-up were required at 1 week, 4 weeks, 6 months, and 1 year after surgery. Additional follow-up visits were required when symptoms such as severe pain, severe urgency, difficult evacuation and other severe discomforts were encountered. Patients who could not attend these follow-up visits were contacted by telephone. The follow-up was done by blinded investigators. At follow-up visits or on telephone contacts, patients were checked or asked for the presence or absence of recurrent prolapsing hemorrhoids, postoperative hemorrhage, pain, urgency, anal incontinence and anal stenosis. Moreover, at the 1 year visit, patients were asked to rate their overall satisfaction, including the appearance of the anus and relief of prolapsing symptoms, into three categories (poor, good, and excellent).

Statistical analysis

Quantitative parameters were expressed as the mean ± standard deviation or median (range), where appropriate. To determine the significance of differences in the variables between groups, a t test was used for two groups whereas the Kruskal–Wallis test and a one-way ANOVA were used to compare three groups. To test the differences between pre- and postoperative anorectal manometry, a paired t test was used, whereas the Wilcoxon signed rank sum test was used for non-parametric data. To determine the pre- and postoperative manometric changes between the BW group and TW group, the t test and Wilcoxon rank sum test were used. A p value <0.05 was considered to be statistically significant. The statistical software program, SPSS version 13.0 (SPSS Inc., Chicago, Illinois), was used for the analyses.

Results

Demographic and clinical characteristics of the patients undergoing PSH

Forty-five patients fulfilled the selection criteria, and one patient refused to participate in the study for economic reasons. Therefore, a total of 44 patients accepted PSH. This series consisted of 32 male (72.7%) and 12 female (27.3%) patients. Their mean age was 39 years (range 26–72 years). Ten patients (22.7%) presented with bleeding hemorrhoids. The mean duration of symptoms was 6.0 years (range 0.7–35.0 years). Hemorrhoids were grade III in 35 patients (79.5%), and grade IV in 9 patients (20.5%). In addition, an external component was identified in 30 patients (68.2%). Based upon the anoscope used in the operation, the patients were divided into three groups: single-window (SW, $n = 2$), bi-window (BW, $n = 6$), and tri-window (TW, $n = 36$). Of the 36 patients who required the use of tri-window anoscopes, 24 patients presented with circumferential prolapsing hemorrhoids. The demographic characteristics of the three groups are detailed in the Table 1, and the data were comparable with regard to their age, gender ratio, duration of symptoms, degrees of hemorrhoids, and external component.

Intraoperative variables of patients undergoing PSH

The mean length of the operation was similar between the three groups (SW group: 17.5 ± 3.5 min, BW group: 17.3 ± 3.0 min, and TW group: 17.8 ± 3.5 min, $P = 0.955$). The estimated blood loss during the operation in the SW, BW, and TW groups was 6.0 ml (range 5.0–7.0 ml), 5.0 ml (range 5.0–6.5 ml), and 5.0 ml (range 4.5–14.5 ml), respectively ($P = 0.332$). After the completion of PSH, skin tags were removed in one patient in the SW group, three in the BW group, and nineteen in the TW group ($P = 0.990$). No particular adverse events or complications were encountered during the operation.

Early postoperative outcomes of patients undergoing PSH

The postoperative visual analog scale score for pain was 3 (range 1–4), 2 (range 1–4), 3 (range 2–6), 1 (range 0–3), 1 (range 0–2) and 2 (range 2–4) at 12 h, on days 1, 2, 3, and 7, and during first defecation, respectively. The postoperative VAS scores in patients who were treated with the different anoscopes are detailed in the Table 2, and the VAS scores between the three groups were similar at each time point. In addition, there was no significant difference in the VAS scores between those who required skin tag excision and those who did not at 12 h, on days 1, 2, 3, and 7, and during first defecation (Table 3). Fecal urgency was all encountered in the patients in the TW group. The number of patients with fecal urgency was 2, 3, 4, 4, and 4 at 12 h, days 1, 2, 3, and 7, respectively. Therefore, the rate of fecal urgency was 9.1% (4/44) in total in the present study. Postoperative hemorrhage was only observed in one patient in the TW group. It occurred within 8 h after surgery, and the bleeding could be stopped by gauze pressure and a local adrenaline enema. No patients developed anal incontinence or anal stenosis. The time to return to normal

Table 1 The demographic and clinical characteristics of patients undergoing partial stapled hemorrhoidopexy (PSH) according to the use of anoscopes

Variables	Single-window anoscope ($n = 2$)	Bi-window anoscope ($n = 6$)	Tri-window anoscope ($n = 36$)	P value
Age (years)	49.0 ± 19.8	46.3 ± 18.1	41.3 ± 12.8	0.552
Male/Female	1/1	4/2	27/9	0.696
Grade of hemorrhoids				0.563
III	1(2.3%)	5 (11.4%)	29 (65.9%)	
IV	1(2.3%)	1 (2.3%)	7 (15.9%)	
Duration of symptoms (years)	10.4 (0.7–20.0)	6.0 (0.7–25.0)	6.0 (0.7–35.0)	0.908
External component	1 (2.3%)	4 (9.1%)	25 (56.8%)	0.845

Age is expressed as the mean ± standard deviation. The duration of symptoms is expressed as the median, with the range in parentheses, while numbers with percentages in parentheses are shown for the grade of hemorrhoids and external component

Table 2 A comparison of the visual analog scale pain score in patients undergoing partial stapled hemorrhoidopexy based on the use of anoscopes

Variables	Single-window anoscope ($n = 2$)	Bi-window anoscope ($n = 6$)	Tri-window anoscope ($n = 36$)	P value
First defecation	3 (2–4)	2 (2–4)	2 (2–4)	0.787
12 h	3 (2–4)	3 (2–4)	3 (1–4)	0.751
Day 1	3 (2–4)	3 (2–4)	2 (1–4)	0.226
Day 2	3.5 (3–4)	4 (2–4)	3 (2–6)	0.776
Day 3	0.5 (0–1)	0.5 (0–3)	1 (0–3)	0.438
Day 7	0.5 (0–1)	1 (0–1)	0 (0–2)	0.199

Visual analog scale scores are expressed as the medians, with the ranges in parentheses

Table 3 A comparison of the visual analog scale scores for pain between those who underwent skin tag excision and those who did not

Variables	Skin tag excision ($n = 23$)	No skin tag excision ($n = 21$)	P value
Visual analog scale score for pain			
During first defecation	2 (2–4)	2 (2–4)	0.316
12 h	3 (1–4)	3 (1–4)	0.495
Day 1	2 (1–4)	2 (2–4)	0.284
Day 2	4 (2–4)	3 (2–6)	0.184
Day 3	1 (0–3)	1 (0–3)	0.931
Day 7	1 (0–2)	0 (0–1)	0.264

Visual analog scale scores are expressed as the medians, with the ranges in parentheses

activity in the SW, BW, and TW group was 9.8 h (range 9.5–10.0 h), 8.8 h (range 6.0–10.0 h), and 8.5 h (range 6.0–10.0 h), respectively ($P = 0.100$). The mean cost for hospitalization was similar between the three groups (SW group: RMB 11,956 ± 213, BW group: RMB 11,410 ± 761, and TW group: RMB 11,174 ± 1,473; $P = 0.705$).

All of the 44 patients underwent anorectal manometery preoperatively; however, 4 patients did not return for this anal functional test for personal reasons 1 month after surgery. Therefore, 6 patients in the BW group and 34 in the TW group underwent both pre- and postoperative anorectal manometry. There were no statistically significant differences between the pre- and postoperative anorectal manometry values ($P > 0.05$) in terms of the anal canal resting pressure, length of anal canal, anal canal maximum squeeze pressure, rectal minimal volume threshold, rectal sensor threshold, and rectal maximum volume threshold in the BW and TW groups (Table 4).

Outcomes of patients who underwent PSH at the 1-year follow-up

All patients were followed-up for 1 year. Only one patient developed recurrent prolapse who had previously presented with bleeding in the TW group. Thus, the overall 1-year recurrence rate of prolapsing hemorrhoids was 2.3% (1/44). No chronic pain, fecal urgency, anal stenosis or incontinence was encountered in any of the patients postoperatively from the 4th month during the follow-up. In addition, for the overall satisfaction rate, excellent satisfaction was

Table 4 A comparison between the results of the preoperative and postoperative anorectal manometry

Variables	Bi-window anoscope ($n = 6$)	Tri-window anoscope ($n = 34$)	P_{bi-tri} value
CRP (mmHg)			
Preoperative	71.7 ± 28.0	63.9 ± 17.7	
Postoperative[a]	67.8 ± 25.7	62.6 ± 16.5	
$Gap_{pre\text{-}post}$	3.9 ± 6.0	1.3 ± 5.0	0.256
$P_{pre\text{-}post}$ value	0.168	0.152	
ACL (cm)			
Preoperative	1.5 ± 0.4	1.5 (1.0–2.2)	
Postoperative[a]	1.5 ± 0.2	1.5 (1.1–2.1)	
$Gap_{pre\text{-}post}$	−0.1 (−0.4 to 0.6)	0.1 (−0.4 to 0.6)	0.566
$P_{pre\text{-}post}$ value	0.840	0.849	
$ACSP_{max}$ (mmHg)			
Preoperative	120.3 ± 35.3	128.2 ± 24.2	
Postoperative[a]	117.8 ± 23.6	124.6 ± 23.3	
$Gap_{pre\text{-}post}$	0.1 (−38.4 to 39.0)	0 (−38.4 to 39.0)	0.810
$P_{pre\text{-}post}$ value	0.821	0.126	
RVT_{min} (ml)			
Preoperative	43 ± 11	33 ± 13	
Postoperative[a]	43 ± 10	34 ± 13	
$Gap_{pre\text{-}post}$	0 (−2 to 2)	0 (−12 to 4)	0.897
$P_{pre\text{-}post}$ value	0.611	0.050	
RST (ml)			
Preoperative	76 ± 30	60 (30–130)	
Postoperative[a]	77 ± 30	60 (30–130)	
$Gap_{pre\text{-}post}$	−0.5 (−5 to 0)	0 (−28 to 20)	0.644
$P_{pre\text{-}post}$ value	0. 201	0.088	
RVT_{max} (ml)			
Preoperative	137 ± 35	110 (35–180)	
Postoperative[a]	124 ± 33	110 (60–180)	
$Gap_{pre\text{-}post}$	1 (−50 to 74)	0 (−94 to 74)	0.210
$P_{pre\text{-}post}$ value	0.509	0.327	

The quantitative parameters were expressed as the mean ± standard deviation or medians (range), where appropriate

$Gap_{pre\text{-}post}$ the differences between pre- and postoperative anorectal manometry, *Bi-Tri* pre-and postoperative manometric changes between the BW and TW groups, *CRP* canal resting pressure, *ACL* anal canal length, *ACMS* anal canal maximum squeeze pressure, *RVT_{min}* rectal minimal volume threshold, *RST* rectal sensor threshold, *RVT_{max}* rectal maximum volume threshold

[a] Postoperative manometry was performed 1 month after surgery

*$P < 0.05$: statistically significant

reported by 2 patients in the SW group, 6 in the BW group, and 34 in the TW group, whereas good satisfaction was selected by 2 patients in the TW group ($P = 0.792$).

Discussion

Since its introduction as a novel procedure for the surgical management of hemorrhoidal disease in 1998, CSH has become increasingly popular. This has been mostly the result of the reported reduction in postoperative pain compared to other procedures. As one of the most important attempts to improve the stapled technique, PSH was developed based on Thomson's theory of the physiological role of anal cushions and the prolapse of the anal mucosa [16]. This stapled technique entails partial excision of the rectal mucosa above the isolated hemorrhoids while preserving the normal mucosa between the mucosectomies. Similar to CSH, the principle of PSH is to decrease the blood flow to the hemorrhoids and restore the fixation of the hemorroidal cushion. The present study demonstrated that PSH, including single-point (through a single-window anoscope), bi-point (through a bi-window anoscope), and three-point suspension (through a tri-window anoscope), achieved satisfactory results in the management of prolapsing isolated hemorrhoids. In addition, circumferential hemorrhoids could also be lifted effectively by three-point suspension through the tri-window anoscope.

It has been shown that stapled techniques are associated with relatively mild pain [8, 9]. The mechanism underlying this pain is not clear. In terms of the cause of postoperative pain after stapled techniques, some authors have demonstrated that the dull pain is not due to the impingement of the stapled line on the sensitive squamous epithelium of the anoderm [17], and we believe that it is due to low-grade inflammation at the site of the stapled ring [11]. PSH was

associated with partial resections of the rectal mucosa to spare the mucosal bridges, reducing the number of staples, thus reducing the inflammation, resulting in less postoperative pain.

Residual skin tags after CSH were reported to occur in 13.9–80% of the patients in the literature [18, 19]. Our hospital prefers to remove skin tags after the operation, as they may cause anal discomfort and pruritus [18]. However, the excision of skin tags leaves a wound in the perianal skin that might cause a significant increase in postoperative pain, which may override the benefit of using the stapled procedure. Therefore, in this study, we compared the patients who underwent skin tags excision with those who did not. In this series, skin tags were removed in 23 patients. We showed that there were no significant differences in pain between patients with and those without skin tags excision. This finding was in agreement with those reported previously in the literature [19, 20]. We believe that the trauma caused by skin tag excision after the stapled techniques is minimal, and would be much lower than that in patients receiving the standard MMH. Therefore, the pain associated with skin tags excision would not significantly increase the degree of postoperative pain in patients treated using the staple techniques.

As reported, the incidence of postoperative urgency after CSH may be as high as 40% [21]. The cause of the urgency is also unclear. It has been reported that low-grade inflammation at the site of the stapled ring may cause fecal urgency [11]. In the present study, the rate of fecal urgency was 9.1%, and it was only identified in the patients in the tri-window group. In addition, the comparison of the pre- and postoperative manometry results also revealed that the anorectal function was in a good state after PSH. Therefore, we speculate that the reduction of the number of required staples, which induces the low-grade inflammation, might be responsible for the reduction in the episodes of fecal urgency after PSH.

The incidence of anal stenosis after CSH in the literature is 0.8–6% [12], and it occurs at an average time of 125 ± 5 days [22] postoperatively. However, none of the patients in this study developed anal stenosis. In general, removal of large areas of the anoderm and hemorrhoidal rectal mucosa, without the sparing of adequate mucocutaneous bridges, can lead to scarring and progressive chronic stricture [12, 23]. The PSH procedure, which is a partial CSH rather than circumferential one, might therefore decrease the incidence of postoperative anal stenosis.

A professional librarian reviewed the literature using the following sources to identify studies: Medline, Scopus, Embase, BIOSIS, Web of Science and Google. The search terms used were: 'selective', 'segmental' 'partial' and 'stapled hemorrhoidopexy', 'stapled hemorrhoidectomy' or 'procedure for prolapsing and hemorrhoids'. To our knowledge this is the first series of PSH with single-window, bi-window, and tri-window anoscopes used to treat prolapsing hemorrhoids. Nevertheless, the present study is just a preliminary study of PSH and aimed to introduce a novel technique. Further investigations, including randomized controlled trials between PSH and CSH, are needed to confirm these results.

Conclusion

Partial stapled hemorrhoidopexy appears to be a safe and effective alternative for the treatment of grade III–IV hemorrhoids. It is associated with mild postoperative pain, few urgency episodes, no stenosis, and less disturbance of the anorectal function. These findings demonstrate that PSH is a minimally invasive technique that can be successfully used in the management of grade III–IV hemorrhoids.

Conflict of interest Hong-Cheng Lin and co-authors have no conflict of interest.

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