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Stapled and Closed Hemorrhoidectomy: A Comparative Retrospective Study with Long-term Follow-up

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Abstract

Background: **Recently the new surgical treatment of hemorrhoids using a circular stapler device has gained increasing approval. Stapled hemorrhoidectomy, by using a circular stapler to resect circumferentially a mucosal-submucosal rectal strip in order to restore the correct anatomical relationships of the anal canal structures, reduces the rectal mucosal and hemorrhoidal prolapse.**

Objective: **To evaluate the long-term results of stapled hemorrhoidectomy and to compare with closed hemorrhoidectomy.**

Patients and Methods: **A comparative retrospective study was conducted in two groups of patients treated surgically for circumferential third degree hemorrhoids and combined external and internal hemorrhoids. From October 2000 to December 2003, eighty-eight patients underwent stapled hemorrhoidectomy by a single surgeon using the instrument kit (PPH01). In another group of 88 patients, the closed hemorrhoidectomy was carried out by other surgeons during the same period.**

Results: **Stapled hemorrhoidectomy, compared with closed hemorrhoidectomy, was found to be less time consuming with less analgesics requirement. The mean duration of postoperative hospitalization was shorter and the complication rate was lower in the stapled hemorrhoidectomy group. Although the urinary retention rate was lower in the stapled group (39.7% vs 55.7%), it was still rather high. During the period of follow-up from 10 months to 4 years, stapled hemorrhoidectomy developed less recurrent symptoms and no readmission.**

Conclusions: **Our results confirm that surgical treatment of hemorrhoids with stapled hemorrhoidectomy is simple, safe and effective. This technique has significantly lower post operative pain and complications than closed hemorrhoidectomy. Because of the rather high urinary retention rate, stapled hemorrhoidectomy should not be performed as a day-case surgery.**

Introduction

Hemorrhoidal disease is a common problem in clinical practice. Surgical treatment of hemorrhoids is very effective. But the notorious typical hemorrhoidectomy sequela is severe postoperative pain, especially while defecating. Many patients avoid surgery because of this problem. Many methods to reduce postoperative pain after hemorrhoidectomy were reported but the results were not striking and none were universally accepted.[1]

In 1998, Antonio Longo from Palermo, Italy[2]

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presented a new method for surgical treatment of hemorrhoids based on the theory of anal cushion by Thompson.[3] Unlike the ablation of hemorrhoids in conventional hemorrhoidectomy, Longo proposed the circumferential resection of prolapsed rectal mucosa and submucosa above the hemorrhoids using circular stapler to reposition and fix hemorrhoids to normal anatomy in the anal canal. In addition, the blood supply to the hemorrhoids is interrupted by excision and stapling of the submucosal layer in which the vessels run. This method can relieve the hemorrhoidal symptoms and also restore anatomy and physiologic function of the anus. Another outstanding benefit of this new method is less postoperative pain due to absence of anal wound at the sensitive anoderm.

The term "stapled hemorrhoidectomy" may not be appropriate because the hemorrhoidal tissue itself is not resected.[4] Some authors preferred the terms "stapled hemorrhoidopexy"[5] or "stapled prolapsectomy"[6] or "stapled anopexy" [4]

Stapled hemorrhoidectomy has been accepted rapidly from Italy to other parts of Europe and the world.

At present, there are 18 prospective randomized controlled studies comparing stapled hemorrhoidectomy with open hemorrhoidectomy[5-22], 14 studies from Europe[5-7,9,10,12-14,16-18,20-22], 3 studies[8,11,15] from Singapore and one study from Egypt[19]. There are 3 prospective randomized controlled studies comparing stapled hemorrhoidectomy with closed hemorrhoidectomy[23-25], 2 studies from Europe[22-24] and one study from Mexico[25]. There is also one prospective randomized controlled trial comparing stapled hemorrhoidectomy with rubber band ligation from Singapore[26]. Results of these randomized controlled trials showed that stapled hemorrhoidectomy was associated with significantly less postoperative pain, shorter operative time and early return to normal activity with no difference in complication rate. One systematic review of stapled hemorrhoidectomy from Australia was reported in 2002.[27] The aims of the Australian Safety and Efficacy Register of New Interventional Procedure-Surgical (ASERNIP-S) are to assess the safety and efficacy of new surgical procedure and to determine whether they are appropriate for widespread use or further evaluation are required. This review concluded that stapled hemorrhoidectomy may be at least as safe as conventional hemorrhoidectomy. However, the efficacy of stapled hemorrhoidectomy compared with the conventional hemorrhoidectomy could not be determined. Larger sample size and long term follow-up are needed to be conducted. It was recommended that surgeons practicing stapled hemorrhoidectomy should conduct a careful audit of their results.

The purpose of this retrospective study were to evaluate the effectiveness and long-term results in the treatment of hemorrhoids with the use of circular stapler (PPH 01 Kit) by a single surgeon and to compare with conventional closed hemorrhoidectomy during the same period.

Patients & Methods

Medical records of hemorrhoidal patients undergoing stapled hemorrhoidectomy (SHD) by one surgeon (C.E) from October 2000 to December 2003 in the Department of Surgery, Ramathibodi Hospital, were analysed retrospectively. Eighty eight cases were available for study. The diagnosis in these patients included third degree hemorrhoids in 42 cases, combined external and internal hemorrhoids in 44 cases and circumferential mucosal prolapse in 2 cases. Our exclusion criteria for stapled hemorrhoidectomy included hemorrhoids with large external component, large fibrotic skin tag or hemorrhoids with only one or two sites. Patients were followed up 2 weeks after surgery and then at 1, 3, and 6 months and then once every year.

For the control group of patients, conventional closed hemorrhoidectomy (CHD) in 88 patients carried out by multiple surgeons during the same period was compared. The diagnosis in these patients included third degree hemorrhoids in 37 cases and combined external and internal hemorrhoids in 55 cases. We excluded cases of conventional closed hemorrhoidectomy with only one or two sites or emergency cases. Both procedures were carried out under spinal anesthesia. No prophylactic antibiotic was administered in both groups.

Surgical Technique of Stapled Hemorrhoidectomy

The Ethicon PPH 01 set was used in all cases. PPH 01 set composes of circular anal dilator (37 mm. in external diameter) with obturator, purse-string anoscope, suture threader and hemorrhoidal circular

stapler (33 mm. diameter). The procedure was performed in prone jackknife position. A purse string suture with prolene 2/0 was placed about 3-4 cm. above the dentate line. Care must be taken to include only mucosa and submucosa. After the widely open hemorrhoidal circular stapler was introduced into the circular anal dilator, the purse string suture was tight around the anvil shaft of the stapler. Both free ends of the suture were pulled through both side holes of the stapler using suture threader. The stapler was closed tightly while pulling the purse string suture knot. The stapler was kept closed for at least 2 minutes to encourage hemostasis.

Before firing the stapler in female patient, vaginal examination was performed to ensure that the vaginal wall was not entrapped within the stapler. The anastomosis was carefully inspected in order to check any possibility of bleeding. Any bleeding point could be easily controlled with electric cauterization without suture. The tissue doughnut was checked for completeness. In SHD group, 47 were male (53.4%) and 41 were female (46.6%) with the mean age of 52 years (20-82 years). In CHD group, 36 were male (40.9%) and 52 were female (59.1%) with the mean age of 46 years (22-79 years) (Table 1). All excised specimens were sent for histopathologic examination.

These medical records were analysed for operative time, postoperative pain (analgesic requirement), duration of postoperative hospitalization, complications i.e. urinary retention (urinary catheterization), bleeding, thrombosed or inflammed skin tag, infection (foul smelling discharge with oral antibiotics administration), incontinence, stenosis, and recurrent symptoms. The patients were followed up from 10 months to 4 years.

Table 1 Gender and age

	SHD (n = 88)	CHD (n = 88)
Male	47 (53.4%)	36 (40.9%)
Female	41 (46.6%)	52 (59.1%)
Mean age (yr.)	52	46.8

SHD = stapled hemorrhoidectomy, CHD = closed hemorrhoidectomy

Statistic Analysis

Two by two table with chi-square test was used for statistic analysis. Statistically significant difference was considered if p-value was less than 0.05.

Results

Operative Time

The average duration of the operation was 20 minutes (15-30 minutes) in SHD group and 35.2 minutes (25-60 minutes) in CHD group

Hospital Stay

The mean postoperative hospitalization was 1.6 days (1-4 days) in SHD group with 62 cases (74.5%) staying for only one day after surgery. The mean post operative hospitalization was 2.6 days (1-5 days) in CHD group with 18 cases (20.4%) staying for only one day after surgery. (Table 2)

Postoperative Pain

Postoperative pain was evaluated from analgesic requirement. Forty-nine (55.7%) in SHD group required analgesic. Parenteral analgesic was used in 22 cases (25%); Pethidine in 11 cases, Voltaren in 8 cases, Morphine in 2 cases and Tramal in 1 case. The maximal dosage of parenteral analgesic was 3 doses of Pethidine for 4 days. The average dose was 0.3 dose/case. The maximal dosage of oral analgesic was 13 doses for 4 days. The average dose of oral paracetamol

Table 2 Operative time and hospital stay

	SHD (n = 88)	CHD (n = 88)	P value
Mean operative time (minutes)	20	35.2	
Postoperative hospital stay (days)	1.5	2.6	
Postoperative hospital stay for 1 day	62 (74.5%)	18 (20.4%)	<0.05

SHD = stapled hemorrhoidectomy, CHD = closed hemorrhoidectomy

was 0.8 tab/case. Thirty-nine cases (44.3%) of SHD group did not require analgesic but all cases (100%) of CHD group require analgesic. In CHD group, parenteral analgesics were used in 27 cases (30.8%); Pethidine in 18 cases, Morphine in 7 cases and Tramal in 2 cases. The maximal dosage of parenteral analgesic was 8 doses of Pethidine for 5 days. The average dosage was 0.5 dose/case. The maximal dosage of oral analgesic was 5 doses for 5 days. The average dosage of oral paracetamol was 4.4 tab/cases. (Table 3)

Complications

Postoperative complications were recorded in 36 cases (40.1%) of SHD group. The most common complication was urinary retention (35/88 or 39.7%). There were 21 males (60%) and 15 females (40%). Urinary catheterization was performed once in 23 cases, twice in 9 cases, 3 times in 2 cases and 4 times in 1 case. Other postoperative complications in SHD group were minor bleeding that were treated conservatively in 6 cases (6.8%), thrombosed or inflammed skin tag in 8 cases (9%), pain on defecation in one case (1.1%), infection (foul smelling discharge with oral antibiotic used) in 2 cases (2.2%), and mild stenosis that resolved after finger dilatation in 3 cases (3.4%). No incontinence or serious infection was recorded in SHD group.

Postoperative complications were recorded in 55 cases (62.5%) of CHD group. The most common complication was urinary retention (49/88 = 55.7%). There were 30 males (61.2%) and 19 females (38.8%). Urinary catheterization was performed once in 27 cases, twice in 15 cases, 3 times in 6 cases and 4 times in 1 case. Other postoperative complications in CHD group included minor bleeding in 3 cases (3.4%), massive bleeding that needed re-suture in the operating room in 1 case (1.1%), pain on defecation in 9 cases (10.2%), and infection (foul smelling discharge with oral antibiotic used) in 5 cases (5.7%). No stenosis, incontinence nor serious infection was recorded in CHD group.

Recurrent Symptoms

Three cases (3.4%) of SHD group developed recurrent symptoms. These included one recurrent bleeding (1.1%) and 2 prolapse (2.3%). All cases were

Table 3 Analgesic requirement

	SHD (n = 88)	CHD (n = 88)	P value
Postoperative analgesic requirement	49 (55.7%)	88 (100%)	<0.05
Parenteral analgesic requirement	22 (25%)	27 (30.8%)	NS
Average dosage of parenteral analgesic (dose/case)	0.3	0.5	
Average dosage of oral paracetamol (dose/case)	0.9 (1.8 tabs.)	2.2 (4.4 tabs.)	

SHD = stapled hemorrhoidectomy, CHD = closed hemorrhoidectomy

Table 4 Postoperative complications

	SHD (n = 88)	CHD (n = 88)	P value
Complications	36 (40.1%)	55 (62.5%)	<0.05
Urinary retention	35 (39.7%)	49 (55.7%)	<0.05
Bleeding	7 (7.9%)	4 (4.5%)	NS
Thrombosed or inflammed skin tag	8 (9%)	9 (10.2%)	NS
Pain on defecation	1 (1.1%)	9 (10.2%)	<0.05
Infections	2 (2.2%)	5 (5.7%)	NS
Mild anal stenosis	3 (3.4%)	0	NS
Incontinence	0	0	

SHD = stapled hemorrhoidectomy, CHD = closed hemorrhoidectomy

Table 5 Recurrent symptoms and readmission

	SHD (n = 88)	CHD (n = 88)	P valve
Recurrent symptoms	3 (3.4%)	9 (10.2%)	NS
Bleeding	1 (1.1%)	8 (9.1%)	<0.05
Prolapse	2 (2.3%)	1 (1.1%)	NS
Readmission	0	6 (6.8%)	<0.05

SHD = stapled hemorrhoidectomy, CHD = closed hemorrhoidectomy

treated successfully with conservative approach. Nine cases (10.2%) of CHD group developed recurrent symptoms. There were 8 recurrent bleeding (9.1%) which required readmission in 4 cases and one prolapse (1.1%) (Table 4)

Readmission

Readmission was recorded in 6 cases (6.8%) of CHD group but none in SHD group. (Table 5)

Pathologic Examination

Excised stapled doughnuts were complete in all cases. All excised specimens were examined histopathologically and none had evidence of smooth muscle fibers.

Discussion

A comparative retrospective study in two groups of patients treated surgically for hemorrhoidal disease was conducted. In this report, we studied the effectiveness and long term results of SHD performed by a single surgeon (C.E) and compared to the results of CHD during the same period of time. The two groups were well-matched in term of number, age, sex and stage of disease.

Mean operative time was shorter in SHD group (20 minutes VS 35.2 minutes). This result was similar to most of the randomized trials comparing SHD to conventional closed hemorrhoidectomy and open hemorrhoidectomy.[5-10,12-25] Only one randomized study from Singapore showed a shorter operative time in open hemorrhoidectomy group[11] (11.4 VS 17.5 minutes). Antonio Longo[2] himself reported the very short operative time of 6 minutes but others reported 15-30 minutes.[5-7,11,14,16-17,25,28-31] From the technical point of view, this new procedure appears to be simple and easily mastered by surgeon with experience in colorectal and stapled surgery.

Regarding the duration of hospitalization, mean postoperative hospitalization was shorter in SHD group than in the CHD group (1.5 days VS 2.5 days). Most of the SHD group (74.5%) stayed for only one night after surgery while the CHD group stayed for one night in only 20.4%. Most of the randomized trials reported shorter hospital stays in SHD group.[7,10,14,16,19] This resulted from less postoperative pain and no specialized wound care in SHD group. Post operative home care was also easier due to absence of anal wound in SHD group.

Assessment of the length of hospitalization is not reliable because many factors are not directly related to the operation. These factors may influence the results such as the hospital policy, the patient motivation or insurance coverage for disability. Some centers perform hemorrhoidectomy as day-case surgery[12] but this is not our policy.

Due to retrospective evaluation in this report, we used analgesic consumption instead of visual analogue scale to evaluate the intensity of postoperative pain. Average pain in the SHD group was significantly lower than in the CHD group. While 44.3% of the patients in SHD group did not require analgesic, all of the patients in the CHD group required analgesic after surgery. The use of oral paracetamol was less in SHD group than in CHD group. (1.8 tab VS 4.4 tab per case). There was no statistically significant difference in parenteral analgesic consumption between SHD and CHD group (25% VS 30%). The reason of having less post operative pain in SHD was due to absence of anal wound in the sensitive skin because the stapled line was above the dentate line. There was also a difference in the quality of pain sensed by the patients after SHD or CHD. This tends to be sharp and tearing after CHD while it was usually accompanied by a mere vague or dull discomfort in SHD. The finding of less postoperative pain was also reported in nearly all randomized studies that compared SHD to conventional hemorrhoidectomy.[5-8,10-19,21-25] The reduction in pain and absence of perianal wound undoubtedly help in the more rapid recovery.

The present study shows that SHD causes less postoperative complications than CHD (40% VS 62.5%). Urinary retention and pain on defecation were statistically less significant in SHD group (39.7%

VS 55.7% and 1.1% VS 10.2% respectively). Other complications including bleeding, thrombosed or inflammed skin tag and infection were not significantly different in both groups. All 8 patients with thrombosed or inflammed skin tag after SHD had preoperative diagnosis of combined external and internal hemorrhoids. There were 3 cases (3.4%) of mild stenosis after SHD which were easily treated by finger dilatation in the out-patient department. No patient in either group showed incontinence of any degree in fluid or gases.

Some randomized studies reported less complications in SHD group[6,8] and some reported no difference in complication rates between SHD and CHD groups.[5,12,16,23-25] The reason that the SHD group had less urinary retention may be due to less post operative pain in this group. But our finding showed a rather high percentage of patients with urinary retention in both groups (39.7% VS 55.7%). While others reported an incidence of 0-22.2% of urinary retention after SHD[5-6,16,25,29-31] and 4-50% of urinary retention after CHD.[5-6,16,25] The precipitating factors of urinary retention in our study may be due to spinal anesthesia and male gender. All of the patients in this study underwent hemorrhoidectomy under spinal anesthesia. Unlike other reports that included patients under general anesthesia or local anesthesia. Urinary retention was found more in male than in female (a ratio of 3:2). Some elderly male may have associated obstructive uropathy. The finding of high urinary retention rate in our study suggested that SHD should not be performed under spinal anesthesia as day-case surgery.

After 10 months to 4 years of follow-up, there were no statistically significant differences in over all recurrent symptoms between SHD and CHD groups (3.4% VS 10.2%). This finding was similar to many previous randomized trials.[7,16,17,20,25] Considering specific type of recurrent symptoms, SHD group had less recurrent bleeding (1.1% VS 9.1%) while recurrent prolapse was not different (2.3% VS 1.1%).

There was no report of the presence of smooth muscle fibers in histopathological examination of the stapled doughnut in this study. The incidence of the finding of smooth muscle fibers in excised specimens varied in many reports from 0-100%.[7,18,25,32,33] This is an operator dependent factor. Some authors believed that inclusion of muscularis propria in the stapled doughnut may cause serious complication such as persistent pain,[34] severe pelvic and retroperitoneal sepsis.[35] But Ho et al[11] reported his finding of smooth muscle fibers in the excised specimen in every case (100%) without any serious complications. One patient in our series (1.1%) developed postoperative pain that persisted for up to 1 month after stapled hemorrhoidectomy. The cause of this phenomenon was unclear, smooth muscle fibers were not found in the excised tissue. The placement of the purse string suture too close to the dentate line and thrombosis of the residual external hemorrhoids may be the cause. This patient had large external hemorrhoidal component before surgery. This type of hemorrhoidal disease is not a good candidate for stapled technique. Our incidence of persistent pain is low (1.1%), unlike St. Mark's experience[35] which showed 31% of persistent pain that lasted for more than 15 months. Other serious complications of stapled hemorrhoidectomy that had been anecdotally reported and reviewed[36], including life-threatening pelvic sepsis[37-39], rectal perforation[40], rectovaginal fistula[38,41] and rectal obstruction[42], were not found in this study. The unusual nature of these isolated cases of sepsis does not support the routine use of antibiotic prophylaxis after stapled hemorrhoidectomy.

The main concern about this new technique is the additional expense, which is attributable to the cost of the staple device. However, this cost is off set by the shorter convalescent period required. This does not take into account the psychological and social advantages which, though not easily quantified, are clearly considerable.

Conclusions

Stapled hemorrhoidectomy is considered to be an alternative method in the management of hemorrhoids. It is an attractive option for the surgical treatment of hemorrhoidal disease. Our results confirm that this technique is simple (shorter operative time), safe (less postoperative pain and low complications) and effective (low recurrent symptoms). However, stapled hemorrhoidectomy is a new method and needs more documentation for longer follow-up outcome (5-10 years).

Two significant factors for good outcomes include the selection of patients and proper surgical techniques

The finding of rather high urinary retention rate suggests that stapled hemorrhoidectomy should not be performed as day-case surgery.

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