Stapled versus harmonic scalpel hemorrhoidectomy in management of third- and fourth-degree hemorrhoids

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Background
The ideal surgical technique for hemorrhoidectomy is still unknown, so new techniques like stapled hemorrhoidectomy (SH) and harmonic scalpel hemorrhoidectomy (HSH) are needed to be discussed. The current study's objective was to compare the results of HSH with SH.
Patients and methods
A prospective randomized clinical trial involving 28 patients with grades III–IV hemorrhoids. Patients were randomized into two groups: group I (SH method): 14 patients underwent hemorrhoidectomy. Group II (HSH method): 14 patients underwent hemorrhoidectomy.
Results
There was no statistically significant difference in the distribution of age between the groups (31.78 9.29 and 29.35 9.10) or the distribution of sex. There was little variation between the groups, and the majority were grade III patients. There is no statistical difference between the study groups in terms of comorbidities. Regarding surgery time or blood loss, there was no statistical difference between the groups. Additionally, extra-analgesia was strongly connected with HSH group and pain was much less among SH group. Hospital stay duration and recovery time were both statistically shorter in the SH group. The cost of surgery was much higher for HSH group.
Conclusion
Because it is associated with reduced postoperative discomfort and an earlier return to work, stapled hemorrhoidopexy offers better outcomes and patient satisfaction than HSH.

Keywords:
harmonic scalpel hemorrhoidectomy, hemorrhoids, stapled scalpel hemorrhoidectomy

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Introduction

Below the dentate line, external hemorrhoids can expand and produce pain in the anal region. Another important factor contributing to patients' acute discomfort is external hemorrhoid thrombosis [1]. Additionally, studies have also declared that digital rectal examination can neither confirm the diagnosis nor rule out hemorrhoids [2].

According to the Goligher classification, there are four further classes for hemorrhoids. When strained, grade I hemorrhoids prolapse behind the dentate line.

When strained, grade II prolapses through the anus and decreases spontaneously. Grade III is identical to grade II but requires manual reduction, and grade IV prolapses via the anus but cannot be reduced [3].

Physicians can then choose the appropriate course of treatment for their patients based on the kind and degree of piles. Hemorrhoids in grades I and II should receive medical attention [4].

According to the Goligher classification, surgical procedures are often advised for hemorrhoids in grades III and IV. These operations include rubber band ligation, stapled hemorrhoidectomy (SH), and hemorrhoidal artery ligation (HAL).

A helpful procedure for removing excessively enlarged hemorrhoidal tissue and relocating any residual hemorrhoidal tissue is called as SH [5].

This procedure is performed by inserting a circular, hollow tube into the anal canal. Different studies have declared that the usage of SH is associated with more beneficial results, postoperative less analgesic requirement, and fewer complications and also shorter times of hospitalization compared with other methods [6].

Harmonic scalpel is an instrument that uses ultrasonic sensations and readily incises and coagulates soft tissues [7]. Harmonic scalpel hemorrhoidectomy (HSH) seems to be rather less painful postoperatively than its other available treatment options [8].

Therefore, this study aimed to compare the degree of pain severity after both SH and HSH. Also, to identify the difference in response to analgesic, duration of hospital stay, and recovery time after both procedures.

Patients and methods

In total, 28 patients with grade III and grade IV hemorrhoidal illness who had been admitted to the General Surgery Department of the Faculty of Medicine at Zagazig University Hospitals between February 2022 and September 2022 were the subjects of this prospective comparative clinical investigation.

Sample size

Assuming the mean convalescing period was 9.77±2.99 versus 13.47±3.75 in intervention versus control group. At 80% power and 95% confidence interval, the estimated sample will be 28 cases, 14 cases in each group.

According to inclusion and exclusion criteria, patients would be chosen for inclusion in this research.

Inclusion criteria

All patients with diagnosis of grades III–IV hemorrhoids, aged from 18 to 60, both sexes included.

Exclusion criteria

Patients with either associated anorectal diseases such as fissures, fistulas in ano, proctitis, recurrent hemorrhoids, or thrombosed hemorrhoids. Patients with decompensated liver disease and uncontrolled diabetes mellitus. Patients with hemorrhoids in grades I–II. Patients who are over 60 or under 18. Patient opposition. According to the American Society of Anesthesiologists, these patients are unsuited for surgery.

Preoperative evaluation

All patients had a clinical examination and history collection. Routine lab tests, such as complete blood count, coagulation profile, liver, kidney, and virus marker functions. Exams using a proctoscope to identify any pathology-reduced residual diet the day before surgery. They would get 500 mg of Metronidazole IV and 1 g of third-generation cephalosporins (Cefotaxime) IV.

Patient groups

Patients were randomized into two groups:

(1) Group I (SH method): 14 paients underwent hemorrhoidectomy by A PPH03 Kit (Ethicon Endo-Surgery Inc., Cincinnati, Ohio, United States).
(2) Group II (HSH method): 14 patients underwent using the Ethicon Harmonic Scalpel 300 (Ethicon Endo-Surgery Inc.).

Operative technique

All procedures were carried out while the patient was in the lithotomy position and under general anesthesia. The same surgical team performed the surgery in each group according to a set protocol.

Group I: SH

Identification of the primary three hemorrhoidal masses at the 'traditional' positions (left lateral, right anterior, and right posterior) corresponding to the sites of inferior hemorrhoidal vessels. After reducing the hemorrhoids, the stapler device is deployed. The SH procedure began with the administration of a purse string suture 3–4 cm above the dentate line. Hemostasis is performed by securing bleeding spots with a figure-eight suture at the stapler line. A thin piece of gauze moistened with lignocaine jelly is used to softly pack the anal canal. T-bandage was used to cover the wound (Fig. 1).

Group II: HSH

Identification of the primary three hemorrhoidal masses at the 'traditional' positions (left lateral, right anterior, and right posterior) corresponding to the sites of inferior hemorrhoidal vessels. The surgical procedures followed the same protocol as the Miligan and Morgan hemorrhoidectomy. But we employ harmonic scalpel instead of monopolar cautery. The anal canal is softly packed with a piece of tiny gauze soaked in lignocaine gel. T-bandage was used to cover the wound (Fig. 2).

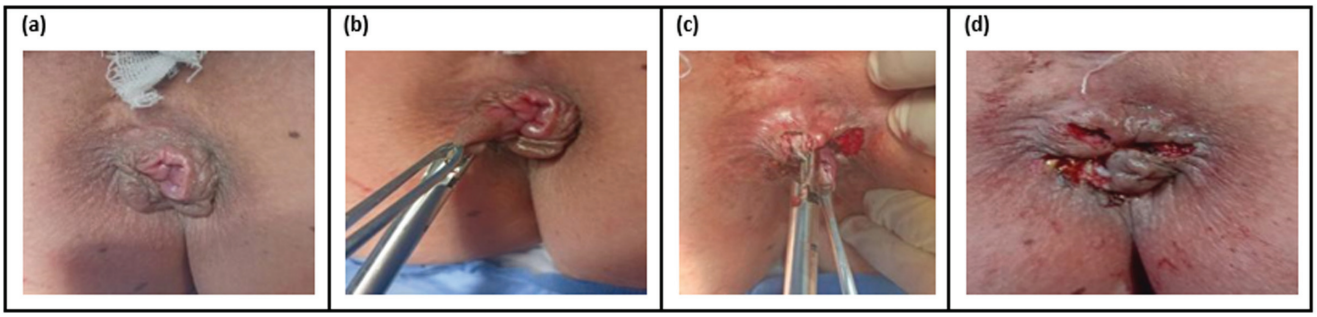
Postoperative care

Low residual diet for 5 days following surgery. Anal packing was removed on the first postoperative day following a warmwater sitz bath. For the first 24 h, the antibiotics were administered intravenously; after that, the oral antibiotics were started. Following surgery, all patients received oral diclofenac sodium 50 mg twice daily for 7 days after receiving 75 mg of diclofenac sodium intramuscularly twice daily for the first 24 h. For 7 days, all patients were given sitz baths twice daily and 10 ml of lactulose stool softener at bedtime.

Figure 1

Surgical technique of stapled hemorrhoidectomy. (a) Third-degree piles, (b) stapled is deployed and firing is done, and (c) bandage was inserted.

Figure 2



Harmonic scalpel hemorrhoidectomy. (a) Third-degree piles, (b and c) the pedicle of pile cauterized by harmonic scalpel, (d) after excision of hemorrhoidal tissue.

Follow-up

Postoperative pain was assessed using a visual analog scale (0–10), where 0–1 represents no pain, 1.1–3 represents low pain intensity, 3.1–7 represents medium-intensity pain, 7.1–9 represents high-intensity pain, and 9.1–10 represents strong at 1, 2, 4, and 6 weeks as well as after 6 months following the operation. Operative time, intraoperative blood loss, hospital stay, and return to daily activities were all taken into account while monitoring patients.

Ethical consideration

The academic and ethical committee of Zagazig University approved the project. All of the subjects' written informed permission was acquired. The Declaration of Helsinki, the World Medical Association's code of ethics for studies involving humans, guided the conduct of this work.

Statistical analysis

Using Microsoft Excel, data are evaluated. The Statistical Package for the Social Sciences (SPSS, Armonk, NY: IBM Corp) version 20.0 software was then used to import the data for analysis. The following tests were performed to determine if differences were significant based on the kind of data – qualitative data were represented as numbers and percentages, while quantitative data were group-represented by means and SD. χ^2-test comparison and associations of qualitative variables. *t*-Test comparisons between quantitative independent groups. *P* value was chosen at 0.001 for very significant findings and 0.05 for outcomes that were significant.

Results

Age was distributed as 31.78±9.29 and 29.35±9.10, respectively, with no significant difference between groups, also, there was no significant difference with regard to sex distribution (Table 1).

No significant difference between groups and the majority were grade III (Fig. 3).

No significant difference between studied groups regarding comorbidities (Fig. 4).

There was no significant difference between groups with regard to operation time or blood loss (Fig. 5).

Table 1 Age and sex distribution between studied groups

	HSH	SH	t/χ^2	*P*
Age	31.78±9.29	29.35±9.10	0.69 8	0.49 1
Sex				
Female				
N (%)	8 (57.1)	7 (50.0)		0.70
Male				
N (%)	6 (42.9)	7 (50.0)	0.14	
Total				
N (%)	14 (100.0)	14 (100.0)		

HSH, harmonic scalpel hemorrhoidectomy; SH, stapled hemorrhoidectomy.

Pain was significantly lower among SH group, also, additional analgesia was significantly associated with HSH group (Table 2).

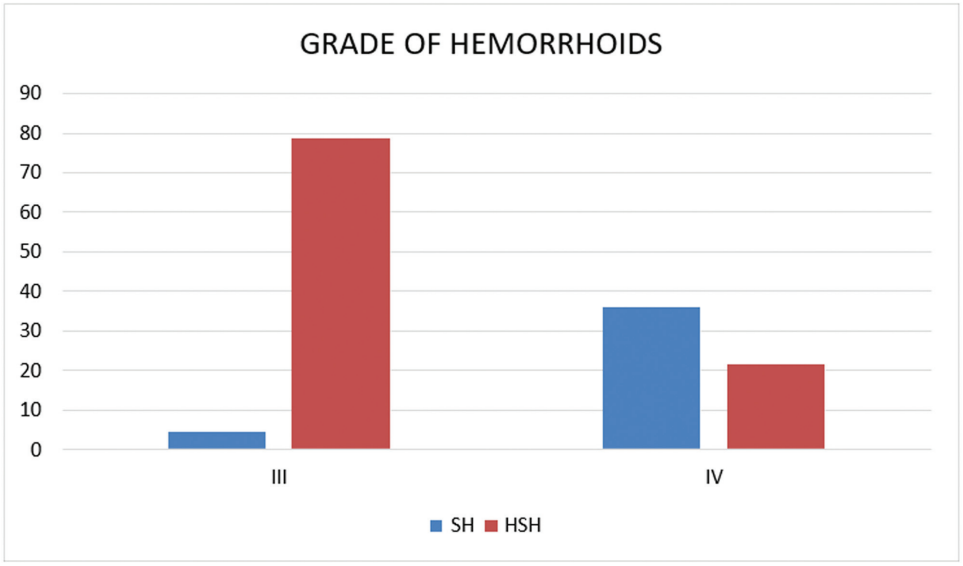
Time of hospital stay and recovery time were significantly shorter among SH group (Table 3).

Concerning surgical cost, HSH group was significantly more expensive (Fig. 6).

Discussion

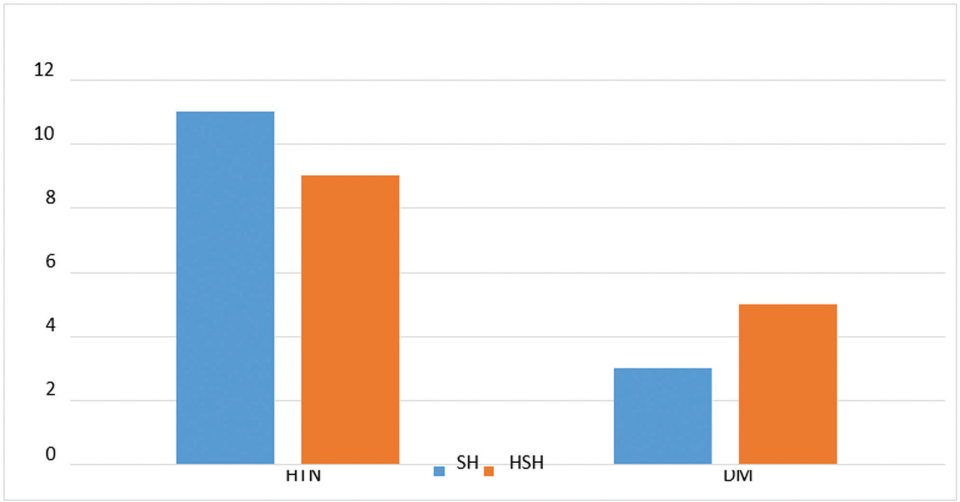
The excision of abnormally enlarged hemorrhoidal tissue and the realignment of the remaining hemorrhoidal tissue are both accomplished using the

Figure 3



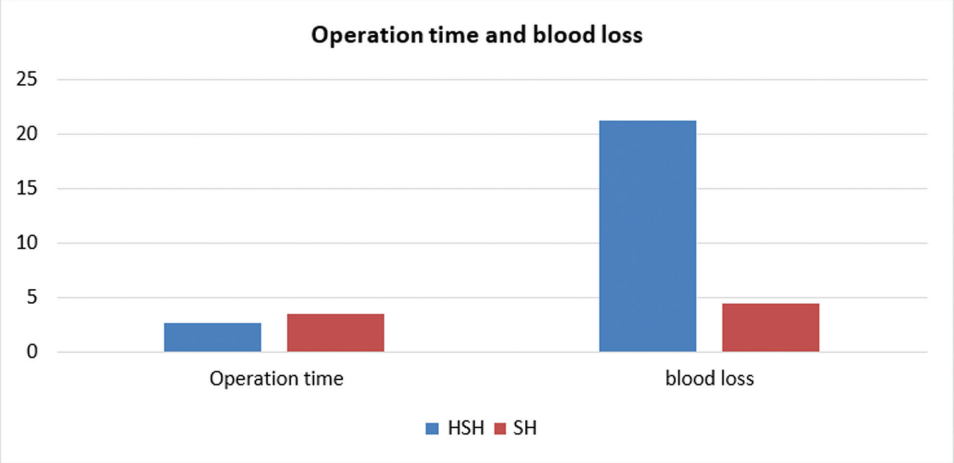
Graphic distribution of grades III and IV among studied patients.

Figure 4



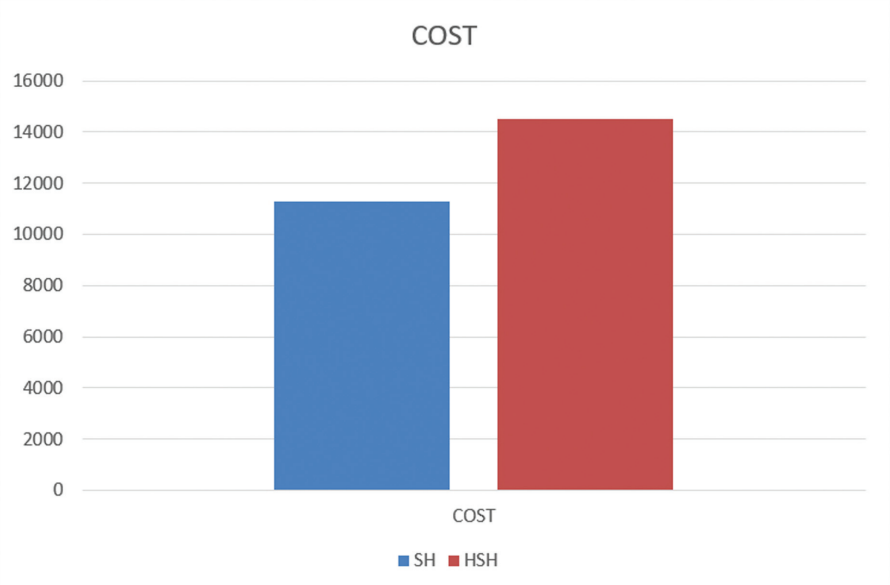
Graphic distribution of hypertension and diabetes mellitus among studied patients.

Figure 5



Graphic distribution of operation time and blood loss among studied patients.

Figure 6



Graphic distribution of cost among studied patients.

Table 2 VAS and need of analgesia distribution between studied groups

	HSH	SH	t/χ^2	*P*
VAS	2.25±0.65	1.62±0.51	2.171	0.038*
Additional analgesia				
Not				
N (%)	7 (50.0)	12 (85.7)		
Needed				
N (%)	7 (50.0)	2 (14.3)	4.09	0.04*
Total				
N (%)	14 (100.0)	14 (100.0)		

HSH, harmonic scalpel hemorrhoidectomy; SH, stapled hemorrhoidectomy; VAS, visual analog scale.

Table 3 Time of hospital stay (hours) and recovery time (days) distribution between studied group

	HSH	SH	*t*	*P*
Time of hospital stay/hour	36.14±12	25.71±6.41	2.754	0.017*
Recovery time/days	19.85±2.85	15.50±2.53	0.907	0.00**

HSH, harmonic scalpel hemorrhoidectomy; SH, stapled hemorrhoidectomy.

advantageous procedure known as SH. According to many lines of research, using SH is related with better outcomes, fewer problems, and shorter hospital stays as compared with alternative procedures [9].

Harmonic scalpel excision, a more contemporary technique for, is said to have superior intraoperative and postoperative outcomes. Under hypothermic

circumstances, it dissolves the hydrogen bond, promotes the formation of coagulum vessels, and decreases damage to the surrounding tissue. The ensuing mucosal defect is then either left open or closed, depending on the surgeon's decision [10].

Although several research have taken into account both the harmonic scalpel and the circular stapler, only one study has directly compared the two [11]. Therefore, the major goal of this study was to determine the most effective way to treat third- and fourth-degree piles using a circular stapler or a harmonic scalpel.

This study had 28 patients in total, with 13 males (46.4%) and 15 females (53.5%) participating at the General Surgery Department of Zagazig University Hospital. In the HSH group, the male-to-female ratio was 46 : 54, whereas in the SH group, it was 32:19. In the HSH group, there were 12 patients, of whom 11 (78.6%) had grade III illness and three (21.4%) had grade IV disease. In total, nine (64.3%) of the 14 individuals in the SH group had grade III illness, whereas five (35.7%) had grade IV disease. According to the current study, there is no statistical difference between SH and HSH in terms of comorbidities. From the 14 patients in the HSH group, 11 (78.6%) had hypertension and 3 (21.4%) had diabetes. In total, nine (64.3%) of the 14 patients in the SH group were hypertensive, and five (35.7%) were diabetic. The mean duration of follow-up was 6 months from February 2022 to August 2022. The current study showed mean operative times for the HSH and SH groups were 17.2 and 17.4 min, respectively. There was no significant difference between both groups. According to the visual analog scale score, there is a statistical significance between SH and HSH. In the HSH group, there were seven (50.0%) extra-analgesic dose-requiring patients, compared with two (14.3%) in the SH group. Between the two groups, there were substantial differences in the overall pain scores. In contrast to the SH group, a disproportionately higher number of patients in the HSH group had severe discomfort.

According to Bilgin and colleagues, overall pain scores were not substantially different across the groups, despite the fact that the harmonic group experienced much more severe pain than the stapler group did.

According to Sadeghi and colleagues, the pain stapler group had a considerable reduction.

Additionally, Khan *et al.* [12] confirm our findings that the stapler group experienced much reduced postoperative discomfort. Jalil *et al.* [14] reported the same outcome.

Al-Thoubaity, 2020 [13], however, noted that while pain was nonsignificantly reduced on the first postoperative day, it was greatly reduced on postoperative days 3, 7, and 14.

According to the results of the current investigation, there was no statistically significant difference in hospital stay duration and recovery time between the G.A. stapler group and the G.B. harmonic group. According to Bilgin and colleagues, there was no statistically significant difference between the hospital stays of 2.4 days for the harmonic group and 2.6 days for the stapler group, which is consistent with our findings.

However, Megahed [15] found that the harmonic scalpel group had a much lower mean hospital stay in days (1.040.2).

Otherwise, Jalil and colleagues found that there was a statistically significant difference in the length of hospital stay (in days) between the stapled group (1.96+0.82) days.

A shorter hospital stay is connected with stapled hemorrhoidopexy (2.52–0.76) with a statistically significant difference, according to Sadeghi and colleagues.

The current study shows that HSH was more costly than SH.

Additionally, according to Lester *et al.* [16], reprocessed harmonic scalpels that pass acceptance testing have functional and safety capabilities on par with those of brand-new equivalents. This study suggests that the HSH technique may end up being more affordable than SH since the harmonic scalpel can be reused, as opposed to circular staplers, which can only be used once. Furthermore, we think that more research on this subject is necessary.

However, the cost of the harmonic scalpel handpiece is about double that of the circular stapler from Longo. However, a shorter recovery period and lower recurrence rates should be used to gauge HSH's cost-effectiveness. Additionally, we followed Ethicon EndoSurgery's advice and only used one harmonic scalpel for each patient once.

Conclusion

The two methods are successful in treating primary hemorrhoids of the third and fourth degrees. However,

because it is associated with reduced postoperative discomfort and an earlier return to work, stapled hemorrhoidopexy has better outcomes and satisfaction than HSH.

All authors contributed equally in the study.

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Nil.

Conflicts of interest
There are no conflicts of interest.

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