

Stapled hemorrhoidopexy versus open hemorrhoidectomy: A comparative analysis of short-term clinical outcomes

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Abstract

Background: Hemorrhoidal disease remains a prevalent anorectal condition, with surgical management often necessary for advanced grades. This study compares the short-term clinical outcomes of stapled hemorrhoidopexy (SH) and open hemorrhoidectomy (OH) among Bangladeshi patients.

Methods: A total of 130 patients with Grade III and IV hemorrhoids were randomized equally into SH ($n = 65$) and OH ($n = 65$) groups. Baseline demographics, perioperative variables, post-operative pain (visual analog scale), complications, hospital stay, return to activity, and treatment cost were analyzed.

Results: Baseline characteristics were comparable between the groups (mean age: SH 41.08 ± 11.46 vs. OH 40.52 ± 10.75 years; $P = 0.777$). SH was associated with significantly lower post-operative pain (80% mild pain vs. 20% in OH; $P < 0.001$), reduced urinary retention (13.8% vs. 40.0%; $P = 0.001$), and shorter hospital stays (mean 2.89 vs. 7.12 days; $P < 0.001$). Patients undergoing SH returned to normal activities faster (mean 7.72 vs. 14.29 days; $P < 0.001$). However, SH incurred significantly higher treatment costs (Taka [Tk.] 18,876.92 vs. Tk. 6,690.77; $P < 0.001$).

Conclusion: SH demonstrates superior short-term outcomes compared to OH, although at a higher financial burden. These findings support the selective adoption of SH in clinical settings where cost is not a limiting factor.

Keywords: Hemorrhoidectomy, open hemorrhoidectomy, post-operative pain, recovery outcomes, stapled hemorrhoidopexy

Introduction

Hemorrhoidal disease is one of the most prevalent anorectal disorders worldwide, characterized by the symptomatic enlargement and distal displacement of the normal anal cushions. It affects a significant proportion of the adult population, with global prevalence rates ranging

from 4% to 35%, depending on age, geography, and diagnostic criteria.^[1] In South Asian countries such as Bangladesh, the burden is particularly pronounced due to widespread dietary practices low in fiber, chronic straining during defecation, sedentary habits, and limited awareness about early medical intervention.^[2] Hemorrhoids, in their normal physiological state, contribute to anal

continence through the maintenance of fine sealing and pressure regulation. However, pathological hemorrhoids arise from degenerative changes in the supportive connective tissue, dilation of the hemorrhoidal plexus, and weakening of the anchoring system, leading to prolapse, bleeding, and pain.^[3]

Clinical grading of hemorrhoids plays a critical role in treatment decisions. The Goligher classification remains the most widely used system, categorizing hemorrhoids from Grade I (no prolapse) to Grade IV (irreducible prolapse).^[4] Grades III and IV, often associated with significant discomfort and frequent prolapse, are typically managed with surgical interventions. While several alternative grading systems have been proposed, the Goligher classification continues to serve as a benchmark for surgical planning and clinical communication.^[5] Given its utility and global adoption, most comparative trials and meta-analyses of surgical techniques have continued to use this grading system to define their inclusion criteria.^[2]

Among surgical options, the Milligan–Morgan (M-M) open hemorrhoidectomy (OH), introduced in 1937, is still widely considered the gold standard for Grades III and IV hemorrhoids.^[6] This technique involves excision of the hemorrhoidal tissue with preservation of mucocutaneous bridges, offering definitive resolution of symptoms with low recurrence rates. However, the procedure is associated with significant drawbacks such as considerable post-operative pain, urinary retention, anal stenosis, prolonged recovery times, and potential for delayed complications.^[7] Despite these limitations, the M-M technique remains predominant, particularly in resource-limited settings, due to its cost-effectiveness, broad familiarity among general surgeons, and favorable long-term outcomes.^[8]

In contrast, stapled hemorrhoidopexy (SH), popularized by Longo in 1998, offers a paradigm shift in the surgical management of prolapsing hemorrhoids.^[9] Rather than excising the hemorrhoids

themselves, SH involves circumferential resection of a ring of rectal mucosa and submucosa above the dentate line using a circular stapling device. This maneuver effectively lifts and repositions the prolapsed hemorrhoids, reduces blood flow, and avoids incisions in the anoderm, leading to significantly less post-operative pain and faster recovery.^[10] SH is particularly appealing for its shorter hospital stays, quicker return to work, and improved early post-operative comfort compared to traditional excisional methods.^[11] Nevertheless, SH is not without criticism. Its higher cost, requirement for specialized instrumentation, a notable learning curve, and rare but serious complications such as pelvic sepsis and rectovaginal fistulas have tempered its universal acceptance.^[12]

A growing body of evidence, including randomized controlled trials (RCTs) and systematic reviews, has compared these two surgical techniques. Meta-analyses consistently report that SH is superior in terms of reduced post-operative pain, shorter duration of hospital stay, and more rapid return to daily activities.^[13] However, some of these studies also document higher recurrence rates and increased likelihood of requiring re-intervention in SH patients during long-term follow-up. Furthermore, while SH is gaining traction in many parts of the world, its integration into surgical practice remains uneven due to logistical, financial, and training-related challenges, particularly in low- and middle-income countries.

Despite these insights, there is a notable paucity of region-specific data from South Asia, including Bangladesh. The demographic, dietary, and economic differences from Western populations – where most large-scale comparative trials have been conducted – underscore the importance of generating localized evidence. In Bangladesh, factors such as delayed health-seeking behavior, limited access to surgical expertise in rural areas, and financial constraints significantly impact both surgical decision-making and post-operative outcomes. Therefore, it is essential to evaluate the real-world applicability and comparative effectiveness of SH versus M-M in the Bangladeshi

context, particularly when considering short-term clinical outcomes such as operative duration, post-operative pain, complications, hospital stay, and return to normal activity. This study seeks to bridge this evidence gap by directly comparing these two surgical modalities in a tertiary-care surgical setting in Bangladesh, thereby contributing to evidence-based surgical care tailored to the region's unique clinical and socioeconomic landscape.

Methods

This prospective, comparative, and observational study was conducted in the Department of Surgery at Khulna Medical College Hospital, Bangladesh, over a 12-month period from January 2022 to December 2022. A total of 60 patients diagnosed with Grade III or Grade IV hemorrhoids, as per Goligher's classification, were enrolled and allocated equally into two groups: Group A underwent SH, and Group B underwent M-M OH. Inclusion criteria consisted of adult patients aged 18–65 years with symptomatic third- or fourth degree internal hemorrhoids requiring surgical intervention, who provided informed written consent. Patients were excluded if they had recurrent hemorrhoids, associated anorectal conditions (e.g., fissures, fistulae, and abscess), a history of colorectal surgery, coagulopathy, or severe comorbid conditions contraindicating anesthesia. All patients underwent standard pre-operative assessments including complete blood count, blood sugar, serum creatinine, and routine coagulation profiles. Random allocation into each surgical group was performed using an alternate patient method on admission. Surgeries were conducted by experienced consultants under regional (spinal) anesthesia, using standard operative protocols for both procedures. In the SH group, a circular stapling device was used to excise a circumferential strip of mucosa above the dentate line, while in the M-M group, hemorrhoids were excised through open dissection with preservation of mucocutaneous bridges. Post-operative management included standardized pain control using paracetamol and/or diclofenac, sitz baths, and stool softeners. Patients were monitored for key

perioperative variables including operative time, intraoperative blood loss (estimated visually), post-operative pain (using visual analog scale [VAS]), analgesic requirement, urinary retention, wound infection, and hospital stay duration. Follow-up assessments were performed on post-operative days 1, 2, 7, and at 4 weeks post-surgery to evaluate complications, recovery, and return to daily activity. Data were compiled using Microsoft Excel and analyzed with the Statistical Package for the Social Sciences version 25.0. Continuous variables were expressed as mean $\pm$ standard deviation and compared using independent samples *t*-tests, while categorical variables were compared using Chi-square or Fisher's exact tests, where appropriate. $P < 0.05$ was considered statistically significant.

Results

The baseline demographic and clinical characteristics were comparable between the SH group and the OH group, with no statistically significant differences observed. The mean age of patients in the stapled group was 41.08 ± 11.46 years, while in the open group, it was 40.52 ± 10.75 years ($P = 0.777$). Age distribution across subgroups also did not differ significantly ($P = 0.234$). Males constituted 55.4% of the stapled group and 56.9% of the open group, while females accounted for 44.6% and 43.1%, respectively ($P = 1.000$). Regarding disease severity, 43.1% of patients in the stapled group and 44.6% in the open group had Grade III hemorrhoids, whereas Grade IV hemorrhoids were present in 56.9% and 55.4% of patients, respectively ($P = 0.860$). These findings indicate that the two groups were well-matched at baseline [Table 1].

Post-operative pain, as assessed by the VAS within the first 24 h, showed a statistically significant reduction in the SH group compared to the OH group ($P < 0.001$). In the stapled group, 80.0% of patients experienced mild pain (VAS 0–2), whereas only 20.0% of patients in the open group reported pain in the same range. Moderate pain (VAS 3–5) was observed in 20.0% of the stapled group and 40.0% of the open group. Notably, 33.8% of patients in the

Table 1: Baseline characteristics of patients in both study groups ($n=130$)

Variable	Stapled group ($n=65$) (%)	Open group ($n=65$) (%)	<i>P</i> -value
Age (years)			
21–30	13 (20.0)	10 (15.4)	0.234
31–40	24 (36.9)	27 (41.5)	
41–50	16 (24.6)	19 (29.2)	
51–60	10 (15.4)	6 (9.2)	
61–70	0 (0.0)	3 (4.6)	
71–80	2 (3.1)	0 (0.0)	
Mean $\pm$ SD	41.08 $\pm$ 11.46	40.52 $\pm$ 10.75	0.777
Gender			
Male	36 (55.4)	37 (56.9)	1.000
Female	29 (44.6)	28 (43.1)	
Grade of hemorrhoid			
Grade III	28 (43.1)	29 (44.6)	0.860
Grade IV	37 (56.9)	36 (55.4)	

SD: Standard deviation

Table 2: Post-operative pain score within 24 h by VAS ($n=130$)

VAS pain score	Stapled group ($n=65$) (%)	Open group ($n=65$) (%)	<i>P</i> -value
Mild (0–2)	52 (80.0)	13 (20.0)	<0.001
Moderate (3–5)	13 (20.0)	26 (40.0)	
Severe (6–8)	0 (0.0)	22 (33.8)	
Worst (9–10)	0 (0.0)	4 (6.2)	

VAS: Visual analog scale

open group experienced severe pain (VAS 6–8), and an additional 6.2% reported worst pain (VAS 9–10); none of the patients in the stapled group reported pain in these higher ranges. These results underscore the superior early post-operative pain profile associated with the stapled technique [Table 2].

Bleeding-related complications were generally more frequent in the OH group compared to the SH group. Intraoperative bleeding was absent in 87.7% of patients in the stapled group and 78.5% in the open group, though this difference was not statistically significant ($P = 0.149$). Mild bleeding occurred in 12.3% of stapled cases versus 16.9% in the open group. Moderate bleeding was observed

Table 3: Perioperative and post-operative bleeding complications ($n=130$)

Per-operative bleeding	Stapled group ($n=65$) (%)	Open group ($n=65$) (%)	<i>P</i> -value
No bleeding	57 (87.7)	51 (78.5)	0.149
Mild bleeding	8 (12.3)	11 (16.9)	
Moderate bleeding	0 (0.0)	3 (4.6)	
Reactionary hemorrhage	0 (0.0)	4 (6.2)	0.042
Secondary hemorrhage	1 (1.5)	2 (3.1)	0.559

Chi-square test used for all comparisons; significance at $P < 0.05$
Table 4: Post-operative urinary retention ($n=130$)

Urinary retention	Stapled group ($n=65$) (%)	Open group ($n=65$) (%)	<i>P</i> -value
Yes	9 (13.8)	26 (40.0)	0.001
No	56 (86.2)	39 (60.0)	

Table 5: Duration of hospital stay (days) ($n=130$)

Duration (days)	Stapled group ($n=65$) (%)	Open group ($n=65$) (%)	<i>P</i> -value
1–3	51 (78.5)	2 (3.1)	<0.001
4–7	13 (20.0)	35 (53.8)	
8–10	1 (1.5)	24 (36.9)	
11–15	0 (0.0)	3 (4.6)	
>15	0 (0.0)	1 (1.5)	<0.001
Mean $\pm$ SD	2.89 $\pm$ 1.71	7.12 $\pm$ 2.58	

SD: Standard deviation

Table 6: Time to return to normal activities (Days) ($n=130$)

Return to activity	Stapled group ($n=65$) (%)	Open group ($n=65$) (%)	<i>P</i> -value
≤ 7 Days	30 (46.2)	1 (1.5)	<0.001
8–14 Days	33 (50.8)	36 (55.4)	
>14 Days	2 (3.1)	28 (43.1)	
Mean $\pm$ SD	7.72 $\pm$ 3.34	14.29 $\pm$ 3.57	<0.001

SD: Standard deviation

only in the open group (4.6%). Importantly, reactionary hemorrhage occurred exclusively in the open group (6.2%) and was statistically significant ($P = 0.042$). Secondary hemorrhage occurred in

Table 7: Total treatment cost by procedure (in Bangladeshi Tk.) ($n=130$)

Cost category (Tk.)	Stapled group ($n=65$) (%)	Open group ($n=65$) (%)	<i>P</i> -value
<10,000	0 (0.0)	64 (98.5)	<0.001
10,000–20,000	50 (76.9)	1 (1.5)	
20,000–30,000	12 (18.5)	0 (0.0)	
>30,000	3 (4.6)	0 (0.0)	
Mean $\pm$ SD	18,876.92 $\pm$ 4,415.90	6,690.77 $\pm$ 1,852.00	<0.001

SD: Standard deviation, Tk.: Taka

1.5% of stapled patients and 3.1% of open group patients, without significant difference ($P=0.559$). Overall, the stapled procedure was associated with fewer bleeding-related complications, particularly in the immediate post-operative period [Table 3].

The incidence of post-operative urinary retention was significantly higher in the OH group compared to the SH group ($P=0.001$). While only 13.8% of patients in the stapled group developed urinary retention, 40.0% of those in the open group experienced this complication [Table 4].

Patients undergoing SH had significantly shorter hospital stays than those who underwent OH ($P<0.001$). The majority (78.5%) of patients in the stapled group were discharged within 1–3 days, compared to just 3.1% in the open group. Conversely, prolonged hospitalizations (>7 days) were observed almost exclusively in the open group, with 36.9% staying 8–10 days and 6.1% requiring more than 10 days. The mean duration of hospital stay was 2.89 ± 1.71 days in the stapled group, versus 7.12 ± 2.58 days in the open group—a statistically significant difference that emphasizes the faster recovery trajectory following stapled surgery [Table 5].

The time required for patients to return to normal daily activities was substantially shorter in the SH group ($P<0.001$). Nearly half of the patients in the stapled group (46.2%) resumed routine activities within 7 days, and 50.8% did so within 8–14 days. In contrast, only 1.5% of patients in the open group returned to normal function within the first week, and 43.1% required more than 14 days. The mean time to resume normal activities was significantly lower in the stapled group (7.72 ± 3.34 days)

compared to the open group (14.29 ± 3.57 days), further supporting the clinical advantages of SH in terms of convalescence [Table 6].

The overall treatment cost was markedly higher in the SH group than in the OH group ($P<0.001$). While nearly all patients (98.5%) in the open group incurred expenses under 10,000 Bangladeshi Taka (Tk.), none of the stapled group patients fell into this category. Instead, the majority of stapled patients (76.9%) incurred costs between Tk. 10,000–20,000, with 18.5% falling between Tk. 20,000–30,000, and 4.6% exceeding Tk. 30,000. The mean cost for SH was Tk. 18,876.92 $\pm$ 4,415.90, significantly higher than Tk. 6,690.77 $\pm$ 1,852.00 for OH [Table 7].

Discussion

The present study compared short-term clinical outcomes between SH and OH in patients with advanced (Grade III and IV) hemorrhoids within a Bangladeshi tertiary care context. Our results contribute to the growing body of evidence assessing these surgical modalities, especially within underrepresented South Asian populations.

Demographic comparability was well-established in this study, as both groups were matched in terms of age (mean age 41.08 ± 11.46 in SH vs. 40.52 ± 10.75 in OH; $P=0.777$), gender (55.4% males in SH vs. 56.9% in OH; $P=1.000$), and hemorrhoid grade distribution (Grade III: 43.1% in SH vs. 44.6% in OH; Grade IV: 56.9% in SH vs. 55.4% in OH; $P=0.860$). These findings are consistent with multiple published trials and systematic reviews that used similar inclusion criteria to control for potential baseline confounders.^[14,15]

One of the most striking observations in our study was the significant reduction in post-operative pain within 24 h following SH. While 80% of SH patients experienced only mild pain (VAS 0–2), 60% of OH patients experienced moderate-to-severe pain, with 6.2% experiencing the worst intensity ($P < 0.001$). This corroborates findings from meta-analyses and RCTs which have consistently shown lower post-operative pain scores in SH due to the absence of perianal wounds and nerve endings near the dentate line.^[14,16]

Perioperative bleeding was not significantly different between the groups (no bleeding in 87.7% SH vs. 78.5% OH; $P = 0.149$), although reactionary hemorrhage was notably more frequent in OH (6.2% vs. 0%, $P = 0.042$). Secondary hemorrhage incidence did not differ significantly. These findings are partially supported by Jin *et al.*, who noted no major difference in intraoperative bleeding but identified increased bleeding complications postoperatively in OH patients across several trials.^[15]

Another key finding was the lower rate of post-operative urinary retention in the SH group (13.8% vs. 40.0% in OH; $P = 0.001$). This aligns with data reported in several systematic reviews, including those by Quan *et al.* and Emile *et al.*, which emphasize that SH is associated with reduced manipulation and post-operative edema, leading to lower urinary retention rates.^[17,18]

The SH group also demonstrated significantly shorter hospital stays, with 78.5% of patients discharged within 1–3 days compared to only 3.1% in the OH group (mean stay: 2.89 ± 1.71 vs. 7.12 ± 2.58 days; $P < 0.001$). This finding is in agreement with the consensus report by Gallo *et al.* and studies like that of Nasution *et al.*, which attribute this to decreased post-operative discomfort and reduced need for intensive pain management in SH.^[14,19]

Furthermore, the time to return to normal activity was significantly quicker in the SH group (mean 7.72 ± 3.34 days vs. 14.29 ± 3.57 days; $P < 0.001$). Nearly half of SH patients resumed

normal activity within 7 days, compared to only 1.5% in the OH group. These functional benefits, such as early ambulation and return to work, have been a major driver of SH's popularity in Western and increasingly, Asian contexts.^[15,19]

On the contrary, the economic cost of SH was significantly higher than OH (mean Tk. 18,876.92 vs. Tk. 6,690.77; $P < 0.001$), driven by the cost of stapling devices and consumables. While clinical advantages are evident, this financial barrier remains a central consideration in low-resource settings like Bangladesh. Gallo *et al.* and Nasution *et al.* similarly emphasized this trade-off, noting that although SH reduces hospitalization and post-operative care costs, its initial procedure cost remains substantially higher.^[14,19]

Collectively, our findings reinforce the global consensus that SH offers clear short-term clinical advantages in terms of pain control, recovery speed, and post-operative morbidity, although cost remains a limiting factor in its widespread adoption in resource-limited healthcare systems. Moreover, the present study contributes valuable localized data from South Asia – an area historically underrepresented in hemorrhoidal surgery research – highlighting the need for context-specific clinical guidelines and economic evaluations.

Limitations of the study

The study was conducted in a single hospital with a small sample size. Hence, the results may not represent the whole community.

Conclusion

The present comparative study between SH and OH demonstrated that SH offers superior short-term clinical outcomes, including significantly reduced post-operative pain, lower incidence of urinary retention, shorter hospital stays, and quicker return to normal activities. These advantages, however, come at a higher economic cost, which may limit widespread accessibility in low-resource settings like Bangladesh. Both groups were

comparable in terms of age, gender, and disease grade, strengthening the validity of the outcome differences. While SH presents a more patient-friendly recovery profile, cost-effectiveness and surgeon expertise remain important considerations in determining the optimal surgical approach. Further multicentric and long-term studies are warranted to evaluate recurrence rates, quality of life outcomes, and long-term cost-benefit dynamics, especially within the South Asian population.

Funding

No funding sources.

Conflicts of Interest

None declared.

Ethical Approval

The study was approved by the Institutional Ethics Committee.

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