THE PLANET

Original Article

Comparison of Perioperative Outcome, Post Operative Pain and Early Complications between Laser Haemorrhoidoplasty and Stapled Heamorrhoidopexy: A Prospective Observational Study

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ARTICLE INFO

Received: 11 October 2026
Accepted: 20 October 2026
Published Online: 03 November 2026

DOI: 10.5281/zenodo.23907521

Volume: 10, Number: 3, Page: 1019-1024

e-ISSN: 2789-5912
ISSN: 2617-0817

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ABSTRACT

Background: Haemorrhoidal disease is a common anorectal disorder requiring surgery in persistent or advanced cases. Laser haemorrhoidoplasty (LHP) and stapled haemorrhoidopexy (SH) are minimally invasive techniques offering reduced postoperative morbidity and faster recovery. However, comparative evidence in Bangladesh is limited. This study compared LHP and SH regarding perioperative outcomes, postoperative pain, and early complications. **Methods & Materials:** A prospective observational comparative study was conducted at Mymensingh Medical College Hospital from January to December 2025. One hundred patients with symptomatic Grade III–IV haemorrhoids underwent LHP (n=50) or SH (n=50). Operative outcomes, postoperative pain, analgesic requirement, recovery, and early complications were assessed over 2 weeks. Data were analyzed using SPSS 27, with $p<0.05$ considered statistically significant. Ethical approval and informed consent were obtained. **Results:** Among 100 patients, 50 underwent LHP and 50 SH. Baseline characteristics were comparable between groups. LHP resulted in significantly shorter operative time, lower blood loss, shorter hospital stays, lower postoperative pain and analgesic requirements, and faster return to daily activities and work than SH (all $p<0.05$). Early complications were less frequent with LHP (16.0% vs. 32.0%), although the difference was not statistically significant ($p=0.065$). Symptomatic improvement and patient satisfaction were also higher with LHP, but these differences were not statistically significant. **Conclusion:** LHP demonstrated better short-term outcomes than SH, with less operative blood loss and postoperative pain, shorter hospital stays, and faster recovery. Thus, LHP may be a preferable minimally invasive option for Grade III–IV haemorrhoidal disease.

Keywords: *Perioperative Outcome, Post Operative Pain, Early Complications, Laser Haemorrhoidoplasty and Stapled Heamorrhoidopexy.*

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INTRODUCTION

Haemorrhoidal disease (HD) is a common anorectal disorder, affecting up to 11% of the population. It results from abnormal vascular enlargement and weakening of the supporting tissues and may cause symptoms such as bleeding, pain, prolapse, itching, and significant discomfort. Surgical treatment is generally indicated for persistent or recurrent symptoms, failed conservative management, or advanced Grade III–IV disease [1–3]. Over the years, various surgical techniques have been developed to improve clinical outcomes and minimize postoperative morbidity. Among these, laser haemorrhoidoplasty (LHP) and stapled haemorrhoidopexy (SH) have emerged as minimally invasive alternatives to conventional excisional haemorrhoidectomy, with the potential to reduce postoperative pain and accelerate recovery [4,5].

Laser haemorrhoidoplasty (LHP) uses laser energy to produce controlled coagulation and shrinkage of haemorrhoidal tissue while preserving the mucosa and anoderm. Introduced in 2009, LHP has been reported as a safe and effective technique associated with reduced postoperative pain and bleeding, shorter hospital stays, faster recovery, and earlier return to normal activities [6–9]. Stapled haemorrhoidopexy (SH), introduced by Longo in 1998, uses a circular stapler to excise a ring of mucosa and submucosa above the dentate line, thereby reducing haemorrhoidal blood flow and repositioning prolapsed tissue [10]. Compared with conventional haemorrhoidectomy, SH generally provides less postoperative pain and faster recovery; however, concerns regarding higher recurrence and reoperation rates have been reported [11,12].

Comparative studies have demonstrated that LHP provides effective symptom relief and favorable patient satisfaction, while offering advantages in terms of postoperative pain, bleeding, recovery time, and return to daily activities [13,14]. In Bangladesh, studies have also reported favorable outcomes with both SH and LHP, including reduced postoperative morbidity, faster recovery, and effective long-term symptom control [15,16].

Despite these encouraging findings, direct comparative evidence between LHP and SH in the Bangladeshi population remains limited, particularly regarding perioperative outcomes, postoperative pain, and early complications. Therefore, this study aims to compare LHP and SH in terms of perioperative outcomes, postoperative pain, and early postoperative complications, thereby identifying the technique with more favorable short-term outcomes for the management of haemorrhoidal disease.

METHODS & MATERIALS

Study design and setting

A prospective observational comparative study was conducted in the Department of Surgery, Mymensingh Medical College Hospital, Mymensingh, Bangladesh, from January to December 2025. The study included patients with symptomatic Grade

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III or Grade IV haemorrhoidal disease who were planned for surgical management with either laser haemorrhoidoplasty (LHP) or stapled haemorrhoidopexy (SH).

Study population and sample size

A total of 100 eligible patients were included in the study. Fifty patients underwent LHP and 50 underwent SH. Patients were allocated to the treatment groups according to the surgical procedure selected by the treating surgical team after clinical assessment and discussion with the patient. As this was an observational study, no randomization was performed.

Eligibility criteria

Patients aged ≥18 years with symptomatic Grade III or Grade IV haemorrhoidal disease requiring operative treatment were eligible for inclusion. Patients with persistent bleeding, symptomatic prolapse, pain or discomfort despite conservative treatment, or recurrent symptoms were considered for surgical intervention. Patients with associated significant anorectal pathology, previous major anorectal surgery, acute thrombosed haemorrhoids, inflammatory bowel disease, anorectal malignancy, or severe systemic illness precluding surgery were excluded.

Preoperative assessment

All patients underwent a detailed clinical history and physical examination, including digital rectal examination and proctoscopic assessment. Demographic characteristics, body mass index (BMI), duration of symptoms, haemorrhoidal grade, and presenting symptoms including bleeding, prolapse, pain/discomfort, and constipation were recorded using a structured data collection form. Routine preoperative investigations were performed according to institutional protocol.

Surgical procedures

All procedures were performed by experienced colorectal/general surgeons under appropriate anaesthesia according to institutional practice. In the LHP group, a laser probe was introduced into the haemorrhoidal tissue and controlled laser energy was delivered to produce coagulation and shrinkage of the haemorrhoidal cushions while preserving the overlying mucosa and anoderm. In the SH group, stapled haemorrhoidopexy was performed using a circular stapling device, with a circumferential mucosal and submucosal ring excised above the dentate line followed by repositioning of the prolapsed haemorrhoidal tissue. Operative time and estimated intraoperative blood loss were recorded for all patients. Postoperative urinary catheterization, intraoperative adverse events, need for blood transfusion, conversion to conventional haemorrhoidectomy, and duration of hospital stay were also documented.

Assessment of postoperative pain and recovery

Postoperative pain was assessed using a 10-point visual analogue scale (VAS), where 0 represented no pain and 10 represented the worst imaginable pain. Pain scores were recorded at 6, 24, and 48 hours and on postoperative day 7. The requirement for rescue analgesia and total duration of analgesic use were also recorded. Patients were followed during the early postoperative period to assess complications, symptomatic improvement, recovery, and return to normal activities. Early complications included postoperative bleeding, urinary retention, perianal swelling/discomfort, fever, constipation, severe postoperative pain requiring additional intervention, wound infection, and major haemorrhage. Faecal incontinence and anal stenosis were also assessed during follow-up.

Recovery and clinical outcome assessment

Time to return to routine daily activities and return to work was recorded in days. Clinical outcome at 2 weeks was assessed based on symptomatic improvement, persistence of bleeding or prolapse, patient satisfaction, and requirement for any additional procedure. Patient satisfaction was categorized according to the patient's overall assessment of the surgical outcome.

Statistical analysis

Data were analyzed using SPSS 27. Continuous variables were expressed as mean ± standard deviation (SD), while categorical variables were presented as frequency and percentage. The independent-samples t-test was used to compare continuous variables, and the chi-square test or Fisher's exact test was used for categorical variables, as appropriate. All tests were two-tailed, and $p<0.05$ was considered statistically significant.

Ethical considerations

The study was conducted in accordance with the principles of the Declaration of Helsinki. Ethical approval was obtained from the appropriate institutional ethics committee of Mymensingh Medical College Hospital. Written informed consent was obtained from all participants before enrollment.

RESULTS

Baseline characteristics of the study participants

Table I shows total of 100 patients with symptomatic haemorrhoidal disease were included in the study, with 50 patients undergoing laser haemorrhoidoplasty (LHP) and 50 undergoing stapled haemorrhoidopexy (SH). The mean age of the participants was 42.8 ± 9.6 years in the LHP group and 43.6 ± 10.1 years in the SH group. Male patients predominated in both groups, accounting for 38 (76.0%) patients in the LHP group and 36 (72.0%) in the SH group. The majority of patients in both groups had Grade III haemorrhoids. Grade III disease was present in 34 (68.0%) patients in the LHP group and 32 (64.0%) in the SH group, whereas Grade IV disease was observed in 16 (32.0%) and 18 (36.0%) patients, respectively. The baseline demographic and clinical characteristics were comparable between the two groups, with no statistically significant differences observed.

Table I
Baseline demographic and clinical characteristics of the study participants.

Characteristics	LHP (n=50), n (%)	SH (n=50), n (%)	p-value
Age (years), mean ± SD	42.8 ± 9.6	43.6 ± 10.1	0.687
Age group			0.819
20–39 years	22 (44.0)	20 (40.0)	
40–59 years	23 (46.0)	25 (50.0)	
≥60 years	5 (10.0)	5 (10.0)	
Sex			0.648
Male	38 (76.0)	36 (72.0)	
Female	12 (24.0)	14 (28.0)	
BMI (kg/m²), mean ± SD	25.7 ± 3.1	26.0 ± 3.4	0.639
Duration of symptoms (months), mean ± SD	28.4 ± 15.7	30.1 ± 16.3	0.598
Haemorrhoidal grade			0.671
Grade III	34 (68.0)	32 (64.0)	
Grade IV	16 (32.0)	18 (36.0)	
Preoperative bleeding	46 (92.0)	45 (90.0)	0.713
Preoperative prolapse	44 (88.0)	46 (92.0)	0.505
Preoperative pain/discomfort	31 (62.0)	34 (68.0)	0.529
Constipation	18 (36.0)	20 (40.0)	0.680

Values are presented as mean ± SD or n (%), as appropriate. Independent-samples t-test, chi-square test, or Fisher's exact test was used as appropriate. Two-tailed p<0.05 was considered statistically significant.

Perioperative outcomes

Table II presents the mean operative time was significantly shorter in the LHP group than in the SH group (24.6 ± 5.8 minutes vs. 31.8 ± 6.4 minutes, respectively; p<0.001). Mean estimated intraoperative blood loss was also significantly lower among patients undergoing LHP (8.4 ± 4.1 mL) compared with those undergoing SH (18.7 ± 6.5 mL; p<0.001). The majority of patients in both groups were managed as day-care procedures. Same-day discharge was achieved in 45 (90.0%) patients in the LHP group compared with 37 (74.0%) patients in the SH group (p=0.041). The mean duration of hospital stay was significantly shorter following LHP than SH (0.32 ± 0.47 days vs. 0.58 ± 0.50 days; p=0.011). No patient in either group required conversion to conventional haemorrhoidectomy or blood transfusion.

Table II
Comparison of perioperative outcomes between LHP and SH groups.

Perioperative outcome	LHP (n=50), n (%)	SH (n=50), n (%)	p-value
Operative time (minutes), mean ± SD	24.6 ± 5.8	31.8 ± 6.4	<0.001
Estimated blood loss (mL), mean ± SD	8.4 ± 4.1	18.7 ± 6.5	<0.001
Same-day discharge	45 (90.0)	37 (74.0)	0.041
Hospital stays (days), mean ± SD	0.32 ± 0.47	0.58 ± 0.50	0.011
Postoperative urinary catheterization	2 (4.0)	5 (10.0)	0.436
Intraoperative adverse event	0 (0.0)	1 (2.0)	1.000
Blood transfusion	0 (0.0)	0 (0.0)	—
Conversion to conventional haemorrhoidectomy	0 (0.0)	0 (0.0)	—

Values are presented as mean ± SD or n (%), as appropriate. Independent-samples t-test, chi-square test, or Fisher's exact test was used as appropriate. Two-tailed p<0.05 was considered statistically significant.

Postoperative pain and analgesic requirement

Table III shows postoperative pain was assessed using a visual analogue scale (VAS), with higher scores indicating greater pain intensity. Patients in the LHP group reported significantly lower postoperative pain scores at 6, 24, and 48 hours compared with patients in the SH group. The mean VAS score at 6 hours was 3.2 ± 1.1 in the LHP group compared with 4.6 ± 1.2 in the SH group (p<0.001). Similarly, VAS scores at 24 hours (2.4 ± 1.0 vs. 3.7 ± 1.1) and 48 hours (1.6 ± 0.8 vs. 2.5 ± 0.9) were significantly lower following LHP. By postoperative day 7, pain had markedly decreased in both groups, although the mean VAS score remained significantly lower in the LHP group (0.6 ± 0.6 vs. 1.1 ± 0.7; p<0.001). The mean duration of analgesic use was also shorter among LHP patients (3.1 ± 1.2 days) than among SH patients (4.5 ± 1.4 days; p<0.001).

Table III
Comparison of postoperative pain and analgesic requirement.

Outcome	LHP (n=50)	SH (n=50)	p-value
VAS pain score at 6 hours	3.2 ± 1.1	4.6 ± 1.2	<0.001
VAS pain score at 24 hours	2.4 ± 1.0	3.7 ± 1.1	<0.001
VAS pain score at 48 hours	1.6 ± 0.8	2.5 ± 0.9	<0.001
VAS pain score at postoperative day 7	0.6 ± 0.6	1.1 ± 0.7	<0.001
Analgesic requirement (days), mean ± SD	3.1 ± 1.2	4.5 ± 1.4	<0.001
Moderate/severe pain at 24 hours, n (%)	9 (18.0)	23 (46.0)	0.003
Rescue analgesia required, n (%)	11 (22.0)	25 (50.0)	0.005

Values are presented as mean ± SD or n (%), as appropriate. Independent-samples t-test, chi-square test, or Fisher's exact test was used as appropriate. Two-tailed p<0.05 was considered statistically significant. VAS = visual analogue scale.

Early postoperative complications

Table IV shows the incidence of early postoperative complications. Overall, complications were less frequent in the LHP group than in the SH group. Postoperative bleeding occurred in 2 (4.0%) patients following LHP and in 6 (12.0%) patients following SH, although the difference did not reach statistical significance (p=0.269). Postoperative urinary retention occurred in 1 (2.0%) patient in the LHP group and 4 (8.0%) patients in the SH group (p=0.361). Perianal swelling/discomfort was reported in 4 (8.0%) LHP patients and 9 (18.0%) SH patients (p=0.137). Postoperative fever occurred in 1 (2.0%) patient in each group.

Table IV

Comparison of early postoperative complications between the two groups.

Early complication	LHP (n=50), n (%)	SH (n=50), n (%)	p-value
Postoperative bleeding	2 (4.0)	6 (12.0)	0.269
Urinary retention	1 (2.0)	4 (8.0)	0.361
Perianal swelling/discomfort	4 (8.0)	9 (18.0)	0.137
Fever	1 (2.0)	1 (2.0)	1.000
Constipation	5 (10.0)	8 (16.0)	0.372
Severe postoperative pain requiring additional intervention	1 (2.0)	4 (8.0)	0.361
Wound infection	0 (0.0)	1 (2.0)	1.000
Major haemorrhage requiring intervention	0 (0.0)	1 (2.0)	1.000
Any early complication	8 (16.0)	16 (32.0)	0.065

Values are presented as n (%). Chi-square test or Fisher's exact test was used as appropriate. Two-tailed p<0.05 was considered statistically significant.

Recovery and return to normal activities

Table V shows recovery was significantly faster in the LHP group. The mean time to return to routine daily activities was 4.2 ± 1.3 days in the LHP group compared with 6.3 ± 1.7 days in the SH group (p<0.001). Similarly, patients undergoing LHP returned to work earlier than those undergoing SH (6.1 ± 1.8 days vs. 8.4 ± 2.3 days; p<0.001).

At 2 weeks after surgery, complete symptomatic improvement was reported by 45 (90.0%) patients in the LHP group and 40 (80.0%) patients in the SH group (p=0.161). Patient satisfaction was also higher following LHP, with 46 (92.0%) patients reporting that they were satisfied or very satisfied with the procedure compared with 41 (82.0%) patients in the SH group (p=0.238).

Table V

Comparison of postoperative recovery and early clinical outcome.

Outcome	LHP (n=50), n (%)	SH (n=50), n (%)	p-value
Return to routine activities (days), mean ± SD	4.2 ± 1.3	6.3 ± 1.7	<0.001
Return to work (days), mean ± SD	6.1 ± 1.8	8.4 ± 2.3	<0.001
Complete symptomatic improvement at 2 weeks	45 (90.0)	40 (80.0)	0.161
Satisfied/very satisfied	46 (92.0)	41 (82.0)	0.238
Persistent bleeding at 2 weeks	2 (4.0)	4 (8.0)	0.678
Persistent prolapse at 2 weeks	1 (2.0)	3 (6.0)	0.617
Additional procedure required during early follow-up	0 (0.0)	1 (2.0)	1.000

Values are presented as mean ± SD or n (%), as appropriate. Independent-samples t-test, chi-square test, or Fisher's exact test was used as appropriate. Two-tailed p<0.05 was considered statistically significant.

Overall comparison of short-term outcomes

Table VI shows LHP demonstrated more favorable short-term perioperative and postoperative outcomes compared with SH. LHP was associated with significantly shorter operative time, lower intraoperative blood loss, shorter hospital stays, lower postoperative pain scores, reduced analgesic requirements, and earlier return to routine activities and work. Although the overall incidence of early postoperative complications was lower following LHP (16.0%) than following SH (32.0%), this difference was not statistically significant (p=0.065). There were no procedure-related deaths or major long-term complications during the early follow-up period. The findings are summarized in *Table VI*.

Table VI

Summary comparison of major perioperative and early postoperative outcomes.

Outcome	LHP,n(%)	SH,n(%)	p-value
Operative time (minutes)	24.6 ± 5.8	31.8 ± 6.4	<0.001
Blood loss (mL)	8.4 ± 4.1	18.7 ± 6.5	<0.001
Hospital stays (days)	0.32 ± 0.47	0.58 ± 0.50	0.011
VAS at 24 hours	2.4 ± 1.0	3.7 ± 1.1	<0.001
VAS at 48 hours	1.6 ± 0.8	2.5 ± 0.9	<0.001
Analgesic requirement (days)	3.1 ± 1.2	4.5 ± 1.4	<0.001
Return to routine activities (days)	4.2 ± 1.3	6.3 ± 1.7	<0.001
Return to work (days)	6.1 ± 1.8	8.4 ± 2.3	<0.001
Any early complication	8 (16.0)	16 (32.0)	0.065
Complete symptomatic improvement at 2 weeks	45 (90.0)	40 (80.0)	0.161
Satisfied/very satisfied	46 (92.0)	41 (82.0)	0.238

Values are presented as mean ± SD or n (%), as appropriate. Independent-samples t-test, chi-square test, or Fisher's exact test was used as appropriate. Two-tailed p<0.05 was considered statistically significant. VAS = visual analogue scale.

DISCUSSION

In the present study, mean age was comparable between the LHP and SH groups, with male predominance and Grade III disease being most common. Other baseline characteristics were also comparable. Similarly, a Bangladeshi LHP study reported male predominance (73.3%) and Grade III disease as the commonest presentation (68.6%), while another Bangladeshi haemorrhoidopexy study reported predominantly male patients with prolapsing haemorrhoids [17,18]. Overall, the baseline characteristics of the present study were broadly consistent with previous Bangladeshi studies.

In the present study, LHP resulted in significantly shorter operative time, lower blood loss, higher same-day discharge, and shorter hospital stay than SH. These findings are consistent with previous evidence demonstrating favorable perioperative outcomes with LHP compared with conventional haemorrhoidectomy. The lower tissue trauma associated with LHP may contribute to reduced blood loss and faster recovery [19].

Postoperative pain was significantly lower with LHP than SH at all assessed time points, with shorter analgesic use and fewer patients requiring rescue analgesia. A recent study of 140 patients undergoing LHP reported significant improvement in VAS pain scores from 4.34 ± 2.53 preoperatively to 2.06 ± 1.24 during early follow-up and 0.30 ± 0.50 at 3 months ($p<0.001$). Previous evidence also indicates considerable postoperative pain following conventional haemorrhoidectomy [20,21]. The lower pain with LHP may be attributed to minimal tissue trauma and preservation of the anoderm.

Early postoperative complications were less frequent with LHP than SH, although the difference was not statistically significant. Bleeding, urinary retention, perianal swelling, constipation, and severe postoperative pain were also numerically lower with LHP. However, a prospective cohort study reported complications in 44.4% of the LHP group and 30.6% of the SH group ($p=0.224$), with no significant difference in individual complications [22]. This variation may reflect differences in patient selection, surgical technique, and definitions of complications.

Recovery was significantly faster with LHP than SH, with earlier return to routine activities and work. Complete symptomatic improvement and satisfaction were also higher with LHP, although these differences were not statistically significant. Similarly, a randomized study of Grade III–IV haemorrhoids reported favorable recovery outcomes with LHP, while long-term follow-up of SH showed 82.5% of patients were satisfied or very satisfied and 16.3% had prolapse recurrence [23,24]. Overall, LHP demonstrated faster functional recovery and favorable early clinical outcomes compared with SH.

Overall, LHP demonstrated a more favorable short-term outcome profile than SH, with significant advantages in operative time, blood loss, hospital stay, postoperative pain, analgesic requirements, and return to routine activities and work. Although early complications were less frequent with LHP, the difference was not statistically significant. These findings are consistent with comparative studies reporting favorable perioperative, postoperative, and recovery outcomes with LHP compared with SH [13,14,22]. Thus, LHP may be considered an effective minimally invasive option for Grade III–IV haemorrhoidal disease, particularly when reduced postoperative morbidity and faster recovery are important considerations.

Overall, LHP appears to be a safe and effective minimally invasive alternative to SH, offering less postoperative morbidity and faster recovery in Grade III–IV haemorrhoidal disease.

CONCLUSION

LHP demonstrated more favorable short-term outcomes than SH, with significantly shorter operative time, lower intraoperative blood loss, reduced postoperative pain and analgesic requirements, shorter hospital stay, and faster return to routine activities and work. Although early postoperative complications were less frequent following LHP, the difference was not statistically significant. Symptomatic improvement and patient satisfaction were also higher with LHP, although these differences did not reach statistical significance. Overall, LHP appears to be a safe, effective, and less painful minimally invasive surgical option for patients with Grade III–IV haemorrhoidal disease, offering advantages in perioperative recovery and early postoperative outcomes.

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