

Functional Outcomes and Quality of Life Following Laser Hemorrhoid Surgery in Advanced Hemorrhoidal Disease.

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Abstract

Background: Laser hemorrhoid surgery has become a minimally invasive treatment option for severe hemorrhoidal disease that could offer better recovery and quality of life after surgery. **Objective:** To evaluate the functional outcomes and quality of life following laser hemorrhoid surgery in patients with advanced hemorrhoidal disease. **Methods:** This is a prospective observational cohort study that was carried out in the Department of General Surgery, MTI, GOMAL Medical College, D.I.Khan, between 1st November, 2024 and 31st March, 2025. Eighty patients who were diagnosed with Grade III or IV hemorrhoids were consecutively selected and entered into the study for laser hemorrhoid surgery. Demographic and clinical parameters were obtained. Functional outcomes, postoperative complications, pain measured by VAS, continence, and quality of life assessed by the SF-36 questionnaire were measured pre- and post-operatively. IBM SPSS version 26.0 was used for data analysis, and a p-value ≤ 0.05 was deemed statistically significant. **Results:** The average age of the participants was 44.8 ± 10.7 years, and 60.0% of the subjects were men. Post-operative pain was significantly reduced, and significant improvements were seen in SF-36 physical, mental, and overall scores of quality of life ($p < 0.001$). The mean operative time was 28.6 ± 6.9 min, the mean hospital stay was 1.2 ± 0.5 days, and patients resumed normal activities within 6.8 ± 2.1 days. Postoperative complications or recurrence were rare, and 92.5% of patients described themselves as satisfied with treatment. Independent predictors of lack of improvement in quality of life after surgery were grade IV hemorrhoids and postoperative pain. **Conclusion:** Laser hemorrhoid surgery allows for excellent functional recovery and an improvement in quality of life, with minimal morbidity after surgery, making it an effective treatment for advanced hemorrhoidal disease.

Keywords: Advanced hemorrhoidal disease; Laser hemorrhoidoplasty; Functional outcomes; Quality of life.



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INTRODUCTION

Hemorrhoidal disease is considered one of the most common benign anorectal conditions, as between 4-5% of people in the general population are affected, and a much greater lifetime prevalence in adults.[1] Hemorrhoidal disease is due to the progressive damage to the connective tissue that supports the normal anal cushions, distal displacement of these cushions, and chronic straining, which causes increased venous pressure.[2] Some common risk factors are constipation, sitting for too much time, obesity, pregnancy, increased age, and lack of dietary fiber.[3] Patients usually report bleeding rectum, prolapse, pain, pruritus, mucus discharge, as well as loss of control and incontinence, which can have a major impact on their quality of life and social life.[4] Surgical management of haemorrhoids is indicated at the end of the spectrum (Grade III & IV), and optimisation of surgical results is an important clinical concern.[5]

The surgery of a 'Milligan–Morgan hemorrhoidectomy' or a 'Ferguson hemorrhoidectomy' is still the most effective option for treating severe hemorrhoids due to their low recurrence rates.[6] These interventions, however, are often accompanied by significant pain after the surgery, a longer recovery period, retention of urine, bleeding, and narrowing of the anus.[7] This has encouraged the evolution of minimally invasive methods designed to lessen the postoperative morbidity but maintain as much as possible the normal anorectal anatomy.[8] Of these, laser hemorrhoidoplasty has become a promising alternative, using diode laser energy to coagulate hemorrhoidal tissue, causing fibrosis and preventing prolapse while causing little damage to surrounding tissues.[9] Recent reports indicate that laser surgery is linked with less pain after surgery, a shorter hospital stay, quicker return to normal activities, and reasonable recurrence rates when compared with traditional hemorrhoidectomy, but there is limited long-term data available.[10, 11]

In addition to resolving symptoms, functional outcomes and quality of life are now better known as critical success factors in hemorrhoid surgery.[12] The ability to maintain a normal bowel routine and continence and patient satisfaction is of special importance as postoperative complications can have a negative impact on the physical, emotional, and social health of the patient.[13] Hemorrhoidal disease is a major cause for outpatient surgery visits worldwide and is one of the more frequent uses of anorectal surgery.[14]

Although laser hemorrhoid surgery is gaining popularity, there is limited and inconsistent evidence of the effects on long-term functional outcomes and health-related quality of life, especially in patients with advanced hemorrhoidal disease, particularly in low- and middle-income countries. Most studies conducted to date have centered on perioperative factors (operative time, postoperative pain, and complications); few studies have evaluated patient-centered functional recovery and quality-of-life outcomes comprehensively. These findings warrant further investigation to better understand them and guide clinical decisions. The present study aimed to assess the functional and quality of life outcomes after laser hemorrhoid surgery in patients with advanced (Grade III and IV) hemorrhoidal disease and to determine the efficacy of this minimally invasive procedure in promoting improved postoperative recovery and overall patient well-being.

METHODOLOGY

This is a prospective observational cohort study to assess the functional outcome and quality of life after laser hemorrhoid surgery in patients with complex hemorrhoidal disease. The study was conducted in the Department of General Surgery, MTI, GOMAL Medical College, D.I.Khan, between 1st November, 2024 and 31st March, 2025.

The sample size was determined using the sample size calculator program called OpenEpi version 3.01 for estimating a proportion. The calculation was based on the results of a previous prospective study performed by Faes et al., who found that 90% of the patients with Grade III and IV hemorrhoids improved their quality of life and symptom relief after laser hemorrhoidoplasty.[15] Using an anticipated frequency (p) of 90%, a 95% confidence level, and an absolute precision of 7%, the minimum required sample size was calculated to be 71 patients. It was decided to increase the number of patients to 80 to make up for possible loss to follow-up and incomplete data.

Non-probability consecutive sampling technique was used. All patients aged 18 years or older with clinically diagnosed Grade III and IV hemorrhoidal disease who had planned for laser hemorrhoidoplasty and agreed to participate in the study after signing informed consent were enrolled. Patients had to be able to attend for postoperative follow-up and completion of quality of life questionnaires. Patients with grade I or II hemorrhoids, thrombosed external hemorrhoids requiring emergency surgery, anal fissure, anal fistula, anorectal malignancy, inflammatory bowel disease, previous anorectal surgery, pregnancy, coagulation disorders, severe systemic illness precluding surgery, or incomplete follow-up data were excluded from the study.

After obtaining approval from the Institutional Ethical Review Committee, eligible patients were enrolled after written informed consent had been obtained. Demographic and clinical data were collected on a structured proforma, which included age, gender, body mass index, duration of symptoms, grade of hemorrhoids, complaints made, and associated comorbidities. All patients were treated with laser hemorrhoidoplasty by an experienced consultant surgeon using a standard surgical technique.

Validated assessment tools were used to evaluate functional outcomes and quality of life preoperatively and at follow-up after surgery. Recorded postoperative parameters were operative time, postoperative pain measured on the 'Visual Analogue Scale' (VAS), analgesic requirement, hospital stay, return to normal daily activity, postoperative complications, recurrence, continence, and patient satisfaction.[16] The Short Form-36 (SF-36) was used to assess the quality of life before surgery and at the last follow-up.[17] Data collection was performed in a predesigned data collection form, maintaining the confidentiality of patients throughout the study.

The information obtained was entered and analyzed in IBM SPSS Statistics (Version 26.0). Data for quantitative variables were presented as mean $\pm$ SD or median (IQR) as appropriate based on data distribution: age, BMI, operative time, hospital stay, pain score, time to return to normal activity, quality-of-life scores. Qualitative data such as gender, grade of haemorrhoids, presenting symptoms, complications after surgery, haemorrhoid recurrence, continence status, and patient satisfaction were reported as frequencies and percentages.

The normality of continuous data was determined by the Shapiro–Wilk test. Pairwise comparisons of functional and quality of life scores before and after surgery were used for normally distributed variables (paired t-test) and for non-normally distributed variables (Wilcoxon signed-rank test). Chi-square test and Fisher's exact test were used to compare categorical variables when appropriate. Multivariable linear regression analysis was used to assess factors associated with improved postoperative QOL. A p-value ≤ 0.05 was considered statistically significant.

RESULTS

A total of 80 patients with advanced hemorrhoidal disease underwent laser hemorrhoid surgery during the study period. The study subjects were mainly middle-aged adults, and there was a slight male predominance. The majority of patients (Grade III) and about one-third (Grade IV) presented with Grade III and IV disease, respectively. Most of the presenting complaints were rectal bleeding and prolapse, while the commonest associated risk factor was constipation. The major comorbidities found for the participants were diabetes mellitus and hypertension. (Table 1)

Table 1. Baseline demographic and clinical characteristics of the study participants (n=80)

Variable	Value
Age (years), Mean $\pm$ SD	44.8 $\pm$ 10.7
BMI (kg/m ²), Mean $\pm$ SD	27.4 $\pm$ 3.8
Male, n (%)	48 (60.0)
Female, n (%)	32 (40.0)
Duration of symptoms (months), Median (IQR)	18 (12–30)
Grade III hemorrhoids, n (%)	52 (65.0)
Grade IV hemorrhoids, n (%)	28 (35.0)
Constipation, n (%)	46 (57.5)
Rectal bleeding, n (%)	72 (90.0)
Prolapse, n (%)	64 (80.0)
Pain during defecation, n (%)	38 (47.5)
Pruritus ani, n (%)	34 (42.5)
Diabetes mellitus, n (%)	14 (17.5)
Hypertension, n (%)	18 (22.5)

Perioperative outcomes revealed that laser hemorrhoid surgery was accompanied by a short surgical time and a short hospital stay after surgery. Analgesics were only needed for a few days, and patients were able to return to their normal daily routine by the first week after surgery. Postoperative complications occurred rarely and included bleeding, urinary retention, infection, transient postoperative fecal incontinence, and recurrence. Most patients reported that they were very satisfied with the postoperative results. (Table 2)

Table 2. Perioperative and postoperative outcomes (n=80)

Variable	n(%) / Mean $\pm$ SD
Operative time (minutes)	28.6 $\pm$ 6.9
Hospital stay (days)	1.2 $\pm$ 0.5
Analgesic requirement (days)	3.1 $\pm$ 1.2
Return to normal activities (days)	6.8 $\pm$ 2.1
Postoperative bleeding	4 (5.0)
Urinary retention	3 (3.8)
Infection	2 (2.5)
Transient fecal incontinence	1 (1.3)
Recurrence during follow-up	3 (3.8)
Patient satisfaction (Satisfied/Very satisfied)	74 (92.5)

There was a significant improvement in functional outcomes after laser hemorrhoid surgery compared to pre-op. Post-operative pain scores were significantly reduced, and continence scores improved significantly. Likewise, post-surgery scores of the SF-36 physical, mental, and overall scores of health-related quality of life were significantly higher, reflecting strong recovery and improvement in functional status and health-related quality of life. (Table 3)

Table 3. Comparison of preoperative and postoperative functional outcomes (Paired t-test/Wilcoxon signed-rank test)

Variable	Preoperative	Postoperative	p-value
VAS pain score (Mean $\pm$ SD)	7.5 $\pm$ 1.2	1.8 $\pm$ 0.9	<0.001
Continence score (Median, IQR)	19 (18–20)	20 (20–20)	0.018
SF-36 Physical Component Score (Mean $\pm$ SD)	48.6 $\pm$ 9.2	79.4 $\pm$ 8.5	<0.001
SF-36 Mental Component Score (Mean $\pm$ SD)	52.3 $\pm$ 10.1	81.7 $\pm$ 7.8	<0.001
Overall SF-36 Score (Mean $\pm$ SD)	50.4 $\pm$ 8.9	80.6 $\pm$ 7.5	<0.001

The results showed no significant relationship between the occurrence of postoperative complications, hemorrhoid grade, or patients' satisfaction, but some patients with Grade III disease had more favorable results than patients with Grade IV disease. (Table 4)

Table 4. Association between hemorrhoid grade and postoperative complications

Variable	Grade III (n=52)	Grade IV (n=28)	χ^2	p-value
Any postoperative complication	4 (7.7)	6 (21.4)	3.17	0.075
Recurrence	1 (1.9)	2 (7.1)	1.38	0.240
Patient satisfied	50 (96.2)	24 (85.7)	2.82	0.093

The factors associated with improvement in postoperative QOL were also assessed, and graded III hemorrhoids had significant improvement when compared to patients with Graded IV disease. The improvement in QOL did not significantly correlate with age, gender, BMI, diabetes mellitus, or hypertension. (Table 5)

Table 5. Association of demographic and clinical variables with improvement in quality of life

Variable	Improved QoL n (%)	χ^2 /Fisher's Exact	p-value
Age ≤ 45 years	38 (95.0)	0.94	0.332
Male gender	45 (93.8)	0.28	0.594
BMI < 30 kg/m ²	51 (94.4)	1.46	0.227
Grade III hemorrhoids	50 (96.2)	4.26	0.039*
Diabetes mellitus	11 (78.6)	Fisher's Exact	0.118
Hypertension	15 (83.3)	Fisher's Exact	0.211
*Statistically significant.			

Multivariable linear regression analysis revealed that higher scores for the postoperative pain score and hemorrhoidal disease grade IV were independently associated with less improvement in the scores of postoperative quality of life. Conversely, age, sex, BMI, and operative time were not independently associated with the outcomes of the postoperative quality of life. (Table 6)

Table 6. Multivariable linear regression analysis for predictors of postoperative improvement in overall SF-36 quality-of-life score

Variable	β Coefficient	Standard Error	t-value	p-value	95% CI
Age	-0.08	0.05	-1.54	0.128	-0.18 to 0.02
Male gender	1.14	1.48	0.77	0.444	-1.81 to 4.09
BMI	-0.27	0.19	-1.42	0.159	-0.64 to 0.10
Grade IV hemorrhoids	-4.36	1.71	-2.55	0.013*	-7.77 to -0.95
Operative time	-0.12	0.08	-1.46	0.148	-0.29 to 0.04
Postoperative pain score	-2.58	0.61	-4.23	$< 0.001^*$	-3.80 to -1.36
*Statistically significant.					

DISCUSSION

This study confirmed that the laser hemorrhoid surgery resulted in favorable functional outcomes, low postoperative morbidity, and significant improvement of the health-related quality of life in patients with advanced hemorrhoidal disease. Patients reported low postoperative pain, short hospital stays, quick return to normal daily activity, and a high satisfaction rate, and the risk of recurrence and complications was low. The results of this study are consistent with the increasing body of evidence that laser hemorrhoidoplasty is a safe and effective minimally invasive procedure for the treatment of advanced hemorrhoids.[18, 19]

The mean operative time in the present study was 28.6 ± 6.9 minutes, and the mean hospital stay was 1.2 ± 0.5 days. The results are similar to the prospective study by Bhanarkar et al. (2025), which found that laser hemorrhoidoplasty had significantly less operative time and hospital stay than stapled hemorrhoidopexy, allowing for earlier discharge and recovery.[20] Likewise, the randomized study showed that the duration of the operation and hospital stay were significantly shorter in the laser hemorrhoidoplasty group than in the conventional hemorrhoidectomy group.[21]

In our patients, a significant improvement in postoperative pain was observed after laser surgery, with a median VAS score of 7.5 preoperatively and 1.8 postoperatively. Similar results were reported in the prospective non-randomized trial that compared the three surgical methods and found that laser surgery had significantly less postoperative pain and sped up

recovery as compared with diathermy surgery in 2024. The same trend was observed in the 2024 meta-analysis that compared diode laser hemorrhoidoplasty to traditional hemorrhoidectomy, which showed significantly fewer pain scores and fewer analgesics required after laser surgery.[22, 23]

An important finding of the present study was the significant improvement in functional recovery and quality of life after surgery. The SF-36 questionnaire showed significant improvement in both the physical and mental aspects after laser hemorrhoid surgery. These health-related QOL benefits were also demonstrated by the latest prospective study (2025), which showed that laser hemorrhoidoplasty led to a notable improvement in the scores related to quality of life and also resulted in a fast functional recovery. Similarly, the 2024 prospective comparative trial showed greater improvement in patients' hemorrhoidal symptom scores and Short Health Scale quality of life scores post laser therapy when compared with traditional techniques.[18, 22]

In the present study, the number of postoperative complications was small, and only occasional complications of bleeding, urinary retention, infection, transient fecal incontinence, and recurrence were observed. These results corroborate the results of the systematic review and meta-analysis published in 2022, which showed lower risks of urinary retention, anal stenosis, bleeding after surgery, and shorter hospital stay in laser hemorrhoidoplasty when compared to the conventional Milligan-Morgan hemorrhoidectomy. The 2024 meta-analysis also found that significantly less bleeding and anal stenosis occurred postoperatively following laser surgery, with no significant differences in recurrence or complications related to continence.[23, 24]

In addition, Wee et al. (2023) conducted a systematic review and meta-analysis of the studies available, which concluded that laser hemorrhoidoplasty significantly reduced the time required for surgery, pain after surgery, consumption of analgesics, and return to work, when compared to the conventional method of hemorrhoidectomy, with acceptable rates of recurrence.[19] These results are similar to the fast functional recovery and good postoperative results reported in the present study.

Lastly, Lakmal et al. (2021) showed that laser hemorrhoidoplasty had less postoperative pain, bleeding, and hospital stays and did not lead to recurrence when compared to open hemorrhoidectomy.[25] The results of these studies, in addition to the results of the present research, all suggest that laser hemorrhoid surgery is an effective method for the treatment of advanced hemorrhoidal disease that achieves excellent functional recovery, provides a significant improvement in quality of life, has minimal postoperative morbidity, and high patient satisfaction.

There were limitations in this study. First, it was undertaken at a single tertiary care center with a relatively small sample size, the findings of which may not be representative. Second, the follow-up was short, and there was no adequate assessment of long-term outcomes, including recurrence and long-term improvement of quality of life. Thirdly, there was no comparison group of patients undergoing standard hemorrhoidectomy, making it impossible to directly compare the effectiveness of laser hemorrhoid surgery. Last but not least, subjective perception might have affected patient-reported outcomes, such as pain and quality of life, even with validated assessment tools.

CONCLUSION

Laser hemorrhoid surgery was shown to be a safe and effective minimally invasive procedure for those who had severe hemorrhoidal disease. It was linked to better functional outcome and health-related quality of life, less postoperative pain, early return to normal activities, fewer complications and fewer recurrences, and high patient satisfaction. Patients with Grade III hemorrhoids demonstrated greater improvement following surgery, and higher postoperative pain scores were independent risk factors for comparatively lower quality-of-life improvement, while higher Grade IV disease was an independent risk factor for comparatively lower improvement. More comprehensive, multi-institutional studies with longer follow-up are suggested to confirm these results and evaluate long-term results.

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