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Original Article

Laser Hemorrhoidoplasty versus Open Hemorrhoidectomy in Grade II–III Hemorrhoids: A Prospective Comparative Study

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Abstract

Background: Open hemorrhoidectomy is effective for Grade II and III hemorrhoids but is associated with significant post-operative morbidity. Laser hemorrhoidoplasty (LHP) has been introduced as a minimally invasive alternative.

Materials and Methods: This prospective randomized controlled study included 120 patients with Grade II–III hemorrhoids. Patients were randomized into two groups of 60 each using a computer-generated random number table, with allocation concealment ensured by sealed opaque envelopes: Open hemorrhoidectomy using the Milligan–Morgan technique (Group A, $n = 60$) and LHP (Group B, $n = 60$). Operative time, intraoperative blood loss, post-operative pain using Visual Analog Scale (0–10), duration of hospital stay, time to return to routine activities, post-operative complications, and recurrence at 6 months were evaluated. Continuous variables were analyzed using the independent t-test, and categorical variables were analyzed using the Chi-square test. A $P < 0.05$ was considered statistically significant.

Results: LHP demonstrated significantly shorter operative time (15.9 ± 1.9 vs. 27.2 ± 6.5 min; $P < 0.0001$) and lower blood loss (10 ± 3 vs. 40 ± 5 mL; $P < 0.0001$). Hospital stay (1.1 ± 0.3 vs. 3.5 ± 0.5 days; $P < 0.001$) and time to return to routine activities (8.1 ± 1.1 vs. 15.7 ± 2.9 days; $P < 0.001$) were significantly reduced in the laser group. Recurrence was observed within 6 months in two patients (3.3%) following open hemorrhoidectomy, while no recurrence occurred in the laser group.

Conclusion: LHP demonstrated superior short-term perioperative outcomes with reduced morbidity and faster recovery, supporting its use as an effective alternative to open hemorrhoidectomy.

Key words: Hemorrhoids, Laser hemorrhoidoplasty, Open hemorrhoidectomy, Post-operative pain

INTRODUCTION

Hemorrhoidal disease is a common anorectal condition characterized by symptomatic enlargement and distal displacement of the anal cushions, which are essential for maintaining fine continence. The global pooled prevalence of hemorrhoids has been reported to be approximately 25%, highlighting its substantial disease burden.[1] Milligan–Morgan open hemorrhoidectomy remains the conventional surgical treatment for symptomatic Grade II and III hemorrhoids; however, it is associated with significant post-operative pain, prolonged hospital stay, and delayed return to normal activities.[2,3]

Advances in minimally invasive techniques, including laser hemorrhoidoplasty (LHP), have been introduced to reduce post-operative morbidity. LHP induces controlled coagulation and shrinkage of hemorrhoidal tissue while preserving the anoderm, thereby minimizing tissue trauma and post-operative discomfort.[4]

However, comparative prospective data evaluating LHP against open hemorrhoidectomy in the Indian population remain limited.

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This study aimed to compare perioperative outcomes, post-operative recovery, complications, and short-term recurrence between LHP and conventional open hemorrhoidectomy in patients with Grade II and III hemorrhoids.

MATERIALS AND METHODS

This prospective randomized controlled study was conducted at a tertiary care center where patients aged 17–70 years diagnosed with Grade II or III hemorrhoids were included after obtaining written informed consent. Patients with Grade IV hemorrhoids, previous hemorrhoidal surgery, thrombosed hemorrhoids, or associated anal pathology were excluded.

A total of 120 patients were randomized into two groups of 60 each using a computer-generated random number table, with allocation concealment ensured by sealed opaque envelopes. Group A underwent open hemorrhoidectomy using the Milligan–Morgan technique, while Group B underwent LHP using a 1470-nm diode laser under spinal anesthesia. All procedures were performed by the same surgeon.

Outcome measures included operative time, intraoperative blood loss, post-operative pain assessed using a Visual Analog Scale (VAS 0–10) ranging from 0 (no pain) to 10 (worst imaginable pain), duration of hospital stay, time to return to routine activities, post-operative complications, and recurrence at 6 months.

Continuous variables were expressed as mean ± standard deviation and compared using the independent *t*-test. Categorical variables were compared using the Chi-square test. A $P < 0.05$ was considered statistically significant. Statistical analysis was performed using Statistical Package for the Social Sciences version 26.

Ethical Approval

Ethical approval was obtained from the Institutional Ethics Committee of Gujarat Research and Medical Institute, Ahmedabad. Written informed consent was obtained from all participants before enrolment.

Informed Consent

Written informed consent was obtained from all participants.

RESULTS

A total of 120 patients with Grade II and III hemorrhoids were enrolled and randomized equally into two groups: Open Hemorrhoidectomy (Group A) and LHP (Group B). The demographic profile, including age, gender distribution, comorbidities, and clinical presentation, was comparable between the two groups with no statistically significant differences [Table 1].

LHP demonstrated a significantly shorter operative time (15.9 ± 1.9 min vs. 27.2 ± 6.5 min; $P < 0.0001$) and markedly reduced intraoperative blood loss (10 ± 3 mL vs. 40 ± 5 mL; $P < 0.0001$) compared to Open Hemorrhoidectomy. The duration of hospital stay was significantly shorter in the laser group (1.1 ± 0.3 days) than in the open surgery group (3.5 ± 0.5 days; $P < 0.001$). Patients undergoing LHP returned to routine daily activities earlier (8.1 ± 1.1 days vs. 15.7 ± 2.9 days; $P < 0.001$).

Post-operative pain, assessed using the VAS, was significantly lower in the laser group at all-time intervals. Mean VAS scores on post-operative day 1, day 7, and day 30 were consistently lower in Group B compared to Group A ($P < 0.05$). Accordingly, the duration of post-operative analgesic requirement was significantly reduced in the laser group (3 ± 1.0 days vs. 7 ± 1.5 days; $P < 0.001$) [Table 2].

Early post-operative complications such as pain, bleeding, urinary retention, edema, and infection were significantly more frequent in the open hemorrhoidectomy group ($P < 0.05$). Late complications, including anal stenosis and recurrence, were observed only in the open surgery group. At 6 months follow-up, recurrence was noted in 3.3% of patients in Group A, whereas no recurrence was observed in the LHP group [Table 3].

Table 1: Demographic and baseline characteristics of patients

Variable	Laser hemorrhoidoplasty (*n*=60)	Milligan–Morgan open hemorrhoidectomy (*n*=60)	*P*-value
Gender[a]–Male	44 (73.3%)	43 (71.7%)	0.851
Age (years)[b]	40.7±8.9	41.2±8.8	0.986
Presenting symptoms[a] (%)			
Pain	43 (71.7)	45 (75.0)	0.68
Bleeding	38 (63.3)	40 (66.7)	0.71
Prolapse	32 (53.3)	34 (56.7)	0.72
Itching	10 (16.7)	12 (20.0)	0.64
Mucous discharge	9 (15.0)	10 (16.7)	0.80

Values are expressed as mean±standard deviation or number (%). [a]Chi-square test applied. [b]Independent t-test applied. A *P*<0.05 was considered statistically significant

Table 2: Comparison of perioperative and post-operative outcomes between open hemorrhoidectomy and laser hemorrhoidoplasty

Parameter	Open hemorrhoidectomy (*n*=60)	Laser hemorrhoidoplasty (*n*=60)	*P*-value
Operative time (min)	27.2±6.5	15.9±1.9	<0.0001
Blood loss (mL)	40±5	10±3	<0.0001
Hospital stay (days)	3.5±0.5	1.1±0.3	<0.001
Return to activity (days)	15.7±2.9	8.1±1.1	<0.001
Recurrence	2 (3.3%)	0	—
Post-operative pain*	4.5±0.8	2.2±0.3	<0.001

Values expressed as mean±standard deviation or number (%). *P*<0.05 considered statistically significant. *Post-operative pain score represents mean overall post-operative pain

Table 3: Early and late post-operative complications in study groups

Complication	Timing	Open hemorrhoidectomy (*n*=60) (%)	Laser hemorrhoidoplasty (*n*=60) (%)	*P*-value
Pain	Early	17 (28.3)	6 (10.0)	<0.001
Bleeding	Early	15 (25.0)	3 (5.0)	<0.001
Urinary retention	Early	6 (10.0)	1 (1.7)	0.05
Edema	Early (1 week)	6 (10.0)	3 (5.0)	0.045
Infection	Early (1 week)	4 (6.7)	1 (1.7)	0.05
Anal stenosis	Late	4 (6.7)	0	<0.05
Recurrence	Late (6 months)	2 (3.3)	0	0.05

Values are expressed as number (%). Early complications were assessed within 7 post-operative days. Late complications were assessed up to 6 months. Chi-square test or Fisher's exact test was applied as appropriate. A *P*<0.05 was considered statistically significant

DISCUSSION

The management of symptomatic hemorrhoidal disease is primarily guided by symptom severity rather than anatomical grading alone, as the traditional Goligher classification does not consistently correlate with symptom burden or patient discomfort.[1] Conventional open hemorrhoidectomy remains a definitive surgical option for Grade II and III hemorrhoids; however, it is frequently associated with significant post-operative pain, prolonged hospital stay, and delayed return to normal activities.[2,3]

In the present prospective randomized study, LHP demonstrated significant advantages over open hemorrhoidectomy across multiple perioperative and post-operative parameters. Operative time was significantly shorter in the laser group, which can be attributed to the minimally invasive nature of the procedure and the absence of extensive tissue dissection. Similar reductions in operative duration have been reported in recent comparative studies and systematic analyses evaluating diode LHP.[4,5]

Intraoperative blood loss was markedly lower in patients undergoing LHP. The superior hemostatic properties of diode laser energy allow precise coagulation of the hemorrhoidal plexus with minimal vascular injury, resulting in reduced bleeding. This finding aligns with pooled evidence from recent systematic reviews comparing laser-based techniques with conventional excisional hemorrhoidectomy.[5]

Post-operative pain remains the most significant determinant of patient satisfaction following hemorrhoidal surgery. In this study, post-operative pain assessed using the VAS was significantly lower in the laser group at all evaluated time points, with a corresponding reduction in analgesic requirements. These findings are consistent with contemporary prospective studies and meta-analyses reporting reduced post-operative pain following LHP due to preservation of the anoderm and absence of open surgical wounds.[4-6]

Reduced post-operative pain translated into a significantly shorter hospital stay and faster return to routine daily activities in the laser group. Minimally invasive techniques such as LHP minimize tissue trauma and post-operative inflammation, thereby facilitating early mobilization and discharge. Similar benefits regarding hospitalization and recovery time have been reported in prior comparative studies.[4,7]

The favorable perioperative and post-operative outcomes observed with LHP can be explained by its distinct mechanism of action. Diode laser energy produces controlled photothermal coagulation of the hemorrhoidal plexus, leading to shrinkage and fibrosis of hemorrhoidal tissue while preserving the overlying mucosa and anoderm. This tissue-sparing effect eliminates the need for excision and suturing, thereby reducing operative time and minimizing intraoperative blood loss.[4,5]

Furthermore, the absence of open wounds and limited collateral thermal injury significantly reduces nociceptive

stimulation, which explains the consistently lower post-operative pain scores and reduced analgesic requirements observed in the laser group. Preservation of the anoderm also decreases post-operative edema, inflammation, and wound-related complications such as bleeding, infection, and anal stenosis.[6]

The use of a 1470-nm diode laser, characterized by high water absorption and limited penetration depth, allows precise energy delivery with minimal thermal spread to surrounding tissues. This results in effective hemorrhoidal tissue contraction with reduced post-operative inflammation, facilitating earlier mobilization, shorter hospital stay, and faster return to routine activities.[8,10]

Early post-operative complications, including bleeding, urinary retention, edema, and infection were significantly more frequent following open hemorrhoidectomy. These complications are commonly associated with excisional techniques due to exposed raw areas and heightened post-operative inflammatory response.[2] Late complications such as anal stenosis and recurrence were observed only in the open hemorrhoidectomy group, a recognized drawback of excisional procedures.[8]

No recurrence was observed in the laser group during the 6-month follow-up period. Although concerns regarding recurrence after laser procedures have been reported, available evidence supports comparable short-term efficacy of LHP for Grade II and III hemorrhoids when appropriate technique and energy settings are used.[8] Recent studies combining laser hemorrhoidoplasty with adjunctive techniques have also demonstrated favorable short-term outcomes in advanced hemorrhoidal disease.[9]

Limitations

The present study has certain limitations. It was conducted at a single Center with a relatively short follow-up period of 6 months, limiting assessment of long-term recurrence. Pain assessment using VAS remains subjective, and objective quality-of-life measures were not included. Additionally, due to the nature of the surgical interventions, blinding of the surgeon and participants was not feasible, which may have introduced performance or reporting bias, particularly in subjective outcomes such as post-operative pain assessment. Cost-effectiveness analysis and stratification based on hemorrhoid grade and number of hemorrhoidal columns treated were beyond the scope of this study. Future multicentric randomized trials with longer follow-up are warranted to further validate these findings.

CONCLUSION

LHP appears to be a safe and effective alternative to open hemorrhoidectomy for Grade II–III hemorrhoids, offering improved short-term recovery with fewer complications.

TRIAL REGISTRATION

This was an institutional academic study and was not registered in a clinical trial registry.

REFERENCES

1. Shirvani AE, Pakdaman K, Maleki Z, Soraneh S, Rezaei Chegini F, Nikbakht HA, *et al*. Worldwide prevalence of haemorrhoids: A systematic review and meta-analysis. Ann Med 2026;58:2606433.
2. Sharma R, Mehta P, Kulkarni S, Desai A. Postoperative pain and recovery following open hemorrhoidectomy: A prospective observational study. Int Surg J 2025;12:456-61.
3. Patel NK, Shah R, Joshi P, Meena R. Comparative study of laser hemorrhoidoplasty and open hemorrhoidectomy in Grade II-III hemorrhoids. Healthc Bull 2025;13:112-8.
4. Cheng PL, Wu CC, Lin HC, Chen YT. Diode laser hemorrhoidoplasty versus conventional hemorrhoidectomy: A systematic analysis. Lasers Surg Med 2024;56:512-21.
5. Wee IJ, Syn N, Hallinan JT, Poon CM. Laser hemorrhoidoplasty versus conventional hemorrhoidectomy: A systematic review and meta-analysis. Int J Colorectal Dis 2020;35:2049-57.
6. Barbu LA, Popescu D, Ionescu M, Dumitrescu A. Laser hemorrhoidoplasty: Postoperative outcomes and patient satisfaction. World J Clin Cases 2025;13:1890-8.
7. Eskandaros MS, Kamel A, Elbadry M, Elshobaky M. Laser hemorrhoidoplasty versus conventional hemorrhoidectomy. Surg Today 2019;49:464-72.
8. Li Z, Huang Y, Chen J, Wang L. Comparison of 980-nm and 1470-nm diode lasers in hemorrhoidoplasty. Lasers Med Sci 2024;39:178-86.
9. Liao YT, Chang KS, Wu BC, Cheng WX, Chuan HH, Huang KW, *et al*. Short-term and patient-reported outcomes of laser hemorrhoidoplasty plus excisional hemorrhoidectomy for the treatment of grade IV hemorrhoid. Sci Rep 2025;15:41510.
10. Di Schiano Di Visconte M. Laser hemorrhoidoplasty: Procedure, outcomes and future directions. ANZ J Surg 2025;95:2301-5.

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