Comparative Study between Laser Hemorrhoidoplasty and Open Hemorrhoidectomy in a Tertiary Center, Pokhara

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ABSTRACT

Introduction: Hemorrhoidal disease is a common anorectal disorder affecting a significant portion of the adult population. While conventional hemorrhoidectomy remains the standard surgical approach for treating hemorrhoidal disease, several minimally invasive procedures have emerged in recent years as alternative options for managing hemorrhoids. Nonetheless, studies report inconsistent outcomes of different methods in terms of symptom resolution. Thus, our study was caried out to evaluate the effectiveness of laser hemorrhoidoplasty (LHP) versus Milligan–Morgan hemorrhoidectomy (MMH).

Methods: This prospective observational study was carried out at a Manipal Teaching Hospital from October 2024 to July 2025, following ethical approval from Institutional Review board (IRB No. MCOMS/IRC/598/GA). A total of 60 patients with symptomatic grade II and III hemorrhoids were enrolled. Participants were randomly assigned into two groups: 30 patients underwent LHP and 30 underwent MMH. The study focused on evaluating duration of surgery, intraoperative bleeding, pain levels and early postoperative factors like bleeding, urinary retention, constipation, abscess edema and, return to normal activities.

Results: Patients in the LHP group experienced significantly lower levels of postoperative pain, reduced operative time, less intraoperative blood loss, shorter hospital stays, less abscess and constipation ($p<0.001$). There was no statistically significant difference between the two groups in terms of postoperative bleeding, urinary retention, edema.

Conclusion: Laser Hemorrhoidoplasty presents a favorable alternative to the traditional Milligan-Morgan hemorrhoidectomy for treating II- and III-degree hemorrhoids. It offers multiple advantages, including decreased postoperative pain, shorter procedure time, quicker recovery, and reduced intraoperative blood loss.

Keywords: Comparison, Laser hemorrhoidoplasty, Milligan-Morgan hemorrhoidectomy

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INTRODUCTION

Hemorrhoids are a common non-cancerous anorectal condition, affecting about 38.9% of adults and often reducing their quality of life.[1] Patients typically use both surgery and over-the-counter treatments.[2] The disease involves swollen and distorted blood vessels in the anal cushions due to connective tissue damage. Among several theories, the vascular

theory is the most widely accepted explanation. Treatment choices depend on patient condition and the severity of hemorrhoids, with surgery often needed for grades III and IV. [3,4]

Open hemorrhoidectomy (OH), described by Milligan and Morgan, remains the gold standard even today.[5] While effective, it can cause significant pain and complications.[6] Alternatives like Ferguson hemorrhoidectomy, rubber-band ligation, and stapled hemorrhoidopexy aim to reduce these issues [7], but they also carry risks such as bleeding, infection, and recurrence.[8]

Recently, non-excisional laser techniques have become increasingly popular for treating symptomatic hemorrhoids due to their minimally invasive approach and lower rates of postoperative complications and recurrence.[9-11] Laser hemorrhoidoplasty (LHP) is a novel method in which a laser probe is inserted at the ano-cutaneous junction to target hemorrhoidal tissue.[12] The thermal energy promotes vascular thrombosis, fibrosis, and tissue remodeling, ultimately reducing and eliminating hemorrhoidal masses.[13,14] This study compares LHP and open hemorrhoidectomy (OH) in terms of patient demographics, operative time, postoperative pain, early complications, and clinical outcomes.

METHODS

This prospective observational study was carried out in the Department of General Surgery at Manipal College of Medical Sciences, Pokhara, October 2024 to July 2025, following approval from the Institutional Review Board (IRB No. MCOMS/IRC/598/GA). A total of 60 patients diagnosed with symptomatic grade II and III hemorrhoids were included in the study. They were randomly divided into two groups: 30 patients underwent Laser Hemorrhoidoplasty (LHP), while the remaining 30 received Milligan–Morgan hemorrhoidectomy (MMH)-(randomization was done at presentation using the lottery method, ensuring equal probability of assignment to either group). All cases were operated by same operative surgeon, ensuring uniformity in surgical technique and minimizing operator related variability. All procedure in both groups were performed under spinal anesthesia. A standard sub arachnoid block was administered at the L3-L4 or L4-L5 interspace using hyperbaric bupivacaine (dose as institutional protocol). Adequate sensory block was confirmed before surgery. All patients received post operative antibiotic as per institutional protocol (e.g. injection ceftriazone 1 g IV every 12 hours for 24 hours followed by oral cefixime 200mg twice daily for 3 days). Post operative analgesia consisted of injection diclofenac 75 mg IM every 12 hours for the 1st 24 hours followed by oral NSAIDs for 3-5 days depending on pain severity.

Data collection was based on patients who met the inclusion criteria, all of whom provided written informed consent. Patients with a history of anal surgery, anal carcinoma, sphincter dysfunction, anal incontinence, age below 18 or above 70 years, grade IV or complicated hemorrhoids, or those unwilling to participate were excluded.

Postoperative pain was assessed daily during hospitalization using the Visual Analog Scale (VAS) at rest. Follow-up evaluations were conducted at day 1, day 3, day 7 and 2 weeks after surgery. (These time points represent the standard postoperative pain pattern in anorectal surgeries. Day 1 and Day 3 assess acute post operative pain, day 7 reflects early wound healing phase and 2 weeks assesses resolution phase and functional recovery).

Data analysis was performed using SPSS version 22.0. Chi-square test and Fisher's exact test were employed to assess associations between categorical variables, where as independent t-test, Man Whittney test was used for comparison of mean difference between

two groups. A p-value of < 0.05 was considered statistically significant.

RESULTS

The average age of the patients was 44.93 years. Among them, 22 (36.7%) were female and 38 (63.3%) were male. In the MMH group, 12 (40%) of the participants were female and 18 (60%) were male. Similarly, in the LHP group, females accounted for 10 (33.3%) and males for 20 (66.7%). Regarding pain status mean postoperative pain score was evaluated through the visual analog scale (VAS), was significantly lower in LHP group (p<0.0010) at each follow-up point i.e. day 3, 7 and 2 weeks. Moreover, there was a significant decrease in days till pain resolution in LHP group in comparison to MMH group, having a mean of 23.06 in the LHP group versus 38.26 in the MMH group. (Table 1)

Table 1: Relation between LH and MMH Regarding Post Operative Pain (n=60)

Post Operative pain Score (VAS)	Groups			
	LHP (n=30)	MMH (n=30)	Test value	*p* value
Day 1				
Range	4-7	2-9	-1.346^	.178
Mean ± SD	5.23	4.83±2.50		
Day 3				
Range	3-5	3-9	-5.610^	<0.001
Mean ± SD	4.06±0.69	6.26±1.38		
Day 7				
Range	2-4	2-9	-5.649^	<0.001
Mean ± SD	3.13±0.62	5.36±1.47		
2nd week				
Range	0-3	2-8	-6.175^	<0.001
Mean ± SD	1.76±0.81	4.63±1.37		
Days till pain solution (days)				
Range	16-30	30-56	-10.95^	<0.001
Mean ± SD	23.06±3.15	38.26±6.91		

^Mann Whitney test, P value <0.05 is significant

The operative time was markedly reduced in the LHP group (25.50 ± 8.84 minutes) compared to the MMH group (61.83 ± 15.94 minutes), demonstrating a highly significant difference (p < 0.001). Similarly, intraoperative blood loss was considerably lower in patients undergoing LHP (12.56 ± 5.06 ml) than those in the MMH group (19.40 ± 5.60 ml), {though this difference approached but did not reach statistical significance (p = 0.09)} The duration of hospital stay was significantly shorter for the LHP group (46.46 ± 11.51 hours) compared to MMH (82.73 ± 29.56 hours; p<0.001). Moreover, patients treated with LHP resumed their routine activities much earlier (4.6 ± 1.51 days) than those who underwent M(10.46 ± 2.62 days; p<0.001). (Table 2)

Postoperative bleeding occurred in 56.7% of LHP cases and 60% of MMH cases, with no

statistically significant difference (p = 0.793). Likewise, urinary retention (40% vs. 50%; p = 0.436) and postoperative edema (43.3% vs. 46.7%; p = 0.795) were comparable between the two groups. However, postoperative discharge was significantly less common in the LHP group (6.7%) compared to MMH (33.3%), with a p-value of 0.01. A notable finding was the incidence of abscess formation, which was significantly higher in the MMH group (30%) than in the LHP group (3.3%; p = 0.006). Similarly, constipation was reported more frequently among MMH patients (46.7%) compared to those who underwent LHP (16.7%), reflecting a statistically significant difference (p = 0.012). (Table 2)

Table 2: Relation between LHP and MMH Regarding Operative and Early Post Operative Factor (n=60)

Variables	Groups			
	LHP (n=30)	MMH (n=30)	test value	*p* value
Operative time (min)				
Range	15-60	30-90	-10.914#	<0.001
Mean ± SD	25.50±8.84	61.83±15.94		
Intraoperative bleeding (ml)				
Range	5-20	10-30	-4.952#	<0.001
Mean ± SD	12.56±5.06	19.40±5.60		
Hospital Stay duration (hrs)				
Range	24-72	16-120	-6.261#	<0.001
Mean ± SD	46.46±11.51	82.73±29.56		
Return to normal daily activities (days)				
Range	2-7	5-15	-10.48#	<0.001
Mean ± SD	4.6±1.51	10.46±2.62		
Post operative bleeding				
Yes	17 (56.7%)	18 (60.0%)	0.69*	.793
No	13 (43.3%)	12 (40.0%)		
Urinary Retention				
Yes	12 (40.0%)	15 (50.0%)	.606*	.436
No	18 (60.0%)	15 (50.0%)		
Oedema				
Yes	13 (43.3%)	14 (46.7%)	.067*	.795
No	17 (56.7%)	16 (53.3%)		
Discharge				
Yes	2 (6.7%)	10 (33.3%)	6.667*	0.010
No	28 (93.3%)	20 (667%)		

Variables	Groups			
	LHP (n=30)	MMH (n=30)	test value	*p* value
Abscess				
Yes	1 (3.3%)	9 (30.0%)	7.68*	0.006
No	29 (96.7%)	21 (70.0%)		
Constipation				
Yes	5 (16.7%)	14 (46.7%)	6.239*	0.012
No	25 (83.3%)	16 (53.3%)		

**x^2- test, # - independent t-test, p value significant at <0.05*

DISCUSSION

Hemorrhoids are the most common colorectal issue, affecting up to 27.9% of people, with about 4% showing symptoms.[15] Despite various treatments, complications like bleeding, infection, and ulceration can still occur. Management options range from medication to surgical procedures like the Milligan-Morgan technique, which is widely used but often causes postoperative pain and issues such as urinary retention, bleeding, abscess and oedema. These limitations have encouraged the use of laser treatments, which offer less pain, quicker recovery, and fewer side effects.

In this comparative study, LHP showed multiple benefits compared to the traditional open surgery. The operative time was significantly shorter in the LHP group. This is in agreement with several previous studies that also reported shorter operative durations with laser techniques due to the minimally invasive nature and lack of tissue excision.[16-19] Intraoperative blood loss was also significantly lower in the LHP group (mean 12.56±5.06 ml) compared to MMH (mean 19.40±5.60 ml, p<0.001), consistent with findings from other literature suggesting laser procedures result in minimal bleeding due to coagulative effects of laser energy.[15-18]

Postoperative pain plays a major role in patient satisfaction and recovery speed. Findings showed that pain levels, measured by VAS scores, were consistently lower in the LHP group, which supports previous studies who noted reduced pain and less need for painkillers after laser surgery. The laser approach minimizes tissue damage and protects the anoderm and mucosa, likely contributing to lower pain. [15-21]

Additionally, hospital stay and recovery time were shorter for patients in the LHP group. This is in line with results from previous studies who reported quicker healing and earlier return to daily activities after LHP.[15-21] In current surgical landscape, reducing hospital stay durations and promoting early rehabilitation are crucial factors in improving cost effectiveness and optimizing patient throughput.

However, when analyzing postoperative complications such as postoperative bleeding, urinary retention, and edema, no statistically significant differences were observed between the two groups. For instance, postoperative bleeding was observed in 56.7% in LHP vs 60% in MMH (p = 0.793), and urinary retention was seen in 40% vs 50%, respectively (p = 0.436). These findings differ among published reports. While some studies have reported significant reduction in urinary retention and bleeding with laser techniques[17], others found no statistical difference in these variables, indicating variability across populations and settings.[18-21]

Interestingly, some other postoperative complications such as discharge, abscess formation, and constipation showed statistically significant differences. Discharge was more common in MMH patients (33.6%) than in LHP (6.7%) (p = 0.010). Similarly, abscess formation was higher in MMH (30%) compared to only 1 (3.3%) case in LHP (p = 0.006). The higher incidence of postoperative abscess formation in the Milligan-Morgan Hemorrhoidectomy (MMH) group may be related to the presence of an open raw wound, which is inherently more susceptible to contamination from the perianal bacterial flora. The open technique exposes the wound surface directly to the polymicrobial environment of the anal canal, increasing the likelihood of postoperative infection compared with laser hemorrhoidoplasty, which preserves tissue planes and leaves minimal open surface. Constipation was also more frequent in MMH group (46.7%) than LHP (16.7%) with significant difference (p = 0.012). These complications have been less frequently compared in literature; however, some reports suggest that less tissue handling in laser techniques may contribute to lower risk of postoperative infection and bowel-related issues. [21,22]

Overall, the findings of this study reinforce the advantages of laser hemorrhoidoplasty in terms of reduced pain, operative time, blood loss, hospital stay, and faster recovery, while also highlighting that not all postoperative parameters may differ significantly. The inconsistency in findings regarding certain complications such as urinary retention and post operative bleeding suggests the need for further large-scale randomized trials to validate these outcomes.

CONCLUSIONS

Compared to the traditional Milligan-Morgan hemorrhoidectomy, this study indicates that laser hemorrhoidoplasty (LHP) is a safe and effective alternative for the management of primary second to third-degree hemorrhoids. LHP was associated with shorter operative time, reduced intraoperative blood loss, less postoperative pain, shorter hospital stays, and earlier return to normal daily activities. While early postoperative complications such as hemorrhage, urinary retention, and edema showed no statistically significant differences between the two groups, variables such as postoperative discharge, abscess formation, and constipation demonstrated statistically significant differences, though without indicating a clear clinical advantage for either procedure. Overall, LHP appears to provide several perioperative advantages without increasing complication rates, supporting its role as a valuable minimally invasive option in appropriately selected patients.

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