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Original Article

Surgery Section

Comparison of Milligan-Morgan Haemorrhoidectomy versus Laser Haemorrhoidoplasty in Patients with Grade II and III Haemorrhoids: A Prospective Observational Study

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ABSTRACT

Introduction: Haemorrhoidal disease results from abnormal dilation of anal cushions, influenced by dietary habits and pelvic anatomy. Surgical management remains essential for symptomatic cases, with Milligan-Morgan haemorrhoidectomy as the gold standard despite significant postoperative pain. Laser haemorrhoidoplasty has emerged as a minimally invasive alternative with faster recovery and fewer complications.

Aim: To compare the clinical outcomes of Milligan-Morgan haemorrhoidectomy and laser haemorrhoidoplasty in patients with grade II and III haemorrhoids, focusing on postoperative pain, hospital stay, complications, and recovery time.

Materials and Methods: A prospective observational study was conducted in the Department of General Surgery at Sri Lalithambigai Medical College and Hospital, Chennai, Tamil Nadu, India, from January 2022 to June 2023 (including three months of follow-up). A total of 40 patients were randomly assigned into 2 groups, group A (laser) with 20 patients and group B (Milligan Morgan) with 20 patients. The postoperative outcomes, including duration of intervention, pain, hospital stay, return-to-work time (recovery time) were assessed. Statistical analysis was performed using Statistical Package For Social Sciences (SPSS) software, with $p<0.05$ considered significant.

Results: The mean age of the study participants was 41.35±13.95 in the laser group vs 43.3±12.75 in the open group, with no significant age or sex difference. The laser group had significantly lower postoperative pain {Visual Analogue Scale (VAS) 4.60±1.14 vs. 9.15±0.67 on Day 1, $p<0.001$}, shorter operative time (19.85 min vs. 54.75 min), reduced intraoperative blood loss (7±2.51 mL vs. 23±5.23 mL, $p<0.001$), and shorter hospital stay (1.1 vs. 1.85 days, $p<0.001$). Recovery time was significantly faster in the laser group (7.75±2.40 vs. 21±4.45 days, $p<0.01$). Complications such as secondary bleeding in 4 (20%) patients, urinary retention in 5 (25%) patients and anal stenosis in 5 (25%) patients occurred only in the open group.

Conclusion: Laser haemorrhoidoplasty offers significant advantages over Milligan-Morgan haemorrhoidectomy, including reduced pain, faster recovery, and fewer complications.

Keywords: Anal stenosis, Hospital stay, Laser haemorrhoidoplasty, Postoperative pain, Urinary retention

INTRODUCTION

Haemorrhoidal disease is the abnormal dilation of blood vessels and destruction of connective tissue in the anal cushion, influenced by dietary habits and lack of knowledge on pelvic anatomy and defecation physiology. Its prevalence ranges from 2.9% to 27.9%, with symptomatic cases around 4% [1,2]. It primarily affects individuals aged 45-65 years, declining after 65, with men more commonly affected than women [3].

Bleeding is usually the first symptom, often painless, and noticed on toilet paper. In rare cases, excessive bleeding can lead to anaemia. The presence of pain may indicate an alternative diagnosis. Effective management is essential for symptomatic haemorrhoids [4].

The Milligan-Morgan open haemorrhoidectomy is the gold standard due to low recurrence rates but involves significant postoperative pain [5]. Early complications include urinary retention (20.1%), abscess, and bleeding (0.5%), while long-term risks include anal fissure (1-2.6%), stenosis (1%), fistula (0.5%), incontinence (0.4%), and recurrence [6]. Closed haemorrhoidectomy reduces wound exposure but remains similar in tissue excision and complications [6].

Minimally invasive diode laser haemorrhoidoplasty uses a 1470 nm laser probe delivering 8-watt pulses for three seconds, inducing venous thrombosis, fibrosis, and mucosal adherence. This reduces haemorrhoidal volume while preserving the anal canal lining and minimising complications [7]. Laser haemorrhoidoplasty is safe, effective, and painless, with rapid symptom relief. Other options include Ferguson closed haemorrhoidectomy, rubber band ligation, haemorrhoidal artery ligation, and stapled haemorrhoidopexy, they are chosen based on disease severity [8,9].

Laser haemorrhoidoplasty represents a significant advancement in the treatment of haemorrhoids to shrink and coagulate haemorrhoidal tissue, which provides the benefits of reduced pain, quicker recovery, and fewer complications compared to traditional techniques [10]. A direct comparison of these techniques can provide valuable clinical insights into efficacy, safety, and patient outcomes to make evidence-based treatment decisions. The present study aimed to compare the clinical outcomes of Milligan-Morgan haemorrhoidectomy and laser haemorrhoidoplasty in patients with grade II and III haemorrhoids, focusing on postoperative pain, hospital stay, complications, and recovery time.

MATERIALS AND METHODS

A prospective observational study was conducted in the Department of General Surgery at Sri Lalithambigai Medical College and Hospital, Chennai, Tamil Nadu, India, from January 2022 to June 2023

(including 3 months of follow-up). Ethical clearance was obtained from the institutional ethical committee with reference number Dr.MGR-ERI/SLMCH/2023/012 dated 22/05/2023, before starting the study. Informed consent was obtained from all the patients who were enrolled in the study.

Sample size calculation: A total of 40 patients were randomly assigned to two groups: Laser haemorrhoidoplasty (n=20) and Milligan-Morgan Haemorrhoidectomy (n=20) using a computer-generated randomisation list with concealed allocation. Blinding was not feasible due to the nature of the procedure. Based on Khan HM et al., study sample size was calculated using postoperative pain (VAS: 2.3±1.05 for laser vs. 5.1±1.11 for open) [11].

The sample size obtained was 19 based on a 20% reduction in postoperative pain in the laser group, the primary outcome of the study. Considering 80% power and 5% allowable error, the final sample size was adjusted to 20 in each group by rounding off.

Inclusion criteria: Adults aged 18 and above with symptomatic grade II or III [9] internal haemorrhoidal disease unresponsive to medical treatment and those with American Society of Anaesthesiologists (ASA) physical status of I or II. Those with no prior surgical interventions for haemorrhoidal disease to minimise bias from prior treatments, and those without significant co-morbidities that may affect wound healing were included in the study.

Exclusion criteria: Patients with co-existing anorectal disease, neurological deficits, chronic pain syndrome, regular immunosuppressant or narcotic use, or those unfit for surgery or anaesthesia due to medical or surgical conditions were excluded.

Study Procedure

All the surgical procedures were performed by experienced proctologic surgeons, assisted by a skilled team (≥5 years experience), which ensured consistency. All surgeries followed a standardised protocol under spinal anaesthesia in the supine lithotomy position.

Group A-Laser group: About 20 laser group patients underwent proctoscope-guided haemorrhoid grading followed by 1470 nm diode laser probe insertion via anodermis to prevent sphincter injury [Table/Fig-1]. Laser shots (8W, 3s, 250-350J/segment) were delivered to shrink haemorrhoidal tissue. Post ablation, an ice cube was applied intra-anally for 1-2 minutes to minimise heat effects. Shrinkage was controlled by laser power and duration, repeated for each haemorrhoidal column.

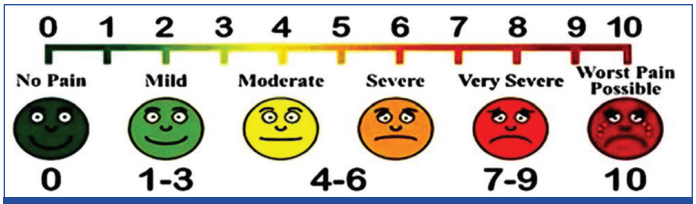
[Table/Fig-1]: Laser energy delivered to the haemorrhoidal cushion.

Group B-Milligan Morgan group: The remaining 20 patients in open surgical haemorrhoidectomy underwent the Milligan-Morgan technique. V-shaped skin incisions were made at the haemorrhoid bases, followed by submucosal dissection with cautery [Table/Fig-2]. Pedicles were ligated with 2-0 Vicryl, distal segments excised, and skin bridges preserved to prevent stenosis. Wounds were left open with an anal pack placed.

[Table/Fig-2]: Dissection of third degree haemorrhoids with cautery.

Postoperative pain care: Postoperative pain management was standardised for all patients. Oral NSAIDs (diclofenac 100 mg twice daily) and topical 2% lidocaine gel for local pain relief, cold compresses to reduce swelling, warm sitz baths (three times daily) to sooth the anal area and promoted healing are prescribed. Stool softeners at bedtime, along with dietary fiber and hydration, are advised to prevent straining and minimise pain during bowel movements.

Assessment of postoperative pain: Postoperative pain was evaluated using Visual Analogue Scale (VAS 0-10) [Table/Fig-3] [12], with 0 representing no pain and 10 corresponding to maximum pain. The intensity of pain using VAS scale after discharge was evaluated at day 1, 7, 14, 21, 30, 60 and 90 days in both the groups for comparison. This different time frames (3 months) minimised the impact of outliers or transient variations in pain perception and assessment of complications.



[Table/Fig-3]: Visual Analogue Scale (VAS 0-10).

Outcome measures: Outcome was measured in terms of grades of haemorrhoid, preoperative symptoms (rectal bleed, anal pain, anal lump), operative time, duration of hospital stay, recovery period (the duration required for a patient to regain normal daily function following surgery, including the resolution of pain VAS score <2 and absence of postoperative complications requiring medical intervention) [9], early postoperative pain, postoperative urinary retention and late postoperative complication like acute thrombosis (formation of a blood clot (thrombus) within the external haemorrhoidal veins, leading to a painful, swollen, and often bluish perianal lump) [8], anal discharge (Anal discharge refers to the abnormal leakage of mucus, pus, or stool from the anus, due to infections, inflammatory conditions, or anorectal surgical procedures) [7] and anal stenosis (a pathological narrowing of the anal canal, leading to difficulty in defaecation, pain, and discomfort, commonly occurs as a complication following anorectal surgeries resulting in excessive scar formation or improper wound healing) [2].

Discharge and follow-up: Patients were discharged a day after surgery upon resuming oral feeding and showing no complications. Follow-up care was provided for a minimum of three months following the surgical intervention.

STATISTICAL ANALYSIS

Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) software (Version 25). Categorical data were summarised as numbers and percentages, while continuous data were presented as means and standard deviations. Normality was assessed using histograms, Q-Q plots, and the Shapiro-Wilk test (p>0.05 indicating normal distribution). The Chi-square test compared categorical variables. For continuous data, an unpaired t-test was used. A p-value <0.05 was considered statistically significant.

RESULTS

Patient's demographics: The mean age of the study participants was 41.35±13.95 (laser) vs 43.3±12.75 (open), with no significant age or sex difference. The most common preoperative symptoms were rectal bleeding (75%, 30/40), anal pain (7.5%, 3/40), and anal lump (17.5%, 7/40), which were statistically significant between the groups [Table/Fig-4]. No harms or unintended effects were received by any of the patients.

Parameter	Laser group (n=20)	Open group (n=20)	p-value
Age (years) (Mean±SD, 95% CI)	41.35±13.945 (34.82-47.88)	43.3±12.749 (37.33-49.27)	0.656[a]
Gender			
Male	17 (85%)	18 (90%)	0.147[b]
Female	3 (15%)	2 (10%)	
Haemorrhoidal grade			
Grade-II	3 (15%)	8 (40%)	0.077[b]
Grade-III	17 (85%)	12 (60%)	
Preoperative symptom			
Rectal bleed	11 (55%)	19 (95%)	0.009*[b]
Anal pain	2 (10%)	1 (5%)	
Anal lump	7 (35%)	0	

[Table/Fig-4]: Comparison of baseline parameters between study groups.
*p value <0.05 is statistically significant
p-value [a] – unpaired t-test
p-value [b] – Chi-square test

There was shorter operative time in the laser group (19.85 min). It was lesser than in the open group (54.75 min) which showed statistical significance (p<0.05) [Table/Fig-5].

Outcomes	Laser group (n=20)	Open group (n=20)	p-value
Operative time (min) (Mean±SD, 95% CI)	19.85±4.44 (17.76-21.94)	54.75±7.7 (50.96-58.54)	0.018*
Blood loss (mL) (Mean±SD, 95% CI)	7±2.513 (5.91-8.09)	23±5.231 (20.67-25.33)	<0.001*
Duration of hospital stay (days) (Mean±SD, 95% CI)	1.1±0.308 (0.96-1.24)	1.85±0.671 (1.54-2.16)	0.004*
Duration of recovery time to return to work (days) (Mean±SD, 95% CI)	7.75±2.40 (6.67-8.83)	21±4.45 (19.05-22.95)	0.008*

[Table/Fig-5]: Comparison of outcome parameters between the two groups.
*p-value <0.05 is statistically significant (unpaired t-test)

Postoperative pain: Postoperative pain was assessed using the VAS [Table/Fig-6], showing a significant difference between groups (p<0.001). On day 1, VAS was 4.60±1.14 in the laser group vs. 9.15±0.67 in the open group. By day 30, it dropped to 0.25±0.44 vs. 4.45±0.83, and by day 60, 0 vs. 3.25±0.72. On day 90, pain remained 0 in the laser group and 2.25±0.91 in the open group.

In this study, secondary bleeding occurred in 20% of open group patients with none in the laser group. Postoperative urine retention affected 25% of the open group, with no cases in the laser group. Anal stenosis was observed in 25% (4 patients) of the open group but was absent in the laser group, which was found to be statistically significant (p<0.05, [Table/Fig-7]).

VAS score	Laser group (n=20)	Open group (n=20)	p-value
1 day (Mean±SD, 95% CI)	4.60±1.142 (4.05-5.15)	9.15±0.671 (8.83-9.47)	<0.001*
7 days (Mean±SD, 95% CI)	3.60±1.046 (3.09-4.11)	7.90±0.553 (7.63-8.17)	
14 days (Mean±SD, 95% CI)	2.15±1.424 (1.48-2.82)	6.60±0.754 (6.24-6.96)	
21 days (Mean±SD, 95% CI)	1.30±0.470 (1.08-1.52)	5.45±0.759 (5.09-5.81)	
30 days (Mean±SD, 95% CI)	0.25±0.444 (0.03-0.47)	4.45±0.826 (4.05-4.85)	
60 days (Mean±SD, 95% CI)	0	3.25±0.716 (2.91-3.59)	
90 days (Mean±SD, 95% CI)	0	2.25±0.910 (1.80-2.70)	

[Table/Fig-6]: Comparison of VAS score between the different follow-up periods.
*p-value <0.05 is statistically significant (unpaired t-test)

Complications	Laser group (n=20)	Open group (n=20)	p-value
Early			
Secondary bleeding	0	4 (20%)	0.047*
Urinary retention	0	5 (25%)	
Late			
Acute thrombosis	2 (10%)	0	0.047*
Anal stenosis	0	5 (25%)	
Anal discharge	0	4 (20%)	

[Table/Fig-7]: Comparison of complications between the study groups.
*p-value <0.05 is statistically significant (Chi-square test)

DISCUSSION

In this study, age distribution was 41.35±13.95 (laser) and 43.3±12.75 (open) with no significant difference. A study conducted by Alsisy AA et al., reported mean ages of 33.67±10.22 years in the open group and 34.73±10.17 years in the laser group, showing no statistically significant difference between the two [9]. In the present study, 55% of the laser group and 95% of the open group had rectal bleeding. Similarly study done by Khan HM et al., reported 92% of rectal bleeding in laser group and 90% in the open group [11]. In our study, VAS pain scores were lower in the laser group than the open group: day 1 (4.60±1.14 vs. 9.15±0.67), day 30 (0.25±0.44 vs. 4.45±0.83), day 60 (0 vs. 3.25±0.72), and day 90 (0 vs. 2.25±0.91). In a study done by Maloku H et al., VAS score in laser group was (2.2±0.3) compared to VAS score in open group (4.5±0.8) [13]. Study done by Gambardella C et al., reported significantly lower postoperative pain scores in laser group compared to those who underwent open procedure (p<0.0001) and experienced smoother wound management [14]. In the present study, blood loss was lower in the laser group (7±2.51 mL) vs the open group (23±5.23 mL). Study done by Khan HM et al., reported similar findings (14.0±5.5 mL vs. 38.5±8.8 mL) [11]. In the present study, early recovery to work was found in the laser group than the open group (7.75±2.40 vs 21±4.45 days, p<0.001). Similar results were found in the study done by Alsisy AA et al., where return to work was significantly lower in the laser group (7.53±1.80 vs. 22.87±3.91 days, p<0.001) [9]. Duration of hospital stay was shorter in the laser group (1.1 vs. 1.85 days, p<0.001) in the present study. Study done by Eskandaros MS and Darwish AA reported similar results with 2.1±0.6 days (open) and 0.7±0.3 days (laser) with significant difference of around 1.85 days [15].

In the present study, about five patients in open haemorrhoidectomy group developed urinary retention postoperatively. In a study done by Khan HM et al., 16% (8 patients) of patients in open haemorrhoidectomy group and none of the patients in laser group had urinary retention [11]. In this study, 2 of 20 laser haemorrhoidoplasty patients had anal thrombosis, similar to study by Khan HM et al., (2 of 50) and study by Alsisy AA et al., three

patients developed anal thrombosis 3-4 days after laser surgery [9-11]. Delayed Post-Haemorrhoidectomy Bleeding (DPHB) is rare but serious. In this study, four open haemorrhoidectomy patients developed DPHB, with none in the laser group. Study by Chen HH et al., reported a 0.9-10% incidence in closed haemorrhoidectomy with delay in wound healing, and Yano T et al., linked DPHB to surgical technique, infection, straining, and pile count [16,17]. In contrast, study done by Skobelkin OK et al., reported twice the occurrence of bleeding and anal pain in open haemorrhoidectomy group [18].

In the present study, 25% of open haemorrhoidectomy patients developed anal stenosis, managed conservatively, with no cases in the laser group. Study by Brusciano L et al., found that 73.9% had moderate to severe fibrosis after stapled transanal rectal resection. Hence, use of laser haemorrhoidoplasty may help prevent anal stenosis and fibrosis [19].

Limitation(s)

The study compared early and mid-term outcomes (pain, wound healing, return to work, and complications) within three months but lacked data on long-term recurrence or delayed complications. The key limitations include a lack of long-term follow-up (≥1 year), and the absence of blinding, potentially introduces bias in pain assessment and recovery analysis.

CONCLUSION(S)

This study highlights the clinical benefits of laser haemorrhoidoplasty over Milligan-Morgan haemorrhoidectomy in managing symptomatic grade II and III haemorrhoids. Patients in the laser group had significantly less postoperative pain, lower blood loss, shorter surgery time, quicker recovery, and fewer complications. These results suggest that laser haemorrhoidoplasty is a safer, less invasive and more patient-friendly option. Further large-scale studies with extended follow-up are needed to confirm its long-term effectiveness and recurrence rates.

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