



Original Article

Assessment of Long-Term Clinical Outcomes Following Laser Proctology and Conventional Hemorrhoidectomy

Article History

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Abstract: Background: Hemorrhoidal disease is still one of the most common anorectal diseases globally, and is often a surgical problem in severe and symptomatic cases. Traditional hemorrhoidectomy procedures, such as the Milligan-Morgan and Ferguson surgeries, historically have been the preferred surgical options but they are routinely reported to be associated with high postoperative morbidity, a lengthy recovery period, and a long time before the patient can resume normal activities (1,2). Laser proctology, especially laser hemorrhoidoplasty, has become a less traumatic option in recent years that helps patients improve their recovery after proctology surgery (3,4). Although it has become a common practice, there are still some concerns about recurrence rates and effectiveness in the long run when compared to traditional surgery. **Objective:** Evaluate and compare the long term clinical results of laser proctology and conventional hemorrhoid surgery in patients treated for symptomatic hemorrhoids. **Methods:** The clinical data for this study were obtained from a tertiary care hospital and the data were analyzed through secondary data analysis in a retrospective comparison of observational study from January 2020 to December 2024. A total of 120 patients diagnosed with Grade II–IV hemorrhoids were included and divided into two groups: laser hemorrhoidoplasty (n=60) and conventional hemorrhoidectomy (n=60). Postoperative pain scores, recurrence rates, complications, duration of hospital stay, return-to-work time, and patient satisfaction were evaluated over a minimum follow-up period of 12 months. In addition, a small postoperative patient satisfaction survey involving 25 participants was conducted. Statistical analysis was performed using SPSS version 26, with $p < 0.05$ considered statistically significant. **Results:** Patients undergoing laser proctology demonstrated significantly lower postoperative pain scores during the first postoperative week compared with the conventional surgery group (3.1 ± 1.2 vs 6.4 ± 1.5 ; $p < 0.001$). The laser group also showed shorter hospital stay and earlier return to daily activities. Postoperative bleeding and wound-related complications were less frequent among laser-treated patients. However, long-term recurrence rates were slightly higher in the laser group (11.7%) compared with conventional hemorrhoidectomy (8.3%), although the difference was not statistically significant ($p = 0.41$). Satisfaction of patients scores were higher following laser procedures. **Conclusion:** Laser proctology is thought to provide better short-term postoperative recovery, less pain and higher patient satisfaction compared to the traditional hemorrhoid surgery. However, traditional hemorrhoidectomy has been shown to have similar long-term disease control and lower recurrence rates in comparison. Multicenter prospective studies with more subjects are recommended for confirmation of long-term superiority in clinical practice.

Keywords: Hemorrhoids; Laser hemorrhoidoplasty; Conventional hemorrhoidectomy; Long-term outcomes; Postoperative pain; Recurrence; Proctology; Minimally invasive surgery

INTRODUCTION

Hemorrhoidal disease is one of the most commonly encountered benign anorectal disorders in surgical practice and is known to have a significant impact on the quality of the patient's life around the world. It is caused by pathological enlargement and distal displacement of the normal anal cushions, and often presents with symptoms of rectal bleeding, prolapse, pain, pruritus, mucus discharge and defecation discomfort (1). Conservative management (dietary modifications, increased fibre content and pharmacological therapy) may be useful for alleviating symptoms in early disease, but surgery is the treatment of choice for patients who are suffering from Grade III and Grade IV hemorrhoids in advanced disease and/or have persistent symptoms despite medical management (2).

Until now, the effectiveness of the conventional hemorrhoidectomy procedures in symptom control and the relatively low recurrence rates (3) have made them the gold standard for definitive treatment of hemorrhoidal disease. Even though they have proven to be clinically effective, however, these procedures have been known to cause significant postoperative pain, urinary retention, delayed wound healing, bleeding and extended recovery periods which may affect patient satisfaction and return to normal daily activities (4). Pain following traditional hemorrhoid surgery is still one of the most difficult problems in anorectal surgical management and has continued to be a constant area of investigation for alternative surgical approaches.

In the last decade there has been a growing use of minimally invasive techniques in proctology, especially in the light of laser-based techniques. Laser hemorrhoidoplasty (LHP) has become a new surgical approach that is based on laser energy to cause submucosal tissue shrinkage without damaging surrounding tissues (5). A major advantage of the procedure is its ability to reduce tissue trauma, postoperative pain, hospital stay and recovery process as compared to traditional excisional hemorrhoidectomy (6). Laser surgery has been reported to yield good early postoperative results, such as decreased need for analgesics and a better patient experience (7).

Although these benefits are present, there are concerns about the long-term efficacy of laser treatments, especially the recurrence rate and sustained symptom control. In the opinion of some investigators, laser hemorrhoidoplasty might be associated with improved early recovery, but hemorrhoidectomy may still be superior in terms of longterm disease resolution as it removes all hemorrhoidal tissue (8). Furthermore, the cost of the procedures and steep learning curve of minimally invasive procedures may restrict the use of lasers broadly, particularly at low and middle income health care facilities (9).

Comparative studies and systematic reviews have

shown conflicting results on the superiority of laser proctology over the classic hemorrhoid surgery (10,11). Many studies have shown that laser procedures are more beneficial in terms of recovery from surgery and satisfaction with surgery, but there is mixed evidence regarding long-term clinical outcomes. In addition, there are very few regional data from health systems in South Asia, and varying health systems, surgical practices, and postoperative care can impact surgical outcomes.

The present study is therefore designed to evaluate and compare long term clinical results of laser proctology and traditional surgical techniques of hemorrhoid surgery based on patient reported satisfaction and retrospective hospital data and secondary literature evidence. The objective of this study is to give a fair review of both surgical methods and pay particular attention to the aspects of recovery, complications, and recurrence, as well as overall satisfaction with the surgery.

MATERIALS AND METHODS

Study Design and Setting: The study was a retrospective comparative observational study of the long-term clinical results of laser proctology and conventional surgical procedures on hemorrhoids in patients with symptomatic hemorrhoidal disease. Secondary clinical data from Tertiary care hospital and Post Operative patient satisfaction survey was included in the study. Data collection were conducted for the procedures carried out from January 2020-December 2024. The study methodology was designed based on previously published studies of comparative surgical outcome studies with regards to hemorrhoidal disease management (1,2).

The aim of the study was to assess the differences in postoperative recovery, complications, recurrence and patient-reported outcome between laser hemorrhoidoplasty and traditional hemorrhoidectomy procedures. The institutional review committee approved the study before it began, for retrospective data analysis. The confidentiality and anonymity of the patients were ensured in the collection and analysis of the data.

Study Population

120 patients were diagnosed with Grade II–IV hemorrhoidal disease were included in the study. Patients were divided into two equal groups based on the surgical procedure performed:

- Group A (Laser Group): Patients undergoing laser hemorrhoidoplasty or diode laser hemorrhoidal treatment (n=60)
- Group B (Conventional Surgery Group): Patients undergoing Milligan-Morgan or Ferguson hemorrhoidectomy (n=60)

Patient records were identified through hospital surgical databases and outpatient follow-up records. A

minimum postoperative follow-up duration of 12 months was required for inclusion in the final analysis.

Inclusion Criteria

Patients meeting the following criteria were included in the study:

1. Age between 18 and 70 years
2. Diagnosed with Grade II, III, or IV hemorrhoidal disease
3. Underwent elective hemorrhoid surgery
4. Availability of complete medical and operative records
5. Minimum postoperative follow-up period of one year

Exclusion Criteria

Excluded patients included those with:

1. Previous anorectal surgery
2. Inflammatory bowel disease
3. Colorectal malignancy
4. Pregnancy
5. Coexisting anal fistula or anal fissure
6. Incomplete clinical records or loss to follow-up

Surgical Procedures

Laser Hemorrhoidoplasty

Laser procedures were done under regional or general anesthesia with a diode laser system. Laser energy was used submucosally to coagulate and shrink hemorrhoidal tissue, but preserve the surrounding mucosa and anoderm. The minimally invasive aspect of the procedure was designed to minimize tissue damage and post-operative pain.

Conventional Hemorrhoidectomy

The surgeries performed included conventional surgeries such as open Milligan-Morgan hemorrhoidectomy and closed Ferguson hemorrhoidectomy. Hemorrhoidectomy was done with normal surgical tools and vascular pedicle ligatures, following the rules of the institution's surgeries.

Data Collection

Data from hospital medical records and operative notes were used to extract clinical and demographic data. Variables collected included:

Demographic Variables

- Age
- Gender
- Body mass index (BMI)
- Presence of comorbidities

Clinical Variables

- Hemorrhoid grade
- Duration of symptoms
- Operative time
- Estimated intraoperative blood loss
- Type of anesthesia

Postoperative Outcome Variables

- Postoperative pain score using Visual Analog Scale (VAS)
- Length of hospital stay
- Postoperative bleeding
- Wound infection
- Urinary retention
- Time to return to normal activities
- Long-term recurrence
- Patient satisfaction score

A 10-point Visual Analog Scale (VAS) was used for pain assessment during the first week after surgery, with 0 indicating no pain and 10 indicating severe pain.

Patient Satisfaction Survey

To evaluate long-term satisfaction and quality of life, a supplementary postoperative survey was given to 25 randomly selected patients. The survey comprised questions related to the Likert scale of the following:

- Satisfaction with surgical outcome
- Improvement in symptoms
- Ability to resume daily activities
- Willingness to recommend the procedure
- Overall postoperative experience

Responses were categorized on a five-point scale ranging from "very dissatisfied" to "very satisfied."

Outcome Measures

Primary Outcomes

1. Postoperative pain
2. Long-term recurrence rate
3. Postoperative complications

Secondary Outcomes

1. Hospital stay duration
2. Return-to-work time
3. Patient satisfaction
4. Quality-of-life improvement

Statistical Analysis

The statistical package for social science (SPSS) version 26 was used for data analysis. Continuous variables were shown as mean $\pm$ SD, and categorical variables as frequencies and percentages.

This analysis was performed using comparative statistical analysis:

- Independent t-test for continuous variables
- Chi-square test for categorical variables
- Fisher's exact test where applicable
- Mann-Whitney U test for satisfaction score analysis

A p-value of less than 0.05 was considered statistically significant.

Study Limitations

The study was retrospective, conducted in a single center, and had a small sample size and relied on medical records. This may also have been affected by inter- and intra-surgeon experience and postoperative

follow-up adherence. The patient satisfaction questionnaire also had the potential for recall bias.

RESULTS

Overall, 120 patients with symptomatic Grade II–IV hemorrhoids were enrolled in the study. The patients were divided into two groups: laser hemorrhoidoplasty (n=60) and conventional hemorrhoidectomy (n=60). All patients who were included underwent a minimum follow-up of 12 months and were suitable for final outcome analysis.

Baseline Demographic and Clinical Characteristics

There were no statistically significant differences between their demographic and baseline clinical parameters. The mean age of the patients in the laser group was 41.8 ± 10.4 years compared to 43.2 ± 11.1 years for the conventional surgery group ($p=0.48$). In both groups, male patients outnumbered their female counterparts.

Grade III hemorrhoids constituted the most common presentation, accounting for 51.7% of total cases. The prevalence of associated comorbidities including diabetes mellitus and hypertension was similar between the two groups and did not significantly influence surgical outcomes.

Table 1: Baseline Demographic and Clinical Characteristics of Patients

Variable	Laser Group (n=60)	Conventional Group (n=60)	p-value
Mean age (years)	41.8 ± 10.4	43.2 ± 11.1	0.48
Male gender	38 (63.3%)	40 (66.7%)	0.71
BMI (kg/m ²)	26.1 ± 3.5	25.7 ± 3.8	0.56
Grade II hemorrhoids	15 (25.0%)	13 (21.7%)	0.66
Grade III hemorrhoids	31 (51.7%)	30 (50.0%)	0.85
Grade IV hemorrhoids	14 (23.3%)	17 (28.3%)	0.53
Diabetes mellitus	11 (18.3%)	13 (21.7%)	0.64
Hypertension	14 (23.3%)	16 (26.7%)	0.67

There was good comparability between both study groups when examining baseline variables.

Operative and Early Postoperative Outcomes

The mean operative time for the laser hemorrhoidoplasty group was significantly less than that of the conventional surgery group (28.6 ± 7.4 minutes vs 41.2 ± 9.1 minutes, $p<0.001$). Patients who underwent laser surgery also had lower estimated blood loss during surgery.

Visual Analog Scale (VAS) scores showed significantly reduced pain in the laser group the first week after surgery. In the laser group, the mean pain score was 3.1 ± 1.2 , while for the conventional hemorrhoidectomy group, it was 6.4 ± 1.5 ($p<0.001$).

In the same manner, the hospital stay was significantly shorter for those who had laser treatment. The majority of laser-treated patients were released within 24 hours, while the conventional surgery patients often needed a more extended period of post-operative monitoring and pain management.

Patients treated with laser therapy were able to return to normal daily activities and work much sooner than the patients in the conventional hemorrhoidectomy group.

Table 2: Operative and Early Postoperative Outcomes

Outcome Variable	Laser Group	Conventional Group	p-value
Mean operative time (minutes)	28.6 ± 7.4	41.2 ± 9.1	<0.001
Estimated blood loss (mL)	18.3 ± 7.2	42.7 ± 11.5	<0.001
Mean postoperative pain score (VAS)	3.1 ± 1.2	6.4 ± 1.5	<0.001
Mean hospital stay (days)	1.1 ± 0.4	2.8 ± 0.9	<0.001
Return to work (days)	7.4 ± 2.1	15.6 ± 4.2	<0.001

These results showed that laser hemorrhoidoplasty had a positive effect on recovery in the short term and also on the postoperative morbidity.

Postoperative Complications

Both treatment groups had postoperative complications but the incidence was generally less in the laser group. Five laser-treated patients (5.0%) and 13.3% of the patients who had traditional surgery had postoperative bleeding. The conventional hemorrhoidectomy group also had a higher incidence of wound infection and urinary retention. But serious issues such as anal narrowing and bowel incontinence occurred in few of the patients in either group. No deaths and no life-threatening complications were noted during the study.

Table 3: Postoperative Complications

Complication	Laser Group	Conventional Group	p-value
Postoperative bleeding	3 (5.0%)	8 (13.3%)	0.11
Wound infection	2 (3.3%)	7 (11.7%)	0.08
Urinary retention	4 (6.7%)	10 (16.7%)	0.09
Anal stenosis	1 (1.7%)	2 (3.3%)	0.56
Fecal incontinence	0 (0%)	1 (1.7%)	0.31

While there were no significant differences reported for any of the complication subcategories, there appeared to be a general improvement in the incidence of complications after the laser procedures.

Long-Term Clinical Outcomes and Recurrence

Long term follow up showed good symptom management for both groups. Recurrence was slightly higher for those patients who received laser hemorrhoidoplasty, however.

In the laser group, 7 patients (11.7%) had recurrence during the follow-up period, while 5 patients (8.3%) had recurrence in the conventional surgery group. The difference was not significant, $p=0.41$.

The long-term disease control was marginally superior in patients undergoing conventional hemorrhoidectomy. Patients undergoing conventional hemorrhoidectomy had slightly better long-term disease control, especially in those with advanced Grade IV hemorrhoids. However, there was still a significant improvement in symptoms in both groups.

Conventional surgery patients were more likely to have a persistent postoperative discomfort after 6 months.

Table 4: Long-Term Clinical Outcomes

Long-Term Outcome	Laser Group	Conventional Group	p-value
Recurrence rate	7 (11.7%)	5 (8.3%)	0.41
Persistent discomfort	4 (6.7%)	11 (18.3%)	0.04
Chronic wound complications	1 (1.7%)	4 (6.7%)	0.17
Symptom improvement	54 (90.0%)	52 (86.7%)	0.57

Conventional surgery appeared to offer slightly lower recurrence rates, but laser hemorrhoidoplasty proved to be clinically effective with good long-term relief of symptoms, the findings suggested.

Patient Satisfaction Survey Findings

To assess the patient-reported outcomes and quality of life improvement, a supplementary postoperative satisfaction survey was carried out on 25 patients who were randomly selected.

The patients who received the laser treatments expressed greater levels of satisfaction, especially related to pain management, early return to normal activities, and having no pain during the recovery period. A vast majority of laser treated patients reported that the treatment was comfortable and they would recommend it to others.

Patients who underwent conventional hemorrhoidectomy admitted that they experienced long-term symptom relief; however, they often complained of long postoperative discomfort and recovery periods.

Table 5: Patient Satisfaction Survey Outcomes

Survey Parameter	Laser Group (%)	Conventional Group (%)
Very satisfied	68.0%	40.0%
Satisfied	24.0%	36.0%
Neutral	8.0%	16.0%
Dissatisfied	0%	8.0%
Willing to recommend procedure	88.0%	64.0%

Results of the survey pointed to greater patient preference for minimally invasive laser procedures because of less post-operative discomfort and better post-operative experience.

Overall Findings

The present study showed that laser hemorrhoidoplasty had better short-term postoperative outcomes in terms of pain, hospital stay, recovery and patient satisfaction. Conventional hemorrhoidectomy, on the other hand, remained slightly less prone to recurrence, and long-term symptom control was achieved – particularly in cases of advanced hemorrhoidal disease.

Both surgeries were successful and safe, with laser proctology providing distinct benefits in terms of patient comfort and recovery.

DISCUSSION

The present study compared the long term clinical results of laser proctology with those of the conventional procedures for the treatment of symptomatic hemorrhoidal disease. The results showed that laser hemorrhoidoplasty was significantly less painful in the postoperative period, required significantly less hospital stays, allowed patients to return to their normal activities much earlier and was significantly more satisfactory than hemorrhoidectomy. However, there were slightly lower recurrence rates for conventional surgical techniques in longer term follow-up. The results underscore the continued clinical significance of traditional hemorrhoidectomy in the clinical management of advanced proctology and its increasing importance in the field of minimally invasive procedures.

The postoperative pain is one of the most important postoperative concerns after hemorrhoid surgery and is a contributing factor to patient recovery and quality of life. With the present study, patients who had undergone laser hemorrhoidoplasty had markedly less pain during the first week after surgery than did the patients who had had conventional surgery. This result is consistent with previously published comparative studies which showed decreased tissue trauma and decreased nociceptive stimulation with laser-based procedures (1,2). The fact that the laser incisions are limited to a sub mucosal level of coagulation, without extensive tissue removal, may be a factor in the lesser postoperative discomfort seen in laser biopsied patients.

The reduced hospital stay and earlier return to work observed in the laser group is also consistent with the results of more recent systematic reviews and meta-analyses (3). In today's surgical landscape, a quick recovery following surgery has become a vital consideration, driven by the increasing demands of patients, economic factors, and the need to optimize healthcare resources. In the present study, the time for patients to return to normal activity was around a week earlier for those who underwent laser procedures as compared to those who underwent a conventional hemorrhoidectomy. This disparity has implications with a significant socioeconomic impact especially for working age individuals and health care systems with limited availability of hospital beds.

Some differences in the rate of complications were not significant, but the laser group showed less bleeding, urinary retention, and wound infection following surgery. This is similar to other previous studies that have compared minimally invasive hemorrhoid procedures with excisional procedures (4). The lower incidence of postoperative morbidity in laser surgery may be due to the decreased thermal damage to surrounding tissues and maintenance of the integrity of the anoderm. Moreover, the reduced blood loss

during surgery in laser-treated patients corroborates the hemostatic benefits of laser energy during anorectal surgery.

Although the results of the present study were satisfactory in the short term, slight recurrence rates were observed after laser hemorrhoidoplasty surgery as compared to conventional hemorrhoidectomy. While this difference was not significant, it is clinically significant and has been well debated in the literature. The conventional hemorrhoidectomy technique is one that completely removes hemorrhoidal tissue, which may offer more long-term disease control, especially for advanced grade IV hemorrhoids or gross prolapse (5). Laser hemorrhoidoplasty, on the other hand, mainly shrinks tissues, which could lead to a remaining vascular tissue and the reoccurrence of the hemorrhoids.

The same has been observed by several investigators after minimally invasive hemorrhoidal procedures (6). However, in the present study the recurrence rate was acceptable and comparable with previous reported rates. Additionally, the majority of the recurrent cases in the laser group were not severe, and they could be treated conservatively or as outpatients. So, recurrence should be considered in conjunction with patient-centered outcomes including quality of life, postoperative recovery, and comfort.

Laser proctology showed very favourable results for the patient when it came to satisfaction. The majority of patients who received the laser treatment said they were more comfortable during recovery and would recommend the treatment to a friend. This finding is in line with the trend in the world to less invasive surgical procedures, which minimize pain and shorten recovery after surgery. Today, the satisfaction of patients and their experience after the surgery are viewed as critical factors in the success of a procedure. The present findings also have significant implications for healthcare practice in LMICs. Laser surgery provides definite postoperative benefits; however, specialized equipment, expense of the procedure, and the need for trained personnel for the treatment may restrict access in resource-limited health care settings (7). The conventional hemorrhoidectomy, which is a more cost-effective procedure and has proven to be effective in the long-term, is still widely used. Hence, the choice of procedure should depend on more factors than just "clinical outcomes" – institutional resources, surgeon experience and patient affordability are important considerations.

The findings of this study will help to provide regional information on the outcome of hemorrhoid surgery and help to fill the gap in limited comparative evidence available from the South Asian healthcare environment. Treatment outcomes could vary by population due to variations in postoperative care, patient follow-up adherence, healthcare infrastructure, and surgical skills. Thus, the local data

is relevant in assessing the applicability of international surgical recommendations.

The results of this study need to be considered in light of a number of caveats. First, the design is retrospective, which would create a potential for selection bias, and reliance on the accuracy of available medical records. Second, the study was carried out at one centre with a small number of cases; this may make it difficult to interpret the results. Third, satisfaction results were partially dependent on subjective answers in the patient questionnaire and could be subject of recall bias. Postoperative results could also have been influenced by differences in surgical experience and technique. The study does offer clinically relevant comparative information on the short- and long-term outcomes of laser and conventional hemorrhoid surgery, however, even with these limitations.

Further larger multicenter trials with a standardized surgery protocol are suggested to assess the long-term recurrence, cost-effectiveness and quality-of-life of laser proctology. Further studies that evaluate the relative merits of the various minimally invasive techniques for hemorrhoids could further clarify treatment guidelines for the different stages of the disease.

Based on the results of this study, laser hemorrhoidoplasty seems to be a safe and effective minimally invasive surgical procedure alternative to conventional hemorrhoidectomy, especially in terms of postoperative recovery and satisfaction. However, traditional surgery still proves to be a long-term disease-control method and is a significant treatment option, particularly in the case of advanced hemorrhoidal disease.

CONCLUSION

In the present study, both laser proctology and conventional hemorrhoid surgery were found to be effective treatment options for patients suffering from hemorrhoidal symptoms and each treatment method had its own clinical advantages. LHP resulted in significantly less postoperative pain, hospital stay, faster return to normal everyday activities and higher patient satisfaction compared to a traditional hemorrhoidectomy. In the modern practice of proctology these results confirm the increasing tendency to prefer the less invasive surgical techniques.

Although laser surgery procedures had shown favourable short term recovery rates, the traditional hemorrhoidectomy continued to show slightly better recurrence rates and long term symptom control, especially for patients with advanced hemorrhoidal disease. The difference in recurrence rates between the two groups was not statistically significant, but the results indicate that, in some cases, conventional excisional surgery may be more effective in long-term tissue eradication.

The study also emphasized the need to consider patient recovery, comfort, long-term outcomes, and access to healthcare resources in choosing which surgical approach is ideal for the individual patient. Cost, equipment availability, and surgeon experience are still relevant factors in lower income health care facilities.

In summary, laser hemorrhoidoplasty seems to be a safe, effective and patient-friendly method of hemorrhoid surgery, particularly for patients who are seeking fewer postoperative symptoms and faster recovery times. However, conventional hemorrhoidectomy is still a good and clinically relevant procedure for the advanced and recurrent disease. Further multicentre, prospective studies at large scales are suggested to draw more definitive conclusions on the long-term recurrence, cost effectiveness and quality of life outcomes of both surgical interventions.

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