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Research Article

Comparative Study of Post-Operative Outcome Between Open Haemorrhoidectomy and Laser Haemorrhoidoplasty

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Abstract: ***Introduction:*** Haemorrhoidal disease is a common anorectal condition that often needs surgery in advanced stages. Open haemorrhoidectomy is still the standard treatment. However, pain after surgery and slow recovery have led to the use of less invasive methods like laser haemorrhoidoplasty. **Objective:** To compare postoperative outcomes between open haemorrhoidectomy and laser haemorrhoidoplasty in patients with grade III and IV haemorrhoids. **Methods:** The prospective comparative study was conducted in the Department of Surgery, Dr. D. Y. Patil Medical College, Hospital and Research Institute, Kolhapur, over a period of 2 years. Fifty patients with grade III or IV haemorrhoids were enrolled and allocated into two groups: Laser Haemorrhoidoplasty (n=25) and Open Haemorrhoidectomy (n=25). Outcomes assessed included operative time, intraoperative blood loss, postoperative pain using the Visual Analogue Scale (VAS), hospital stay, return to normal activity, postoperative complications, and recurrence. Statistical analysis was performed using SPSS version 25.0, with $p<0.05$ considered significant. **Results:** Operative time was significantly shorter in the laser group (33.28±8.82 vs. 57.28±10.41 minutes; $p<0.001$). Mean intraoperative blood loss was markedly lower following laser haemorrhoidoplasty (16.80±12.39 vs. 105.80±51.20 mL; $p<0.001$). Postoperative pain scores were significantly reduced in the laser group at 6 hours (2.72±1.43 vs. 6.52±1.45), 24 hours (1.96±1.65 vs. 5.48±1.45), and 7 days (0.56±1.00 vs. 2.60±1.68) (all $p<0.001$). Patients undergoing laser haemorrhoidoplasty demonstrated faster postoperative recovery and fewer perioperative morbidities. **Conclusion:** Laser haemorrhoidoplasty is considered a safe and effective alternative to open haemorrhoidectomy, offering significantly shorter operative time, blood loss, postoperative pain, and enhanced recovery. It ca be considered a minimally invasive option for selected patients with advanced haemorrhoidal disease.

Keywords: Haemorrhoidal Disease; Open Haemorrhoidectomy; Milligan–Morgan Procedure; Laser Haemorrhoidoplasty; Postoperative Pain.

INTRODUCTION

Haemorrhoidal disease represents one of the most common anorectal disorders worldwide, with a significant impact on quality of life and healthcare resources. Over the decades, surgery has remained the mainstay of treatment for severe haemorrhoidal disease, with open haemorrhoidectomy historically considered the gold standard procedure. However, in recent years, minimally invasive techniques such as laser haemorrhoidoplasty have gained momentum, offering the promise of effective symptom control with reduced postoperative morbidity. The comparative evaluation of postoperative outcomes between these two surgical approaches has become an important area of interest, as both patients and surgeons seek an optimal balance between efficacy, safety, and recovery.[1]

Open haemorrhoidectomy, popularized by Milligan and Morgan, has long been regarded as the definitive treatment for advanced haemorrhoids due to its low recurrence rates and reliable long-term outcomes. The procedure involves excision of haemorrhoidal tissue with careful preservation of mucocutaneous bridges, allowing for secondary healing. Despite its efficacy, open haemorrhoidectomy is often criticized for its associated drawbacks, which include considerable postoperative pain, delayed wound healing, risk of anal stenosis, and prolonged time away from work. These limitations, particularly the intense pain experienced in the immediate postoperative period, have spurred the development of alternative surgical techniques that aim to minimize tissue trauma while achieving comparable efficacy. As patients increasingly prioritize not only cure

but also comfort and rapid return to normal activity, minimally invasive options are being explored with growing enthusiasm.[2]

Laser haemorrhoidoplasty represents one such advancement, utilizing laser energy to shrink and coagulate haemorrhoidal tissue without excising it. The procedure involves the introduction of a radial fibre tip into the haemorrhoidal mass, delivering controlled energy that induces fibrosis, reduces vascularity, and restores the haemorrhoidal cushions to their physiological state. Because it avoids cutting and open wounds, laser haemorrhoidoplasty is associated with significantly less tissue trauma, minimal intraoperative bleeding, and faster convalescence. Early reports suggest that patients undergoing this procedure experience markedly reduced postoperative pain, require fewer analgesics, and are able to resume normal daily activities sooner compared to those undergoing open haemorrhoidectomy. However, critics argue that the long-term efficacy and recurrence rates of laser haemorrhoidoplasty remain areas of concern, with some studies indicating the need for additional interventions in a subset of patients.[3]

The comparison between open haemorrhoidectomy and laser haemorrhoidoplasty reflects the balance between established surgical efficacy and minimally invasive innovation. While open haemorrhoidectomy provides proven long-term outcomes, it is associated with greater postoperative pain. In contrast, laser haemorrhoidoplasty offers reduced discomfort and faster recovery, although evidence regarding its long-term effectiveness is still evolving. surgical practice continues to shift towards patient-centered care, the choice between these modalities is likely to be increasingly shaped by individualized assessments of postoperative quality of life rather than solely by traditional markers of surgical success.[4]

MATERIALS AND METHODS

The prospective observational cross-sectional comparative study was conducted in the Department of Surgery at Dr. D. Y. Patil Medical College, Hospital and Research Institute, Kolhapur, over a period of two years. Consecutive sampling method was employed and total of 50 patients were selected for the study. The study was started after receiving ethical clearance from the Institutional Ethics Committee.

Inclusion Criteria

Patients age above 18 years with Third - and Fourth-degree Haemorrhoids.

Exclusion Criteria

Patients with ascites associated with portal hypertension, fistula-in-ano, rectal malignancy, pregnant women.

All eligible patients admitted with third- or fourth-degree hemorrhoids were prepared preoperatively with routine investigations and bowel preparation as per institutional protocol. After obtaining informed consent, patients were randomized to either the open hemorrhoidectomy or the laser hemorrhoidoplasty group.

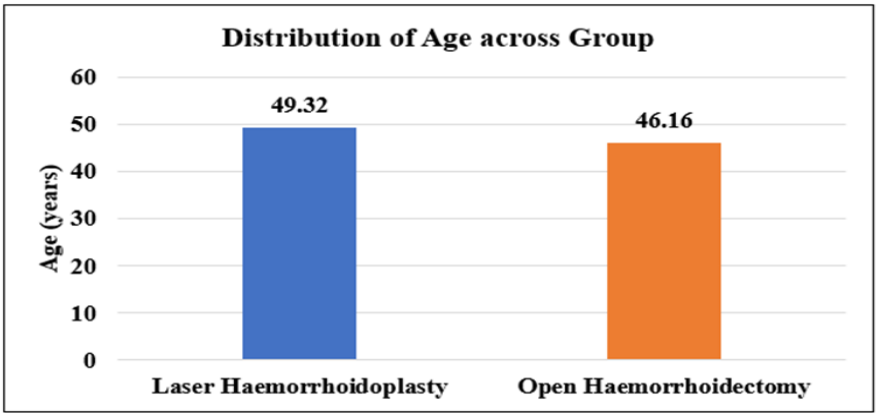
In the open hemorrhoidectomy group, the Milligan-Morgan technique was employed. Patients were placed in lithotomy position, and hemorrhoidal tissue was excised under anesthesia using standard surgical instruments. Hemostasis was secured, and wounds were left open for secondary healing.

In the laser hemorrhoidoplasty group, a diode laser with wavelengths of 918 nm or 1470 nm was used. Approximately 100–150 Joules per pile mass at 8 watt/sec in continuous mode was applied. The intra-hemorrhoidal route was followed using either bare fiber or radial fiber probes. Laser energy was delivered directly into the hemorrhoidal tissue, causing coagulation and shrinkage of the vascular plexus without excision.

All patients were monitored intraoperatively for blood loss, hemodynamic stability, and operative duration. Postoperative care was standardized across both groups, with analgesics, stool softeners, and dietary advice provided as per protocol.

Data was collected using a structured proforma and entered into Microsoft Excel. Statistical analysis was conducted using a SPSS 25.0 version. Continuous variables such as operative time, blood loss, pain scores, and hospital stay were expressed as mean ± standard deviation and compared using Student's t-test. Categorical variables such as complication rates and recurrence were expressed as frequencies and percentages and compared using Chi-square or Fisher's exact test, as appropriate. A p-value of <0.05 was considered statistically significant.

RESULTS



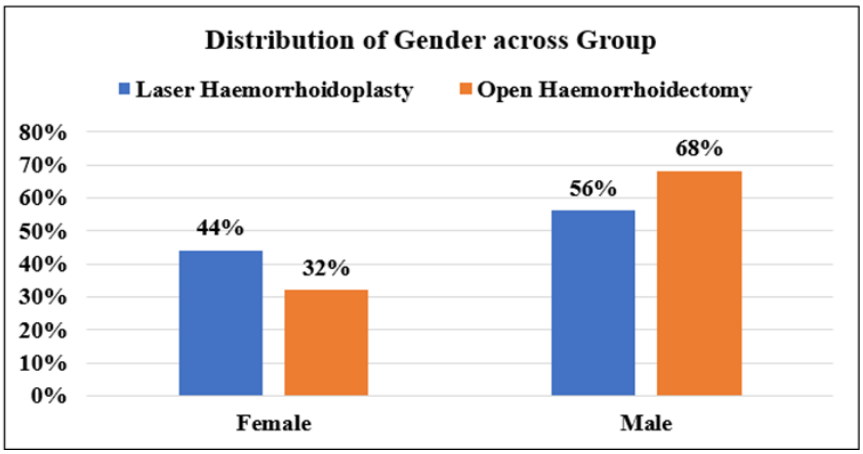


Figure 1: Baseline Demographic Characteristics of Patients in Laser Haemorrhoidoplasty and Open Haemorrhoidectomy Groups

The baseline demographic characteristics were comparable between the two study groups. The mean age was 49.32 ± 10.39 years in the Laser Haemorrhoidoplasty group and 46.16 ± 8.25 years in the Open Haemorrhoidectomy group. Males constituted the majority of patients in both groups, accounting for 56% and 68% of patients in the Laser Haemorrhoidoplasty and Open Haemorrhoidectomy groups, respectively. This indicates a broadly similar demographic profile between the treatment groups.

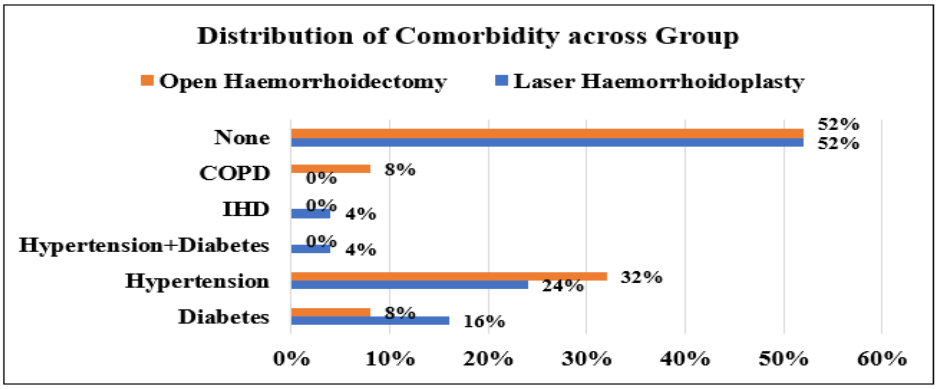


Figure 2: Baseline Clinical Characteristics of Patients in Laser Haemorrhoidoplasty and Open Haemorrhoidectomy Groups

The distribution of comorbidities was comparable between the two groups, with 52% of patients in each group having no associated systemic illness. Hypertension was the most common comorbidity in both groups. Most patients belonged to ASA Grade I or II, indicating acceptable operative fitness. Although the Laser Haemorrhoidoplasty group included a slightly higher proportion of ASA Grade II and III patients, it still demonstrated superior perioperative and postoperative

outcomes. These findings suggest that baseline clinical characteristics were broadly comparable between groups and were unlikely to have significantly influenced the observed differences in postoperative outcomes.

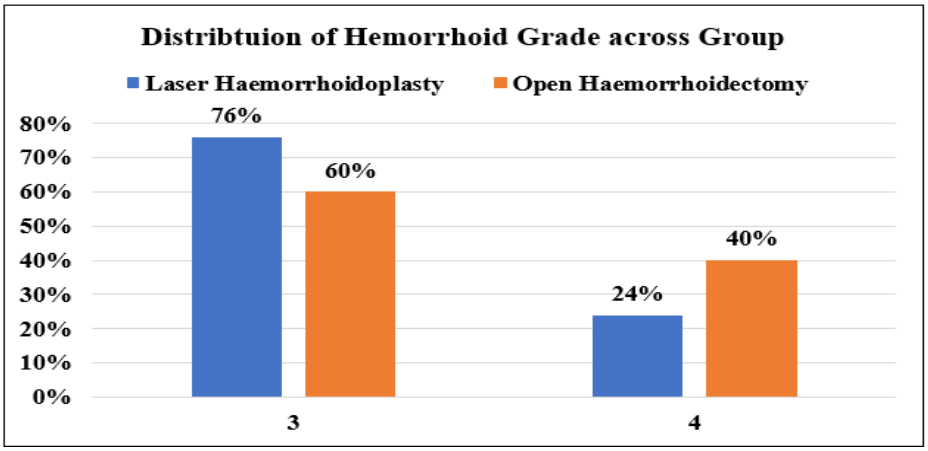


Figure 3: Distribution of Hemorrhoid Grade Among Patients in Laser Haemorrhoidoplasty and Open Haemorrhoidectomy Groups

In the Laser Haemorrhoidoplasty group, 19 patients (76%) had grade 3 hemorrhoids and 6 patients (24%) had grade 4 hemorrhoids. In the Open Haemorrhoidectomy group, 15 patients (60%) had grade 3 hemorrhoids and 10 patients (40%) had grade 4 hemorrhoids. Grade 3 hemorrhoids were more frequent in both treatment groups.

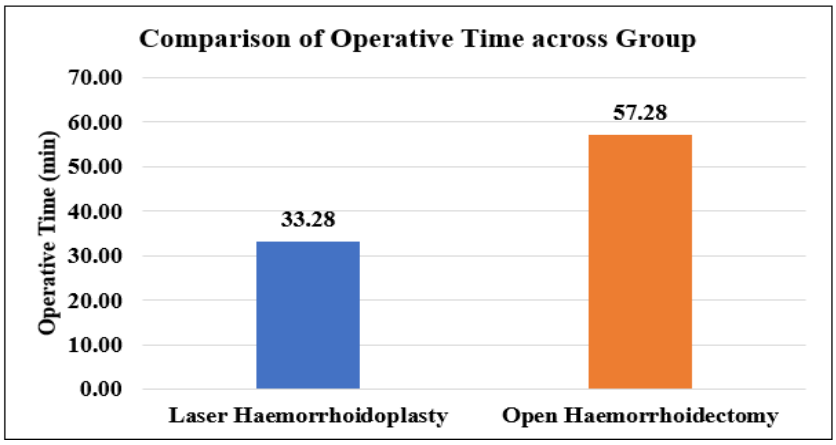


Figure 4: Comparison of Mean Operative Time Between Laser Haemorrhoidoplasty and Open Haemorrhoidectomy Groups

The mean operative time was 33.28 ± 8.82 minutes in the Laser Haemorrhoidoplasty group and 57.28 ± 10.41 minutes in the Open Haemorrhoidectomy group. Operative time was lower in the laser group compared with the open haemorrhoidectomy group, and this difference was statistically significant with a p-value <0.001.

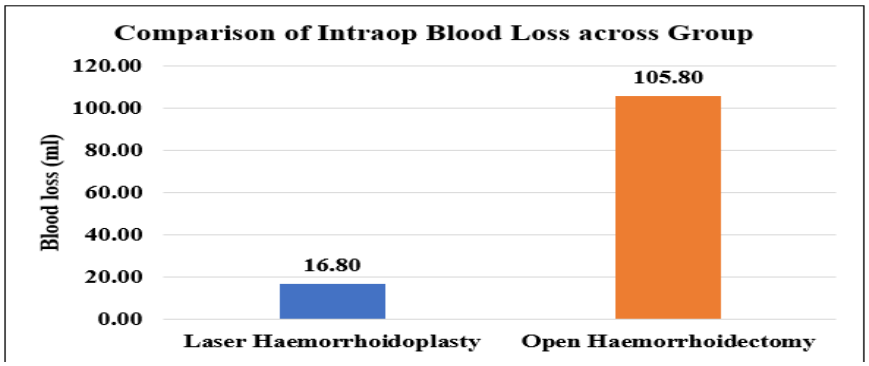


Figure 5: Comparison of Mean Intraoperative Blood Loss Between Laser Haemorrhoidoplasty and Open Haemorrhoidectomy Groups

The mean intraoperative blood loss was 16.80 ± 12.39 ml in the Laser Haemorrhoidoplasty group and 105.80 ± 51.20 ml in the Open Haemorrhoidectomy group. Blood loss was markedly lower in the laser group than in the open haemorrhoidectomy group, with a statistically significant difference at p-value <0.001.

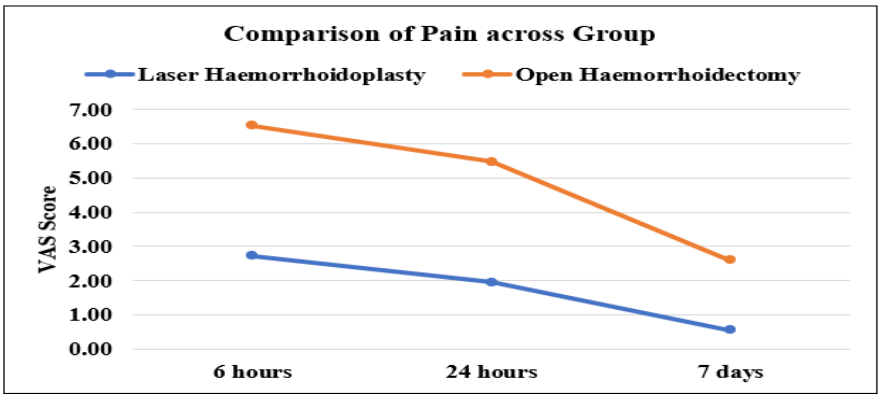


Figure 6: Comparison of Postoperative Pain Scores (VAS) at 6 Hours, 24 Hours and 7 Days Between Laser Haemorrhoidoplasty and Open Haemorrhoidectomy Groups

The mean VAS score was lower in the Laser Haemorrhoidoplasty group at 6 hours (2.72 ± 1.43 vs 6.52 ± 1.45), 24 hours (1.96 ± 1.65 vs 5.48 ± 1.45), and 7 days (0.56 ± 1.00 vs 2.60 ± 1.68) compared with Open Haemorrhoidectomy. The differences were statistically significant at all intervals with p-value <0.001.

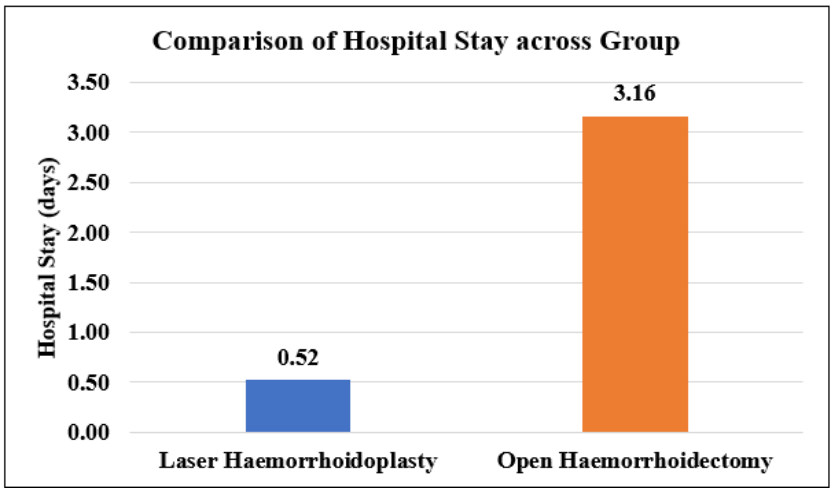


Figure 7: Comparison of Mean Duration of Hospital Stay Between Laser Haemorrhoidoplasty and Open Haemorrhoidectomy Groups

The mean duration of hospital stay was 0.52 ± 0.65 days in the Laser Haemorrhoidoplasty group and 3.16 ± 1.14 days in the Open Haemorrhoidectomy group. Hospital stay was shorter in the laser group compared with the open haemorrhoidectomy group, and the difference was statistically significant with p-value <0.001.

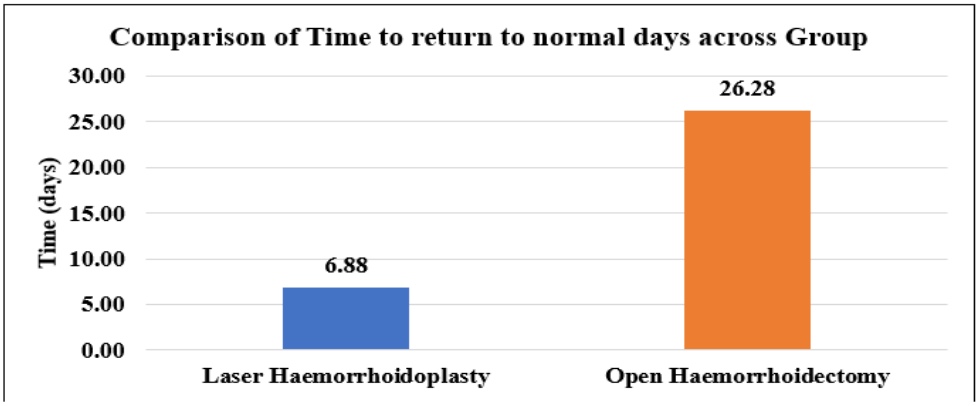


Figure 8: Comparison of Mean Time to Return to Normal Activity Between Laser Haemorrhoidoplasty and Open Haemorrhoidectomy Groups

The mean time to return to normal activity was 6.88 ± 4.23 days in the Laser Haemorrhoidoplasty group and 26.28 ± 5.76 days in the Open Haemorrhoidectomy group. Return to normal activity was earlier in the laser group, with a statistically significant difference between the two groups at p-value <0.001.

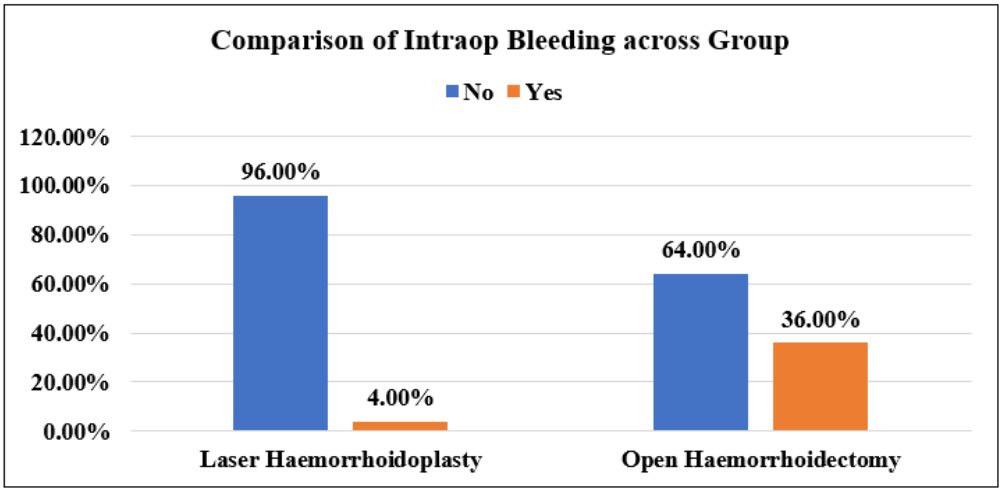


Figure 9: Comparison of Intraoperative Bleeding Between Laser Haemorrhoidoplasty and Open Haemorrhoidectomy Groups

Intraoperative bleeding was absent in 24 patients (96%) in the Laser Haemorrhoidoplasty group and 16 patients (64%) in the Open Haemorrhoidectomy group. Bleeding was present in 1 patient (4%) in the laser group and 9 patients (36%) in the open group. The difference was statistically significant with p-value = 0.005.

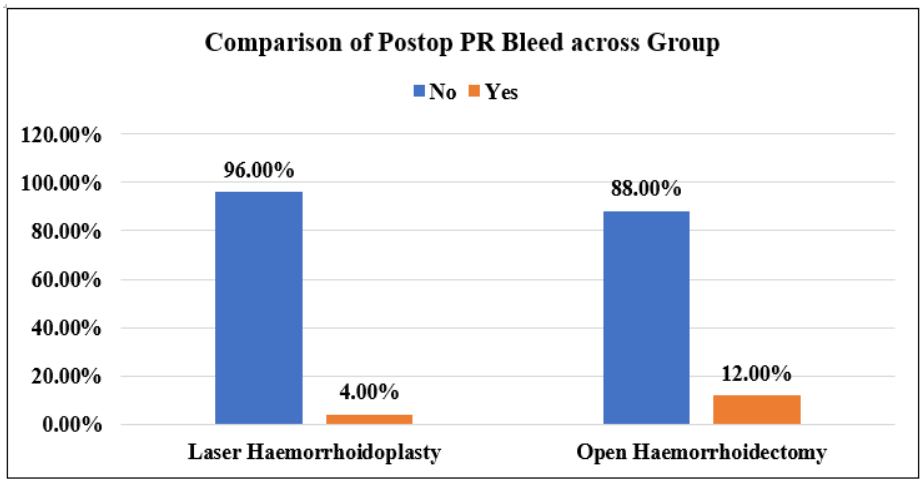


Figure 10: Comparison of Postoperative Per Rectal Bleeding Between Laser Haemorrhoidoplasty and Open Haemorrhoidectomy Groups

Postoperative per rectal bleeding was absent in 24 patients (96%) in the Laser Haemorrhoidoplasty group and 22 patients (88%) in the Open Haemorrhoidectomy group. Bleeding was present in 1 patient (4%) and 3 patients (12%), respectively. The difference was not statistically significant, with p-value = 0.609.

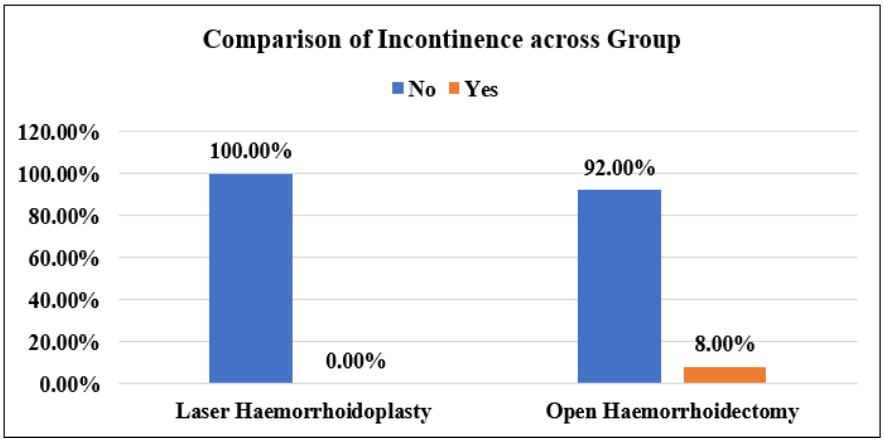


Figure 11: Comparison of Postoperative Incontinence Between Laser Haemorrhoidoplasty and Open Haemorrhoidectomy Groups

Postoperative incontinence was absent in 25 patients (100%) in the Laser Haemorrhoidoplasty group and 23 patients (92%) in the Open Haemorrhoidectomy group. Incontinence was reported in 0 patients (0%) in the laser group and 2 patients (8%) in the open group. The difference was not statistically significant, with p-value = 0.149.

***Indicates Significance (p-value<0.05)**

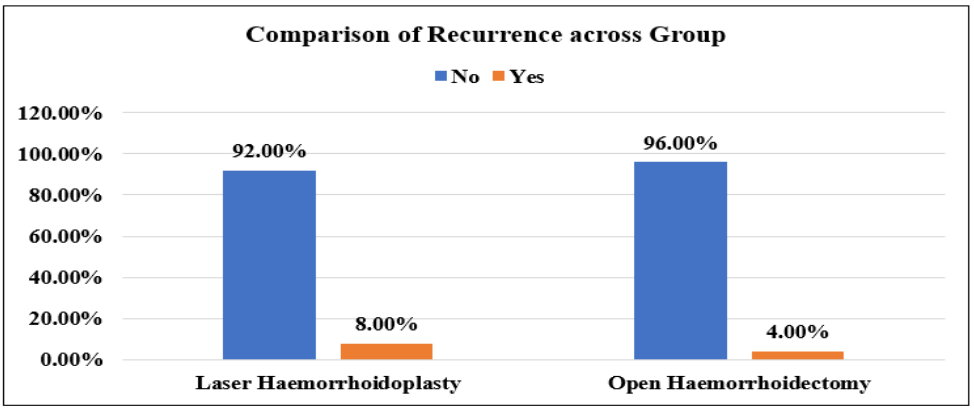


Figure 12: Comparison of Recurrence at 6 Months Between Laser Haemorrhoidoplasty and Open Haemorrhoidectomy Groups

At 6 months, recurrence was absent in 23 patients (92%) in the Laser Haemorrhoidoplasty group and 24 patients (96%) in the Open Haemorrhoidectomy group. Recurrence was observed in 2 patients (8%) and 1 patient (4%), respectively. The difference between groups was not statistically significant, with p-value = 0.552.

DISCUSSION

The aim of the present study was to compare the postoperative outcomes between Open Haemorrhoidectomy and Laser Haemorrhoidoplasty in patients with symptomatic grade 3 and grade 4 hemorrhoids, with special focus on operative efficiency, intraoperative blood loss, postoperative pain, hospital stay, return to normal activity, complications, and recurrence.

The present study included 50 patients, with 25 patients each in the Laser Haemorrhoidoplasty (LHP) and Open Haemorrhoidectomy groups. The mean age was 49.32 ± 10.39 years in the LHP group and 46.16 ± 8.25 years in the Open Haemorrhoidectomy group, indicating that both groups represented a middle-aged population commonly affected by advanced haemorrhoidal disease. These findings are comparable to those reported by Maloku et al. [5]. Male predominance was observed in both groups, accounting for 56% and 68% of patients in the LHP and Open

Haemorrhoidectomy groups, respectively. Similar male predominance has been reported by Maloku et al. [5] and Brusciano et al. [6]. The comparable demographic profile between groups supports the validity of postoperative outcome comparisons.

Comorbidity distribution was comparable between the two groups, with 13 patients (52%) in each group having no comorbidity. Hypertension was the most common comorbidity, affecting 24% of patients in the Laser Haemorrhoidoplasty (LHP) group and 32% in the Open

Haemorrhoidectomy group. Similar consideration of baseline comorbidities in comparative haemorrhoid surgery has been reported by Adas et al. [7], while Durgun et al. [8] demonstrated comparable baseline characteristics between LHP and LigaSure haemorrhoidectomy groups.

Most patients in both groups belonged to ASA grade I or II. In the LHP group, 28%, 52%, and 20% of patients were ASA grades I, II, and III, respectively, compared with 44%, 40%, and 16% in the Open Haemorrhoidectomy group. Despite a slightly higher proportion of ASA grade II and III patients in the LHP group, superior perioperative and postoperative outcomes were observed. Brusciano et al. [6] reported no significant intraoperative complications following 1470-nm diode laser haemorrhoidoplasty, while Gambardella et al. [9] found comparable intraoperative safety between LHP and Milligan- haemorrhoidectomy. These findings suggest that LHP is safe and effective even in patients with mild-to-moderate systemic illness.

Grade III hemorrhoids predominated in both groups, accounting for 76% of cases in the LHP group and 60% in the Open Haemorrhoidectomy group. Similar patient populations with grade III–IV disease were evaluated by Maloku et al. [5], Majumder et al. [10], and Mert et al. [11]. Despite the inclusion of advanced hemorrhoids, LHP demonstrated superior early postoperative outcomes.

The mean operative time was significantly lower in the LHP group (33.28 ± 8.82 minutes) compared with the Open Haemorrhoidectomy group (57.28 ± 10.41 minutes; $p<0.001$). Similar reductions in operative duration with LHP have been reported by Poskus et al. [12], Eskandaros et al. [13]. The shorter operative time reflects the minimally invasive nature of laser treatment.

Mean intraoperative blood loss was significantly lower in the LHP group (16.80 ± 12.39 ml) than in the Open Haemorrhoidectomy group (105.80 ± 51.20 ml; $p<0.001$). Comparable findings were reported by Naderan et al. [14], Majumder et al. [10], Tümer et al. [15], and Adas et al. [7]. The coagulative effect of laser energy contributes to superior haemostasis.

Patients undergoing LHP experienced significantly lower postoperative pain at 6 hours, 24 hours, and 7 days (all $p<0.001$). Similar observations have been reported by Maloku et al. [5], Naderan et al. [14], Brusciano et al. [6], and Durgun et al. [8]. Reduced tissue trauma and preservation of anoderm likely explain the lower pain scores following LHP.

The mean hospital stay was significantly shorter following LHP (0.52 ± 0.65 days) than Open Haemorrhoidectomy (3.16 ± 1.14 days; $p<0.001$). Similar findings were reported by Eskandaros et al. [13] and Majumder et al. [10]. Reduced pain, minimal bleeding, and faster mobilization facilitate earlier discharge after LHP.

Patients treated with LHP returned to normal activities significantly earlier than those undergoing Open Haemorrhoidectomy (6.88 ± 4.23 vs 26.28 ± 5.76 days; $p<0.001$). Comparable results have been reported by Eskandaros et al. [13], Poskus et al. [12], and Jain et al. [16]. Faster recovery represents one of the major advantages of laser treatment.

Intraoperative bleeding occurred significantly less frequently in the LHP group (4%) compared with the Open Haemorrhoidectomy group (36%; $p=0.005$). Similar findings have been reported by Naderan et al. [14], and Majumder et al. [10], supporting the haemostatic benefits of laser surgery.

Postoperative per rectal bleeding was less frequent following LHP (4%) than Open Haemorrhoidectomy (12%), although the difference was not statistically significant ($p=0.609$). Comparable trends have been reported by Eskandaros et al. [13] and Zakaria et al. [17].

No patient in the LHP group developed postoperative incontinence, whereas two patients (8%) in the Open Haemorrhoidectomy group experienced this complication. Although the difference was not statistically significant ($p=0.149$), the findings are consistent with reports by Poskus et al. [12], Shabahang et al. [18] suggesting that LHP preserves anorectal function effectively.

Recurrence rates at 6 months were comparable between groups, occurring in 8% of patients after LHP and 4% after Open Haemorrhoidectomy ($p=0.552$). Similar recurrence rates have been reported by Poskus et al. [12] and Eskandaros et al. [13]. The present findings suggest acceptable short-term efficacy of LHP, while longer follow-up is required to assess long-term durability.

Overall, these findings demonstrate that Laser Haemorrhoidoplasty provides superior short-term postoperative outcomes, including reduced operative time, blood loss, pain, hospital stay, and faster return to normal activity, while maintaining comparable short-term recurrence rates to Open Haemorrhoidectomy.

The present study's major strength lies in its direct comparative design between Laser Haemorrhoidoplasty and Open Haemorrhoidectomy, with equal group sizes and comprehensive evaluation of clinically relevant outcomes, including operative time, blood loss, postoperative pain, hospital stay, return to normal activity, complications, and recurrence. The inclusion of objective outcome measures and grade III–IV hemorrhoids enhance the clinical applicability of the findings. However, the study was limited by its relatively small sample size and short follow-up period of 6 months, which may not adequately reflect long-term

recurrence and treatment durability. The higher proportion of grade IV hemorrhoids in the open surgery group may have influenced some outcomes. Furthermore, quality of life, patient satisfaction, analgesic requirements, and cost-effectiveness were not assessed. Therefore, larger randomized studies with longer follow-up are required to confirm these results.

CONCLUSION

The above findings state that Laser Haemorrhoidoplasty can be concluded to be a safe, effective, minimally invasive, and patient-friendly alternative to Open Haemorrhoidectomy for appropriately selected patients with symptomatic grade 3 and grade 4 hemorrhoids. It provides clear advantages in terms of shorter operative time, minimal blood loss, lower postoperative pain, shorter hospitalization, earlier return to normal activity, and reduced intraoperative bleeding. Open Haemorrhoidectomy remains an effective conventional procedure, particularly for durable excisional control, but it is associated with greater postoperative pain, longer hospital stay, delayed recovery, and increased intraoperative blood loss. The absence of statistically significant differences in postoperative bleeding, incontinence, and recurrence suggests that the early recovery benefits of Laser Haemorrhoidoplasty are achieved without major compromise in short-term safety or effectiveness.

Overall, the findings support the use of Laser Haemorrhoidoplasty as a preferable surgical option where early recovery, patient comfort, reduced morbidity, and rapid return to daily activities are important treatment goals, while longer follow-up and larger studies are needed to further evaluate long-term recurrence and durability.

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