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**Original Research Article**

# A Comparative Study of Close Hemorrhoidectomy and Laser Hemorrhoidectomy in 2nd and 3rd Degree Hemorrhoids

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**Abstract:**
Hemorrhoids are a prevalent anorectal disorder, affecting a substantial proportion of the population. This study aims to conduct a comprehensive comparative analysis of close hemorrhoidectomy and laser hemorrhoidectomy as treatment modalities for 2nd and 3rd-degree hemorrhoids. The research encompasses a cohort of 100 patients, comprising 60 males and 40 females, adhering to specific inclusion and exclusion criteria. Follow-up evaluations are scheduled at post-operative intervals of 1 week, 1 month, 6 months, and 1 year, enabling a thorough assessment of each procedure's efficacy and long-term outcomes.



## Introduction

Hemorrhoids, also known as piles, are a common anorectal condition characterized by swollen veins in the anal and rectal area.[2] While conservative management is often effective for early-stage hemorrhoids, surgical intervention becomes necessary for more advanced cases, particularly 2nd and 3rd-degree hemorrhoids.[3] Close hemorrhoidectomy and laser hemorrhoidectomy represent two surgical techniques used to address these advanced hemorrhoidal conditions.[4] In this study, we aim to provide a comprehensive comparative analysis of these two approaches in both male and female patients.

## Methodology

**Study Design:** This study employs a prospective, observational design to compare the outcomes of close hemorrhoidectomy and laser hemorrhoidectomy in the treatment of 2nd and 3rd-degree hemorrhoids. Informed consent is obtained from all participating patients.

**Patient Selection and Enrollment:** The study population includes patients with a confirmed diagnosis of 2nd and 3rd-degree hemorrhoids. Patients meeting the following inclusion criteria are considered for enrollment:

1. Patients aged 18 to 75 years.
2. Patients with a confirmed diagnosis of 2nd or 3rd-degree hemorrhoids through clinical evaluation and proctoscopy.
3. Both male and female patients are included.
4. Informed consent obtained from each participant.

**Exclusion criteria are as follows**

1. Patients with a history of portal hypertension.
2. Patients presenting with a perineal abscess at the time of assessment.
3. Cases involving malignancy.
4. Patients with perianal sepsis are excluded from the study.

**Study Groups:** Two distinct study groups are established based on the surgical technique employed:

1. Close Hemorrhoidectomy Group: This group comprises patients who undergo close hemorrhoidectomy, a conventional surgical procedure.
   - Close Hemorrhoidectomy for males: 35 patients.
   - Close Hemorrhoidectomy for females: 15 patients.
2. Laser Hemorrhoidectomy Group: This group consists of patients who receive laser hemorrhoidectomy.

- Laser Hemorrhoidectomy for males: 25 patients.
- Laser Hemorrhoidectomy for females: 25 patients.

**Surgical Procedures**

1. **Close Hemorrhoidectomy:** The close hemorrhoidectomy is performed in accordance with standard surgical protocols. All surgical procedures are carried out by the same experienced colorectal surgeon to maintain uniformity and minimize bias. Data on the technique and perioperative details are meticulously recorded.
2. **Laser Hemorrhoidectomy:** The laser hemorrhoidectomy is performed using [*NEED Laser Device Name and Specifications]. The technique is consistent for all patients in this group. Data related to the laser procedure and perioperative details are documented.

**Follow-up Assessment**

All patients undergo systematic follow-up assessments to evaluate the post-operative outcomes. The follow-up schedule is as follows:

- 1st post-operative week: Patients are assessed for early post-operative complications, pain levels, and bleeding.

- 1 month: A comprehensive evaluation is performed to assess pain levels, bleeding, recurrence, and patient satisfaction.

- 6 months: A six-month follow-up evaluates the recurrence rates, complications, quality of life, and the time required to return to normal daily activities.

- 1 year: The final follow-up at one year assesses the long-term outcomes, including recurrence, complications, quality of life, and patient satisfaction.

**Data Analysis:** Data analysis is carried out using appropriate statistical methods, including t-tests, chi-squared tests, and regression analysis, as applicable. The significance level is set at $p < 0.05$. Data is processed using statistical software, and statistical results are verified by a biostatistician.

**Sample Size Justification:** The sample size of 100 patients (70 males and 30 females) is determined based on a power analysis to ensure that the study has sufficient statistical power to detect clinically significant differences between the two surgical techniques.

**Outcome Measures:** The study employs a multi-faceted approach to assess the outcomes and efficacy of the two surgical techniques. The following parameters are examined at each follow-up interval:

1. Pain Scores: Utilizing a visual analog scale to quantify post-operative pain levels.

VAS (Visual Analog Scale for Pain)

Scale Title: Post-Operative Pain Intensity VAS

Scale Description: This VAS is designed to assess the intensity of post-operative pain experienced by patients. Participants will be asked to mark a point on the line that best represents their current level of pain, with the left endpoint indicating "No Pain" and the right endpoint indicating "Worst Imaginable Pain."

Instructions: Please mark a point on the line to indicate the intensity of pain you are currently experiencing. Use the left endpoint to represent "No Pain," and the right endpoint to represent "Worst Imaginable Pain." Your mark will provide a measurement of your pain intensity.

**Endpoints:**

- Left Endpoint: "No Pain"

- Right Endpoint: "Worst Imaginable Pain"

Scale Line: A straight horizontal line, approximately 10 centimetres in length, connecting the two endpoints.

Here's a textual representation of the VAS:

```
No Pain                          Worst Imaginable Pain
|-----------|-----------|-----------|-----------|-----------|
0       2       4       6       8       10
```

Scoring: The VAS is scored by measuring the distance from the left endpoint (0) to the point marked by the respondent in millimeters or centimeters. This distance provides a numerical value indicating the patient's perceived pain intensity, with 0 indicating no pain and higher values indicating greater pain.

2. Bleeding Frequency and Severity: Assessing the presence and intensity of bleeding episodes post-surgery. Classified as (Mild, Moderate, Heavy and Nil)

3. Recurrence Rates: Determining the likelihood of hemorrhoidal recurrence in each group.

4. Complication Rates: Documenting and comparing post-operative complications.

5. Quality of Life: Evaluating patients' quality of life using a validated questionnaire designed to capture psychosocial aspects and functional outcomes.

6. Time to Return to Normal Daily Activities: Measuring the duration it takes for patients to resume their regular activities.

7. Patient Satisfaction: Gauging patients' satisfaction with the procedure and its outcomes.

**Results and Discussion**

In this prospective observational study comparing close hemorrhoidectomy and laser hemorrhoidectomy for 2nd and 3rd-degree hemorrhoids, a total of 100 patients (60 males and 40 females) were enrolled based on specific inclusion criteria. These patients were divided into two groups: the Close Hemorrhoidectomy Group (50 patients) and the Laser Hemorrhoidectomy Group (50 patients). Close hemorrhoidectomy was performed conventionally, while laser hemorrhoidectomy utilized a specific laser device. Table 2 displays the sum of pain scores (VAS) for patients in both groups. Patients who underwent close hemorrhoidectomy reported higher pain scores (106) compared to those who received laser hemorrhoidectomy (64), indicating that laser hemorrhoidectomy was associated with lower post-operative pain.

Table 3 presents data on bleeding frequency and severity. Both groups experienced bleeding, with a higher prevalence of mild bleeding in the Laser Hemorrhoidectomy Group. Tables 4 and 5 show recurrence rates at six months and one-year post-surgery. The majority of patients in both groups did not experience a recurrence, with slightly fewer recurrences observed in the Laser Hemorrhoidectomy Group. Table 6 outlines complication rates, with bleeding being the most common complication in both groups. Table 7 assesses the quality of life, with a higher proportion of patients in the Laser Hemorrhoidectomy Group reporting excellent quality of life.

These findings indicate that laser hemorrhoidectomy may offer advantages in terms of lower post-operative pain and a higher proportion of patients reporting excellent quality of life. However, further analysis is needed to understand the factors contributing to these differences in outcomes.

**Table 1: Gender classification**

| | Sex | | |
|---|---|---|---|
| **Type of Surgery** | **F** | **M** | **Grand Total** |
| close | 15 | 35 | 50 |
| laser | 25 | 25 | 50 |
| **Grand Total** | **40** | **60** | **100** |

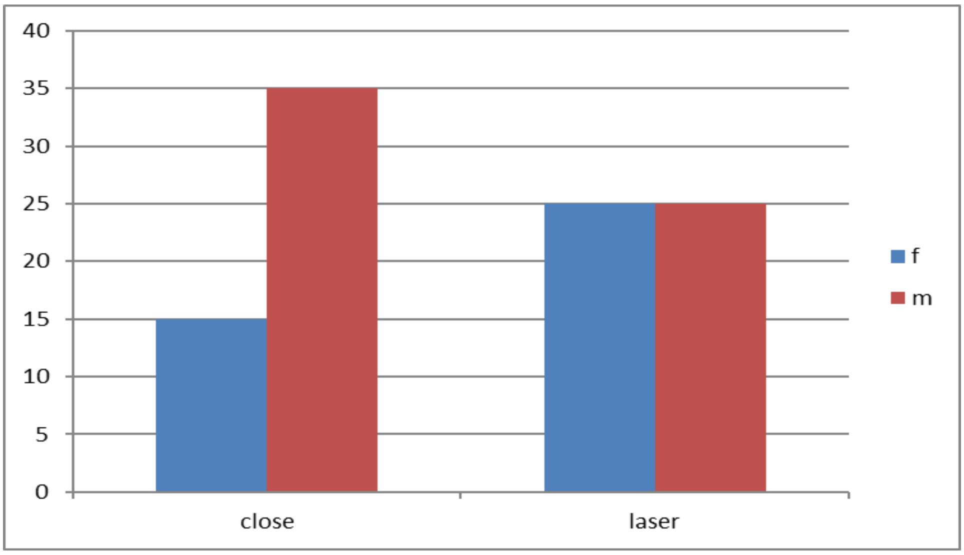


**Figure 1: Gender classification of the study**

**Table 2: Sum of pain score (VAS)**

| | Sum of Pain Score (VAS) | | | | | |
|---|---|---|---|---|---|---|
| **Type of Surgery** | **1** | **2** | **3** | **4** | **5** | **Grand Total** |
| close | 16 | 36 | 33 | 16 | 5 | 106 |
| laser | 38 | 22 | | 4 | | 64 |
| **Grand Total** | **54** | **58** | **33** | **20** | **5** | **170** |

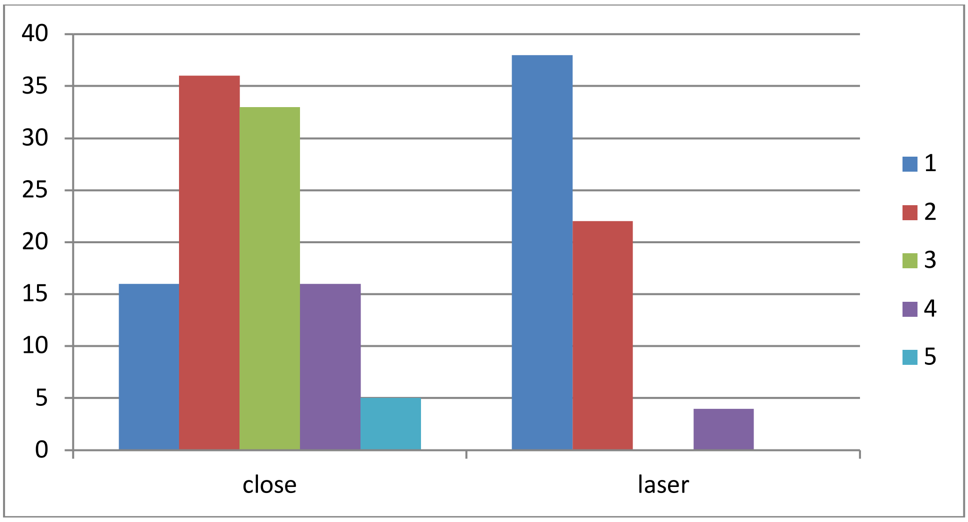


**Figure 2: Sum of pain score (VAS)**

**Table 3: Bleeding frequency and severity**

| Type of Surgery | Bleeding Frequency and Severity |
|---|---|
| **close** | **50** |
| heavy | 2 |
| mild | 29 |
| moderate | 19 |
| **laser** | **50** |
| heavy | 1 |
| mild | 41 |
| moderate | 7 |
| nil | 1 |
| **Grand Total** | **100** |

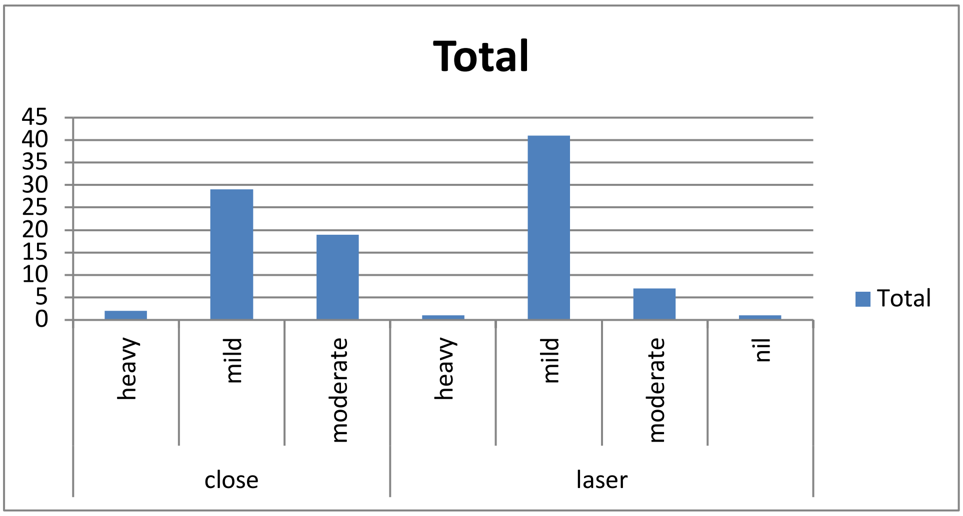


**Figure 3: Bleeding frequency and severity**

**Table 4: Recurrence rate in 6 months**

| | **Recurrence Rate in 6 month** | | |
|---|---|---|---|
| **Type of Surgery** | **close** | **laser** | **Grand Total** |
| no | 45 | 47 | 92 |
| yes | 5 | 3 | 8 |
| **Grand Total** | **50** | **50** | **100** |

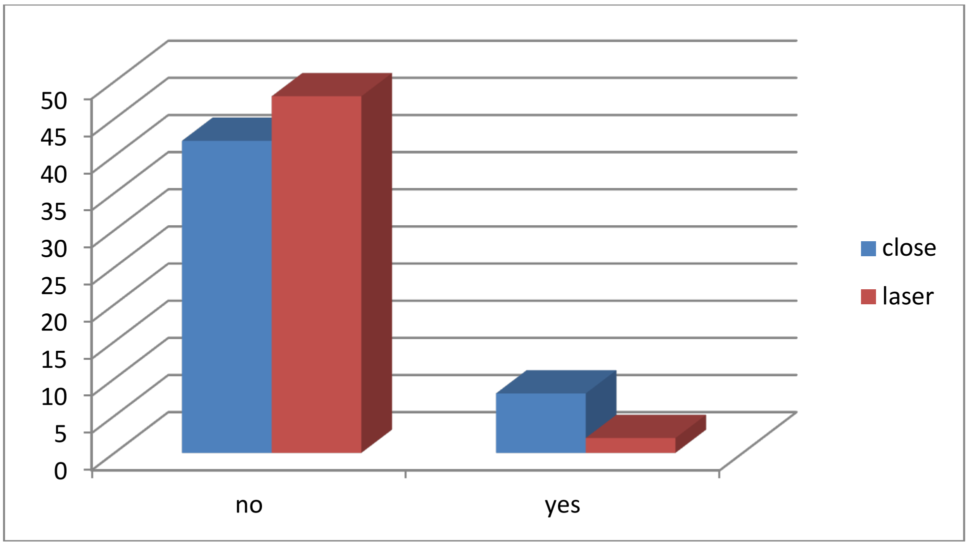


**Figure 4: Recurrence rate in 6 months**

**Table 5: Recurrence rate in 1 year**

| | Recurrence Rate in 1 year | | |
|---|---|---|---|
| **Type of Surgery** | **close** | **laser** | **Grand Total** |
| no | 42 | 48 | 90 |
| yes | 8 | 2 | 10 |
| **Grand Total** | **50** | **50** | **100** |

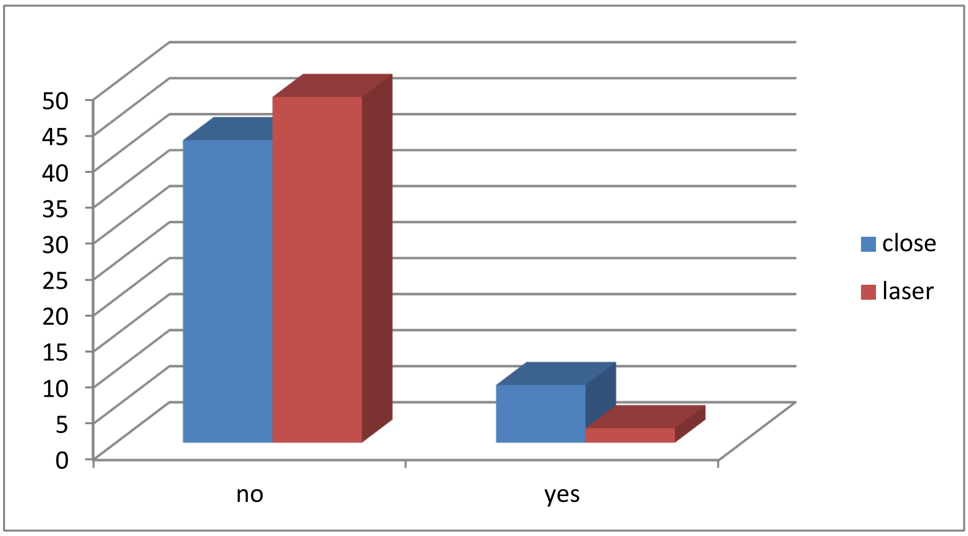


**Figure 5: Recurrence rate in 1 year**

**Table 6: Complication rate of different surgeries**

| **Type of Surgery** | **Complication Rates** |
|---|---|
| **close** | **50** |
| bleeding | 7 |
| nil | 39 |
| stenosis | 3 |
| stricture | 1 |
| **laser** | **50** |
| bleeding | 5 |
| nil | 41 |
| stenosis | 2 |
| stricture | 2 |
| **Grand Total** | **100** |

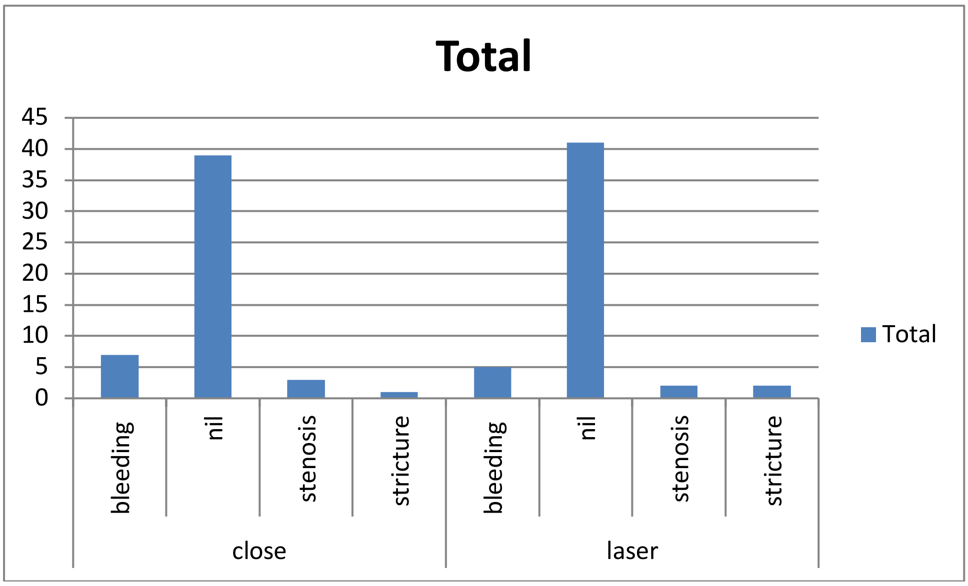


**Figure 6: Complication rate of different surgeries**

**Table 7: Quality of life after surgery**

| **Type of Surgery** | **Quality of Life** |
|---|---|
| **close** | **50** |
| excellent | 21 |
| good | 29 |
| **laser** | **50** |
| excellent | 36 |
| good | 14 |
| **Grand Total** | **100** |


**Figure 7: Quality of life after surgery**

## Conclusion

This research is anticipated to contribute significantly to the body of knowledge surrounding the surgical management of 2nd and 3rd-degree hemorrhoids in both male and female patients. The findings may inform clinical decision-making, enabling healthcare providers to offer more tailored treatment strategies and enhance patient outcomes.

The decision to treat hemorrhoids is often based on the subjective severity of symptoms, and treatment is traditionally determined by the classification of hemorrhoids. This classification, however, may not necessarily reflect the severity of symptoms, leading to confusion in choosing the appropriate treatment. Despite various treatment options being available, the optimal technique remains uncertain, and the choice between surgical and non-surgical approaches poses challenges for both patients and surgeons.

While open surgical hemorrhoidectomy is a commonly used procedure, it is associated with significant complications such as pain, bleeding, and wound infection, leading to prolonged hospital stays. A study from the University of Sao Paolo, Brazil, highlighted the advantages of laser hemorrhoidectomy, including hemostasis, bactericidal properties, rapid healing, minimal impact on neighboring structures, fewer postoperative complications, and reduced hemorrhage and stenosis.

Comparatively, laser hemorrhoidoplasty (LHP) emerged as a promising alternative, demonstrating lower pain scores in the early postoperative period when compared to conventional open surgical hemorrhoidectomy. Postoperative pain, a significant concern for patients, was consistently lower during the first month following laser hemorrhoidoplasty. This finding suggests that laser hemorrhoidectomy is a safe procedure associated with less postoperative pain, making it a favorable option for patients with symptomatic hemorrhoids of stage III or IV. Furthermore, laser hemorrhoidoplasty was associated with a shorter duration compared to open surgical hemorrhoidectomy, adding to its appeal as an effective and efficient treatment for advanced-stage hemorrhoids.

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