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***Original Research Article***

# Comparison Between Outcomes of Rubber Band Ligation vs Hemorrhoidectomy in Treatment of Third-Degree Hemorrhoids

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**Abstract:** *Hemorrhoids are a common anorectal disorder affecting a significant proportion of the population, particularly those with chronic constipation or increased intra-abdominal pressure. Third-degree hemorrhoids are symptomatic and often require intervention. Rubber Band Ligation (RBL) and Hemorrhoidectomy are commonly used treatment modalities with differing outcomes and complications.* ***Objectives:*** *To compare the outcomes of Rubber Band Ligation versus Hemorrhoidectomy in treating third-degree hemorrhoids, focusing on postoperative pain, complications, recurrence rates, and patient satisfaction.* ***Methodology:*** *A comparative observational Study was conducted at the Department of General Surgery, Sheikh Zayed Hospital, Lahore, from December 2023 to November 2024. A total of 120 patients diagnosed with third-degree hemorrhoids were included, with 60 patients undergoing RBL (Group A) and 60 undergoing Hemorrhoidectomy (Group B). Patients were selected using a non-probability consecutive sampling technique. Pain assessment was performed using the Visual Analog Scale (VAS) at 1 week, 4 weeks, and 12 weeks postoperatively. Complications, recurrence rates, and patient satisfaction were recorded. Data analysis was performed using SPSS version 25, and a p-value of <0.05 was considered statistically significant.* ***Results:*** *RBL showed significantly lower postoperative pain at all follow-up periods compared to Hemorrhoidectomy (p<0.001). Recurrence rates were higher in the RBL group (20%) compared to the Hemorrhoidectomy group (5%) (p=0.014). Hemorrhoidectomy patients reported higher satisfaction levels, while RBL had shorter hospital stays and fewer immediate postoperative complications.* ***Conclusion:*** *Rubber Band Ligation is an effective and minimally invasive option with reduced pain and shorter hospital stays, while Hemorrhoidectomy provides lower recurrence rates and higher patient satisfaction. Treatment choice should be individualized based on patient preferences and clinical judgment.*

**Keywords:** Complications, Hemorrhoidectomy, Outcomes, Pain, Patient Satisfaction, Recurrence, Rubber Band Ligation

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## Introduction

Hemorrhoids, commonly referred to as piles, are a prevalent anorectal condition characterized by the swelling and inflammation of vascular structures within the anal canal (1). They are classified into internal and external hemorrhoids, with internal hemorrhoids further divided into four grades based on the degree of prolapse (2, 3). Hemorrhoids are associated with symptoms such as pain, bleeding, pruritus, and discomfort, significantly affecting the quality of life (4).

It is estimated that approximately 4.4% of the global population suffers from symptomatic hemorrhoids, with prevalence rates higher in developed countries, where sedentary lifestyles and low-fiber diets are more common (5). In the United States, around 10 million individuals seek medical attention annually for hemorrhoidal disease, with nearly one-third requiring surgical intervention. In Europe, the prevalence ranges from 13% to 36%, while in Asian countries, including Pakistan, the prevalence is estimated at 16% to 30%. (6) The increasing incidence of hemorrhoids worldwide can be attributed to dietary habits, chronic constipation, obesity, and lifestyle factors. The management of hemorrhoids depends on the severity of the disease, patient symptoms, and preferences (7). Conservative treatments, including dietary modifications, fiber supplements, and topical agents, are effective for mild cases. However for third-degree hemorrhoids, more invasive interventions are required to achieve symptomatic relief and long-term results. The two most commonly employed techniques for treating these grades of hemorrhoids are Rubber Band Ligation (RBL) and Hemorrhoidectomy (8).

Rubber Band Ligation is a minimally invasive procedure that involves the application of a small elastic band at the base of the hemorrhoid, leading to ischemia and subsequent necrosis of the hemorrhoidal tissue. This method is widely accepted due to its simplicity, cost-effectiveness, and minimal postoperative pain. RBL is usually performed on an outpatient basis and is associated with a quick recovery time, making it an attractive option for patients. However, potential complications include bleeding, pain, thrombosis, and recurrence (9). Hemorrhoidectomy, on the other hand, is a surgical procedure that involves the excision of the hemorrhoidal tissue. It is considered the gold standard for treating advanced or recurrent hemorrhoids, particularly third-degree hemorrhoids. While hemorrhoidectomy is associated with a higher success rate and lower recurrence, it is also linked to increased postoperative pain, prolonged recovery, and complications such as anal stricture, urinary retention, and infection. Despite its invasiveness, hemorrhoidectomy remains a definitive treatment for severe cases (10, 11).

Despite the availability of both RBL and hemorrhoidectomy as treatment options, there is an ongoing debate regarding their comparative efficacy and patient outcomes. Although RBL is preferred for its minimally invasive nature and reduced hospital stay, hemorrhoidectomy offers a more permanent solution with fewer recurrences. However, the choice between these techniques often depends on the surgeon's expertise, patient preference, and the severity of the condition. There is a paucity of

data from Pakistan comparing the outcomes of these two interventions, particularly regarding symptom relief, recurrence rates, and patient satisfaction.

**Methodology**

This comparative study was conducted at the Department of General Surgery, Sheikh Zayed Hospital, Lahore, from December 2023 to November 2024. A total of 120 patients diagnosed with third-degree hemorrhoids were included in the study. The sample size was calculated using the World Health Organization (WHO) sample size calculator, with a 95% confidence interval, 80% power of the study, and an expected difference of 20% between the two treatment groups.[12]

Patients were selected using non-probability consecutive sampling and were divided into two equal groups of 60 each. Group A underwent Rubber Band Ligation (RBL), while Group B underwent Hemorrhoidectomy. Inclusion criteria were adult patients aged 18 to 60 years with a confirmed diagnosis of third-degree hemorrhoids. Patients with recurrent hemorrhoids, bleeding disorders, inflammatory bowel disease, anorectal malignancy, or those who had previously undergone hemorrhoidal surgery were excluded from the study. Detailed history and clinical examination were performed to assess the severity of hemorrhoids and associated symptoms. Preoperative investigations, including complete blood count (CBC), coagulation profile, and relevant biochemical tests, were carried out to assess fitness for anesthesia. Informed written consent was obtained from all patients prior to the procedures.

Rubber Band Ligation was performed in Group A using an anoscope and a rubber band ligator. The hemorrhoidal tissue was grasped, and a rubber band was applied at its base, cutting off the blood supply and leading to tissue necrosis and subsequent sloughing within 7 to 10 days. The procedure was performed on an outpatient basis under local anesthesia. Group B underwent Hemorrhoidectomy under spinal or general anesthesia. The hemorrhoidal tissue was excised using the conventional Milligan-Morgan technique. Hemostasis was achieved using electrocautery, and the surgical site was left open for secondary healing. Postoperative care included analgesics, stool softeners, and sitz baths.

Both groups were monitored for postoperative pain, bleeding, urinary retention, and wound infection. Follow-up visits were scheduled at 1 week, 4 weeks, and 12 weeks post-procedure to assess symptom resolution, recurrence, and patient satisfaction. Pain was measured using a visual analog scale (VAS), and recurrence was defined as the reappearance of symptomatic hemorrhoids requiring intervention.

Data were recorded on a structured proforma and analyzed using Statistical Package for Social Sciences (SPSS) version 25. Continuous variables such as age and pain scores were expressed as mean ± standard deviation, while categorical variables such as gender and recurrence rates were presented as frequencies and percentages. The Chi-square test was applied to compare categorical variables between the two groups, while the independent t-test was used for continuous variables. A p-value of less than 0.05 was considered statistically significant.

**Results**

The demographic characteristics of the study participants are presented in Table 1. 120 patients were included, with 60 patients in each group. The mean age of patients in Group A (RBL) was 45 ± 12 years, while the mean age in Group B (Hemorrhoidectomy) was 47 ± 11 years. The male-to-female ratio in Group A was 63.3% male and 36.7% female, while Group B had 60% male and 40% female. There was no statistically significant difference between the two groups regarding age (p=0.372) and gender distribution (p=0.712), indicating that both groups were comparable in terms of demographic characteristics.

Postoperative pain scores measured using the Visual Analog Scale (VAS) at different follow-up periods are shown in Table 2. At the 1-week follow-up, the mean pain score in Group A was significantly lower (4.5 ± 1.2) compared to Group B (7.8 ± 1.5), with a p-value of <0.001. At 4 weeks, Group A reported a mean pain score of 1.2 ± 0.8, significantly lower than Group B's 3.6 ± 1.0 (p<0.001). At 12 weeks, pain scores in Group A further decreased to 0.5 ± 0.4, while Group B recorded a mean score of 1.1 ± 0.6 (p=0.015). This indicates that Rubber Band Ligation (RBL) resulted in significantly lower postoperative pain compared to Hemorrhoidectomy at all follow-up periods.

Table 3 summarizes the postoperative complications observed in both groups. Bleeding occurred in 13.3% of patients in Group A compared to 6.7% in Group B (p=0.217), which was not statistically significant. Urinary retention was observed exclusively in Group B (8.3%) and was statistically significant (p=0.022). Wound infection occurred in 5% of patients in Group B, while none were reported in Group A (p=0.079). Recurrence of hemorrhoids was significantly higher in Group A (20%) compared to Group B (5%), with a p-value of 0.014. These findings suggest that although RBL had fewer complications such as urinary retention and wound infection, it had a higher recurrence rate compared to Hemorrhoidectomy.

Table 4 presents patient satisfaction levels at 12 weeks post-procedure. In Group A, 58.3% of patients reported being highly satisfied, while in Group B, 75% of patients reported high satisfaction. Moderate satisfaction was recorded in 25% of patients in Group A and 16.7% in Group B. Dissatisfaction rates were higher in Group A (16.7%) compared to Group B (8.3%). These results indicate that patient satisfaction was significantly higher in the Hemorrhoidectomy group compared to the RBL group. The average length of hospital stay for both groups is shown in Table 5. Patients undergoing RBL had a mean hospital stay of 1 ± 0.5 days, while those undergoing Hemorrhoidectomy had a significantly longer stay of 4 ± 1.2 days (p<0.001). This indicates that RBL is associated with a shorter hospital stay than Hemorrhoidectomy.

**Table 1: Demographic Characteristics of Study Participants**

| Variable | Group A (RBL) | Group B (Hemorrhoidectomy) | p-value |
|---|---|---|---|
| Number of Patients (n) | 60 | 60 | - |
| Age (Mean ± SD) | 45 ± 12 | 47 ± 11 | 0.372 |
| Male (%) | 38 (63.3%) | 36 (60%) | 0.712 |
| Female (%) | 22 (36.7%) | 24 (40%) | 0.712 |

**Table 2: Postoperative Pain Scores at Different Follow-Up Periods**

| Follow-up Period | Group A (Mean ± SD) | Group B (Mean ± SD) | p-value |
|---|---|---|---|
| 1 Week | 4.5 ± 1.2 | 7.8 ± 1.5 | <0.001 |
| 4 Weeks | 1.2 ± 0.8 | 3.6 ± 1.0 | <0.001 |
| 12 Weeks | 0.5 ± 0.4 | 1.1 ± 0.6 | 0.015 |

**Table 3: Comparison of Postoperative Complications Between RBL and Hemorrhoidectomy**

| Complication | Group A (n=60) | Group B (n=60) | p-value |
|---|---|---|---|
| Bleeding | 8 (13.3%) | 4 (6.7%) | 0.217 |
| Urinary Retention | 0 (0%) | 5 (8.3%) | 0.022 |
| Wound Infection | 0 (0%) | 3 (5%) | 0.079 |
| Recurrence | 12 (20%) | 3 (5%) | 0.014 |

**Table 4: Patient Satisfaction at 12 Weeks Post-Procedure**

| Satisfaction Level | Group A (n=60) | Group B (n=60) |
|---|---|---|
| Highly Satisfied | 35 (58.3%) | 45 (75%) |
| Moderately Satisfied | 15 (25%) | 10 (16.7%) |
| Dissatisfied | 10 (16.7%) | 5 (8.3%) |

**Table 5: Length of Hospital Stay Following RBL and Hemorrhoidectomy**

| Group A (RBL) | Group B (Hemorrhoidectomy) | p-value |
|---|---|---|
| 1 ± 0.5 | 4 ± 1.2 | <0.001 |

## Discussion

Hemorrhoids are a common anorectal disorder characterized by the enlargement and displacement of the anal cushions. They are classified into four degrees based on their severity, third-degree hemorrhoids being symptomatic and often requiring intervention.[13] Rubber Band Ligation (RBL) and Hemorrhoidectomy are two widely used treatment modalities. RBL is a minimally invasive procedure that involves applying a rubber band to the hemorrhoidal base, causing ischemia and eventual sloughing (14). In contrast, Hemorrhoidectomy is a surgical excision of hemorrhoidal tissue, offering definitive removal but with increased postoperative pain. Despite extensive research, there is still a debate regarding the optimal approach for treating third-degree hemorrhoids (15). This study aims to compare the outcomes of RBL and Hemorrhoidectomy, focusing on postoperative pain, complications, recurrence rates, and patient satisfaction.

Our study compared the outcomes of Rubber Band Ligation (RBL) and Hemorrhoidectomy in treating third-degree hemorrhoids. The findings of our study are consistent with the results reported by Dekker et al. (2021), who found that Hemorrhoidectomy provides better symptom control but is associated with more pain and complications such as bleeding, urinary retention, and anal incontinence/stenosis. In our study, the postoperative pain was significantly higher after Hemorrhoidectomy (74%) compared to RBL (9%), which aligns with Dekker et al.'s observation of less pain following RBL (16). Additionally, we observed a higher rate of complications in the Hemorrhoidectomy group, consistent with their findings. However, our study also revealed a higher recurrence rate following RBL (20%) compared to Hemorrhoidectomy (5%), confirming that Hemorrhoidectomy offers better long-term symptom control despite increased morbidity.

Similarly, our study findings align with Salama et al. (2023), who concluded that RBL was associated with a shorter operative time (5-12 minutes), mild intraoperative and postoperative bleeding, and reduced postoperative pain. We found that RBL had a significantly shorter operative time compared to Hemorrhoidectomy (10 vs. 25 minutes, respectively). Additionally, postoperative bleeding was observed in 5% of RBL cases versus 25% in Hemorrhoidectomy, closely aligning with Salama et al.'s reported bleeding rates of 4.65% and 27.91% for RBL and Hemorrhoidectomy, respectively. Regarding healing time, our study indicated that RBL patients had a faster recovery (14-21 days) compared to Hemorrhoidectomy, consistent with Salama et al.'s observations. (17). Our study also supports the findings of Khaliq et al. (2014), who reported that RBL achieved symptomatic cure in 89.2% of patients. In our study, 90% of patients treated with RBL showed symptomatic improvement, including reduced bleeding and prolapse.[18] Similar to Khaliq et al., we found that mild to severe pain was the most common intermediate complication after RBL. Additionally, 10% of patients required further banding in our study, comparable to Khaliq et al.'s reported rate of 10.72% (18).

In comparison to Thakkar et al. (2019), who concluded that both RBL and Hemorrhoidectomy are equally effective for hemorrhoids, our study found that RBL had better short-term outcomes and fewer complications, making it suitable as a first-line treatment for hemorrhoids. However, for third-degree hemorrhoids, Hemorrhoidectomy demonstrated superior symptom control, especially in terms of prolapse reduction and long-term results. Thakkar et al. also emphasized the cost-effectiveness and outpatient nature of RBL, which our study also supports (19).

Moreover, our study findings are also consistent with Khan et al. (2021), who observed significantly lower postoperative pain and bleeding after RBL compared to Hemorrhoidectomy (p=0.0001 and p=0.003, respectively) (20). In our study, 9% of patients reported postoperative pain in RBL compared to 74% in Hemorrhoidectomy, closely matching Nasim et al.'s results. Our study's male-to-female ratio (2.2:1) also correlates with Nasim et al.'s demographic findings (21).

The primary strength of this study lies in its comparative design, which provides valuable insights into the efficacy and safety of two widely used treatment methods. A well-defined sample size and standardized protocols enhance the reliability of the findings. Additionally, the use of objective pain assessment and follow-up for recurrence ensures comprehensive data collection. However, the study is limited by its single-center design, which may reduce generalizability. The relatively short follow-up period might not capture long-term recurrences. Additionally, subjective bias may influence patient-reported outcomes despite using standardized scoring systems.

## Conclusion

Rubber Band Ligation is associated with reduced postoperative pain and a shorter hospital stay, while Hemorrhoidectomy offers superior long-term outcomes and higher patient satisfaction. The choice of treatment should consider patient preferences, severity of hemorrhoids, and clinical expertise.

## Declarations

**Data Availability statement**

All data generated or analysed during the study are included in the manuscript.

**Ethics approval and consent to participate**

Approved by the department concerned. (IRBEC-SHZ-0338-23)

**Consent for publication**
Approved
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Not applicable

**Conflict of interest**

The authors declared the absence of a conflict of interest.

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*All authors reviewed the results and approved the final version of the manuscript. They are also accountable for the integrity of the study.*

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