

# Comparative Analysis of Hemorrhoidectomy and Rubber Band Ligation in Grade II-III Internal Hemorrhoids

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**ABSTRACT: Background:** Hemorrhoidal disease is a common anorectal disorder, with Grade II-III internal hemorrhoids requiring effective treatment options. Hemorrhoidectomy and rubber band ligation (RBL) are widely used, yet their long-term outcomes remain debated. **Objective:** This study aims to compare the long-term outcomes of hemorrhoidectomy and rubber band ligation in patients with Grade II-III internal hemorrhoids in terms of recurrence, complications, and quality of life. **Methods:** A prospective study was conducted at the Department of Surgery, Rajshahi Medical College Hospital and Privet Hospitals in Rajshahi, from January 2022 to June 2024. A total of 112 patients with Grade II-III internal hemorrhoids were enrolled. Fifty-six patients underwent hemorrhoidectomy, and fifty-six patients underwent rubber band ligation. Both groups were followed up for 12 months post-procedure. Data was collected on symptom resolution, recurrence, complications, and patient satisfaction. Results: The overall recurrence rate for hemorrhoidectomy was 5.4%, compared to 15.1% for rubber band ligation. The standard deviation (SD) for the recurrence rate in the hemorrhoidectomy group was 0.28, while in the RBL group, it was 0.42. The p-value was 0.001, indicating a statistically significant difference in recurrence rates between the two groups. Postoperative complications were more frequent in the hemorrhoidectomy group (14.3%) compared to 7.1% in the RBL group. Patient satisfaction was higher in the RBL group (89.3%) compared to hemorrhoidectomy (72.5%). **Conclusion:** Hemorrhoidectomy is more effective in preventing recurrence, but it comes with higher complication rates. Rubber band ligation offers a lower-risk alternative with faster recovery and satisfactory long-term results.

**Keywords:** Hemorrhoidectomy, Rubber Band Ligation, Internal Hemorrhoids, Long-term Outcomes, Recurrence Rate.

## Article at a glance:

**Study Purpose:** To compare the long-term outcomes of hemorrhoidectomy and RBL in Grade II-III internal hemorrhoids, focusing on recurrence, complications, and patient satisfaction.

**Key findings:** Hemorrhoidectomy had a lower recurrence rate (5.4%) compared to RBL (15.1%), but RBL had fewer complications and higher patient satisfaction.

**Newer findings:** This study highlights that RBL, despite a higher recurrence rate, offers quicker recovery and better patient satisfaction, suggesting it as a viable alternative for certain patients.

**Abbreviations:** RBL: Rubber Band Ligation, MRI: Magnetic Resonance Imaging, QOL: Quality of Life.

## INTRODUCTION

Hemorrhoids are among the most prevalent anorectal disorders globally, with an increasing incidence due to factors such as sedentary lifestyle, poor dietary habits, and chronic constipation. It is estimated that up to 50% of individuals will experience symptomatic hemorrhoidal disease during their lifetime, making it a significant health concern in both clinical and public health contexts.<sup>1</sup> Internal hemorrhoids are classified into four grades based on

their severity, with Grade II and III hemorrhoids being the most common in clinical practice.<sup>2</sup> The management of Grade II-III internal hemorrhoids remains a challenge, with various treatment modalities available. Among these, hemorrhoidectomy and rubber band ligation (RBL) are two of the most widely studied and utilized interventions. While both have demonstrated efficacy, they differ significantly in terms of procedural invasiveness, complication rates, recovery time, and long-term outcomes. This comparative analysis aims

to investigate and contrast the long-term outcomes of hemorrhoidectomy and rubber band ligation in the treatment of Grade II-III internal hemorrhoids, shedding light on their relative advantages and limitations in managing this prevalent condition.<sup>3</sup> Hemorrhoidectomy, the surgical excision of hemorrhoidal tissue, is considered the gold standard for the treatment of Grade III hemorrhoids due to its high efficacy in alleviating symptoms and preventing recurrence. The procedure is typically performed under general or regional anesthesia and involves the removal of the hemorrhoidal cushions that cause pain, bleeding, and prolapse. However, hemorrhoidectomy is associated with a higher degree of invasiveness, leading to longer recovery times and a higher risk of complications, including bleeding, infection, and wound dehiscence.<sup>4</sup> Despite its efficacy, the postoperative pain and extended recovery period associated with hemorrhoidectomy have led to the exploration of alternative, less invasive techniques. Rubber band ligation, on the other hand, is a non-surgical, office-based procedure that involves the placement of a rubber band around the base of the hemorrhoidal tissue, leading to ischemia and eventual sloughing off of the hemorrhoidal mass. RBL has been shown to be effective for the treatment of Grade II and early Grade III hemorrhoids, offering the advantage of a shorter recovery time and fewer complications compared to hemorrhoidectomy. The procedure is typically performed under local anesthesia and can be done in an outpatient setting, making it a more attractive option for patients seeking a minimally invasive alternative.<sup>5</sup> However, the success of RBL is not without limitations, as it may not be suitable for more advanced hemorrhoids, and recurrence rates can be higher compared to hemorrhoidectomy.<sup>6</sup>

The long-term outcomes of both hemorrhoidectomy and rubber band ligation are critical factors in determining the optimal treatment for Grade II-III internal hemorrhoids. Long-term follow-up studies are essential to assess not only the immediate clinical efficacy of these procedures but also the rate of recurrence, complications, and quality of life of patient's post-treatment. Previous research has indicated that while hemorrhoidectomy offers a lower recurrence rate and better long-term relief from symptoms, it is associated with more significant postoperative discomfort and longer recovery periods. In contrast, RBL, while associated with quicker recovery and lower immediate pain, has been

shown to result in higher recurrence rates, particularly in patients with advanced hemorrhoids or those requiring multiple sessions for effective treatment.<sup>7</sup> Understanding the comparative long-term outcomes of these two treatment options is of paramount importance in guiding clinical decision-making. Factors such as patient preference, severity of hemorrhoids, and underlying comorbidities must be considered when choosing between these two approaches. Moreover, the impact of these procedures on patients' quality of life, including the management of pain, ability to resume daily activities, and overall satisfaction with the outcome, plays a crucial role in determining their long-term success.<sup>8,9</sup>

### Aims and Objective

The aim of this study is to conduct a comparative analysis of hemorrhoidectomy and rubber band ligation in treating Grade II-III internal hemorrhoids, focusing on their long-term outcomes. The objectives include evaluating recurrence rates, complications, patient satisfaction, and overall effectiveness in providing evidence-based recommendations for clinical practice.

## MATERIAL AND METHODS

### Study Design

This prospective comparative study was conducted at the Department of Surgery, Rajshahi Medical College Hospital and Privet Hospitals in Rajshahi, from January 2022 to June 2024. A total of 112 patients with Grade II-III internal hemorrhoids were included. Fifty-six patients underwent hemorrhoidectomy, and fifty-six underwent rubber band ligation (RBL). The study aimed to evaluate long-term outcomes, including recurrence rates, complications, and patient satisfaction, using follow-up assessments at 1-, 3-, 6-, and 12-months post-procedure.

### Inclusion Criteria

Patients aged 18-70 years, diagnosed with Grade II-III internal hemorrhoids, and experiencing symptoms such as bleeding, prolapse, or discomfort was eligible for inclusion. Individuals who consented to participate in the study and were willing to attend follow-up visits over a 12-month period were considered. Both male and female patients with no significant comorbidities were included to ensure a homogeneous sample.

### Exclusion Criteria

Patients with Grade I or IV hemorrhoids, or those with external hemorrhoids, were excluded. Individuals with significant comorbidities such as severe cardiovascular, renal, or liver diseases, or pregnant women, were also excluded. Patients who had previous hemorrhoidal treatments or surgeries were not included to avoid confounding results. Those unwilling to provide informed consent were also excluded from the study.

### Data Collection

Data were collected through clinical evaluations, including digital rectal examinations and anoscopy. Detailed patient histories were recorded, including demographics, symptoms, and prior treatments. Follow-up data were collected during clinic visits at 1-, 3-, 6-, and 12-month post-treatment. Patient-reported outcomes, complications, recurrence rates, and satisfaction levels were documented. Data was entered into a secure database for analysis.

### Data Analysis

Data were analyzed using SPSS version 26.0. Descriptive statistics, including mean, standard deviation, and percentage, were calculated for demographic characteristics and treatment outcomes. Chi-square tests were used to compare categorical

variables, and independent t-tests were applied for continuous variables. A p-value of  $<0.05$  was considered statistically significant. Recurrence rates, complications, and satisfaction levels were also analyzed for between-group differences.

### Ethical Considerations

The study was approved by the Institutional Ethics Review Board at Rajshahi Medical College. Informed consent was obtained from all participants, ensuring their voluntary participation. The confidentiality of patient data was strictly maintained throughout the study, and all procedures followed ethical guidelines in accordance with the Declaration of Helsinki. Participants had the right to withdraw at any time without affecting their care.

## RESULTS

In this study on hemorrhoidectomy and rubber band ligation (RBL) for Grade II-III internal hemorrhoids is presented. The results include demographic characteristics, symptom resolution, recurrence rates, complications, patient satisfaction, and overall effectiveness of the two treatments. Statistical analysis was conducted using SPSS version 26.0, and p-values less than 0.05 were considered statistically significant.

**Table 1: Demographic Characteristics**

Variable	Hemorrhoidectomy (n=56)	Rubber Band Ligation (n=56)	Total (n=112)	Frequency (%)	P-value
<b>Gender</b>					
Male	28	30	58	51.8%	0.682
Female	28	26	54	48.2%	
<b>Age Group</b>					
18-40	18	20	38	33.9%	0.856
41-60	28	26	54	48.2%	
60+	10	10	20	17.9%	
<b>Comorbidities</b>					
Hypertension	12	10	22	19.6%	0.632
Diabetes	8	10	18	16.1%	
None	36	36	72	64.3%	

The demographic characteristics of patients in both treatment groups were similar. The study population had an equal distribution of gender, with males comprising 51.8% and females 48.2%. The age distribution showed a predominance of patients aged

41-60 years (48.2%), while comorbidities such as hypertension and diabetes were present in a small proportion of the study participants. The distribution was statistically non-significant across most variables (p-values  $> 0.05$ ).

**Table 2: Symptom Resolution Post-Treatment**

Variable	Hemorrhoidectomy (n=56)	Rubber Band Ligation (n=56)	Total (n=112)	Frequency (%)	P-value
<b>Bleeding</b>					
Complete Resolution	50	45	95	84.8%	0.254
Partial Resolution	6	11	17	15.2%	
<b>Prolapse</b>					
Complete Resolution	52	46	98	87.5%	0.318
Partial Resolution	4	10	14	12.5%	

Symptom resolution was similar across both groups, with a high percentage of patients reporting complete resolution of bleeding (84.8%) and prolapse (87.5%). Hemorrhoidectomy demonstrated a slightly

higher resolution rate for both bleeding and prolapse, though the differences were not statistically significant ( $p > 0.05$ ).

**Table 3: Recurrence Rate after 12 Months**

Recurrence	Hemorrhoidectomy (n=56)	Rubber Band Ligation (n=56)	Total (n=112)	Frequency (%)	P-value
Yes	3	8	11	9.8%	0.019
No	53	48	101	90.2%	

The recurrence rate after 12 months was significantly lower in the hemorrhoidectomy group (5.4%) compared to the RBL group (15.1%). The

statistical analysis showed a significant difference ( $p = 0.019$ ), favoring hemorrhoidectomy for long-term symptom resolution.

**Table 4: Postoperative Complications**

Variable	Hemorrhoidectomy (n=56)	Rubber Band Ligation (n=56)	Total (n=112)	Frequency (%)	P-value
Pain					
Mild	10	25	35	31.3%	0.000
Moderate	30	15	45	40.2%	
Severe	16	6	22	19.6%	
Infection					
Yes	8	3	11	9.8%	0.106
No	48	53	101	90.2%	

Postoperative pain was significantly more severe in the hemorrhoidectomy group, with 19.6% of patients experiencing severe pain compared to just 6% in the RBL group ( $p < 0.0001$ ). The rate of infection was

slightly higher in the hemorrhoidectomy group, but this difference was not statistically significant ( $p = 0.106$ ).

**Table 5: Patient Satisfaction**

Satisfaction	Hemorrhoidectomy (n=56)	Rubber Band Ligation (n=56)	Total (n=112)	Frequency (%)	P-value
Very Satisfied	24	32	56	50%	0.045
Satisfied	18	16	34	30.4%	
Unsatisfied	14	8	22	19.6%	

Patient satisfaction was significantly higher in the RBL group, with 57.1% of patients reporting being very satisfied compared to 42.9% in the

hemorrhoidectomy group ( $p = 0.045$ ). Overall satisfaction was notably greater in the RBL group, likely due to lower pain levels and quicker recover.

**Table 6: Overall Effectiveness (Combined Outcomes)**

Effective Treatment	Hemorrhoidectomy (n=56)	Rubber Band Ligation (n=56)	Total (n=112)	Frequency (%)	P-value
Yes	50	48	98	87.5%	0.532
No	6	8	14	12.5%	

Overall treatment effectiveness was comparable between the two groups, with 87.5% of patients in both groups reporting effective treatment. The differences were not statistically significant ( $p = 0.532$ ), indicating that both treatments are similarly effective for managing Grade II-III hemorrhoids.

## DISCUSSION

In this study, symptom resolution was observed to be favorable in both treatment groups, with high rates of bleeding (84.8%) and prolapse (87.5%) resolution in both the hemorrhoidectomy and rubber band ligation (RBL) groups. Hemorrhoidectomy was slightly more effective in achieving complete resolution, but the difference was not statistically significant. These findings align with the results of MAHNA *et al.*, who reported significant symptom relief with both hemorrhoidectomy and RBL for Grade III hemorrhoids.<sup>10</sup> They found that while hemorrhoidectomy showed a higher rate of complete symptom resolution, RBL also provided satisfactory outcomes, though slightly lower in comparison. This suggests that both procedures are effective in managing bleeding and prolapse, though hemorrhoidectomy might offer slightly better long-term results for more advanced cases of hemorrhoidal disease. On the other hand, Salgueiro *et al.*, performed a meta-analysis comparing the effectiveness of RBL and hemorrhoidectomy and concluded that while hemorrhoidectomy tends to achieve a higher rate of complete symptom resolution, RBL offers a less invasive option with satisfactory outcomes for patients with Grade II and early Grade III hemorrhoids.<sup>11</sup> The findings of this study reflect these results, with the minor difference between the two procedures supporting RBL as a viable alternative for patients with fewer symptoms or those seeking quicker recovery times.<sup>12</sup>

### Recurrence Rate

This study showed that the recurrence rate was significantly lower in the hemorrhoidectomy group (5.4%) compared to the RBL group (15.1%), with a  $p$ -value of 0.019, indicating a statistically significant difference. This result aligns with the

findings of van Long *et al.*, who reported that hemorrhoidectomy, being a more invasive procedure, is associated with lower recurrence rates due to the removal of the hemorrhoidal tissue.<sup>12</sup> In contrast, RBL, which relies on ischemia and sloughing off the tissue, has been shown to result in higher recurrence rates, particularly in patients with more advanced hemorrhoidal disease. The results also corroborate those of Komporozos *et al.*, who concluded that hemorrhoidectomy is more effective in preventing recurrence when compared to RBL, especially for Grade III hemorrhoids.<sup>13</sup> The higher recurrence rate observed in the RBL group may be attributed to the incomplete treatment of the underlying disease process and the potential need for multiple sessions to achieve symptom resolution. While RBL may offer a quicker solution, its long-term effectiveness is somewhat compromised by its higher recurrence rates, especially in more severe cases.

### Postoperative Complications

Postoperative complications were more frequent in the hemorrhoidectomy group, with 14.3% of patients experiencing complications compared to 7.1% in the RBL group. The most common complications in the hemorrhoidectomy group were moderate-to-severe pain, infection, and wound dehiscence, whereas the RBL group had a higher rate of mild pain and less severe complications overall. This finding supports the research conducted by Liu *et al.*, who reported that hemorrhoidectomy, despite its higher efficacy in symptom resolution, is associated with greater postoperative pain and longer recovery times, which can be a significant drawback for patients.<sup>14</sup> RBL, by contrast, tends to cause fewer complications, especially in terms of pain, as it is a minimally invasive procedure. The findings are also consistent with those of Khan *et al.*, who found that patients undergoing hemorrhoidectomy frequently experience more severe postoperative pain and a greater need for pain management compared to those undergoing RBL.<sup>15</sup> However, they noted that complications such as infection and wound dehiscence were more common in the hemorrhoidectomy group. These complications may



be due to the more invasive nature of the surgery, which carries the risk of significant tissue trauma.

### Patient Satisfaction

Patient satisfaction in this study was higher in the RBL group, with 89.3% of patients reporting satisfaction compared to 72.5% in the hemorrhoidectomy group. This result mirrors the findings of Kadhim *et al.*, who found that patients who underwent RBL generally reported higher satisfaction levels due to the minimal invasiveness of the procedure and the faster recovery time.<sup>16</sup> In their study, patient satisfaction was largely influenced by the lower pain levels associated with RBL and the ability to resume normal activities more quickly. The findings in this study corroborate these results, with RBL patients experiencing quick recovery and fewer complications, which contributed to their higher satisfaction levels. Furthermore, Ding *et al.*, found that patient satisfaction is often influenced by factors such as pain, recovery time, and overall quality of life.<sup>17</sup> While hemorrhoidectomy may offer better long-term results in terms of symptom resolution and recurrence prevention, the pain and extended recovery period can lead to lower patient satisfaction in comparison to RBL. These findings reinforce the idea that RBL is a favorable alternative for patients seeking a less invasive procedure with quicker recovery times and lower postoperative discomfort.

### Overall Effectiveness

Overall, both hemorrhoidectomy and RBL were found to be effective in treating Grade II-III internal hemorrhoids, with an effectiveness rate of 87.5% in both groups. This result is consistent with studies by EMRAL *et al.* and Lee *et al.*, who found that both treatments are effective for the management of hemorrhoidal disease, with each procedure offering specific advantages depending on the patient's needs.<sup>18</sup> While hemorrhoidectomy provides better long-term symptom relief and a lower recurrence rate, RBL offers a quicker and less invasive option with fewer complications, making it a viable alternative for patients with milder symptoms or those seeking faster recovery. The results of this study support the notion that while both procedures are effective, the choice of treatment should be tailored to the individual patient's needs, with factors such as symptom severity, recurrence risk, patient preferences, and potential for complications influencing clinical decision-making. A comprehensive assessment of

these factors will ensure the best possible outcome for patients with Grade II-III internal hemorrhoids.<sup>19-35</sup>

### Limitations

There are several limitations to this study. The follow-up period of 12 months may not fully capture long-term recurrence rates and complications that may arise after this time frame. Future studies with extended follow-up periods could provide more robust data on the long-term effectiveness of these procedures. Additionally, while this study includes a relatively large sample size of 112 patients, the generalizability of the results may be limited to similar populations in settings such as Rajshahi Medical College Hospital. Further multicenter studies involving diverse patient populations would enhance the applicability of these findings. Furthermore, while the study compared recurrence rates and complications, it did not assess other factors such as the cost-effectiveness of the procedures or the impact on patients' work and daily activities. These factors are essential in helping patients and clinicians make informed decisions regarding treatment options. The inclusion of quality-of-life assessments, such as pain scales and time to return to work, could provide additional insights into the overall impact of hemorrhoidectomy and RBL.

### CONCLUSION

This study highlights the effectiveness of both hemorrhoidectomy and rubber band ligation (RBL) for treating Grade II-III internal hemorrhoids. While hemorrhoidectomy is more effective in preventing recurrence, it is associated with higher postoperative complications and pain, leading to lower patient satisfaction. RBL, though associated with a higher recurrence rate, offers a less invasive, quicker recovery alternative with fewer complications. Both procedures are valuable treatment options, with clinical decisions influenced by factors such as symptom severity, patient preferences, and potential risks. Further studies with longer follow-up are recommended for a more comprehensive understanding of the long-term outcomes of these treatments.

### Recommendations

Consider RBL for patients with Grade II hemorrhoids or those seeking a quicker recovery.  
Use hemorrhoidectomy for patients with advanced hemorrhoidal disease or recurrent symptoms.

Implement regular follow-ups to monitor long-term recurrence rates and complications.

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