

# Comparative Evaluation of Rubber Band Ligation and Open Excisional Hemorrhoidectomy in the Management of Second-Degree Hemorrhoids: An Observational Study

Sufiyan Aathif.H<sup>1</sup>, Saravanan P.S<sup>2</sup>, Suresh Babu.K<sup>3</sup>, Swathi Sivakumar<sup>4</sup>

<sup>1</sup>Postgraduate, Department of General Surgery, Meenakshi Medical College Hospital & Research Institute, Kanchipuram, MAHER University, Chennai

<sup>2</sup> Professor and HOD, Department of General Surgery, Meenakshi Medical College Hospital & Research Institute, Kanchipuram, MAHER University, Chennai

<sup>3</sup> Professor Department of General Surgery, Meenakshi Medical College Hospital & Research Institute, Kanchipuram, MAHER University, Chennai

<sup>4</sup>Postgraduate, Department of General Surgery, Meenakshi Medical College Hospital & Research Institute, Kanchipuram, MAHER University, Chennai

\*Correspondence: Dr.Sufiyan Aathif. H, E-mail: [dr.sufi001@gmail.com](mailto:dr.sufi001@gmail.com)

## Abstract

**Background:** Hemorrhoidal disease is a common anorectal condition, and second-degree hemorrhoids are frequently managed with both minimally invasive and surgical procedures. Rubber band ligation and open excisional hemorrhoidectomy are widely used treatment modalities, each with its own advantages and limitations. **Aim:** To compare the clinical outcomes of rubber band ligation and open excisional hemorrhoidectomy in the management of second-degree hemorrhoids.

**Materials and Methods:** This hospital-based observational study was conducted in the Department of General Surgery at Meenakshi Medical College Hospital and Research Institute, Kanchipuram, over a period of one year. A total of 75 patients with second-degree hemorrhoids were included. Based on routine clinical practice, patients underwent either rubber band ligation (n = 38) or open hemorrhoidectomy (n = 37). Outcomes assessed included procedure duration, postoperative pain using the Visual Analogue Scale, time to return to normal activities, complications, and recurrence. Statistical analysis was performed using SPSS, and a p value < 0.05 was considered statistically significant.

**Results:** The duration of procedure was significantly shorter in the rubber band ligation group (12.4 ± 3.2 vs 32.6 ± 6.8 minutes; p = 0.001). Postoperative pain scores were significantly lower at 6 and 24 hours (p = 0.001), and patients returned to normal activities earlier (3.2 ± 1.1 vs 10.5 ± 2.6 days; p = 0.001). Complications were more frequent in the hemorrhoidectomy group but were not statistically significant. Recurrence was higher in the rubber band ligation group (15.8% vs 5.4%), though not statistically significant (p = 0.14).

**Conclusion:** Rubber band ligation offers better short-term outcomes and faster recovery, while open hemorrhoidectomy provides more definitive treatment with lower recurrence.

**Keywords:** Hemorrhoids, rubber band ligation, hemorrhoidectomy, postoperative pain, recurrence, observational study.

**How to cite this article:** Aathif.H S, P.S S, Babu.K S, Sivakumar S. Comparative Evaluation of Rubber Band Ligation and Open Excisional Hemorrhoidectomy in the Management of Second-Degree Hemorrhoids: An Observational Study. *Int J Drug Deliv Technol.* 2026;16(16s): 588-591. DOI: 10.25258/ijddt.16.16s.63

## Introduction

Hemorrhoidal disease is one of the most common anorectal conditions encountered in clinical practice, affecting a significant proportion of the adult population. It is characterized by symptomatic enlargement and distal displacement of the normal anal cushions, leading to symptoms such as bleeding per rectum, prolapse, pain, itching, and discomfort. Among the different grades, second-degree hemorrhoids are characterized by prolapse during defecation with spontaneous reduction, and they are commonly managed with both non-surgical and minimally invasive procedures [1].

The management of hemorrhoids depends on the severity of symptoms and the degree of prolapse. Conservative measures such as dietary modification, increased fiber intake, and medical therapy are often the first line of treatment. However, patients who do not respond adequately to conservative management

require procedural intervention. In such cases, treatment options include office-based procedures such as rubber band ligation as well as surgical approaches like hemorrhoidectomy [2].

Rubber band ligation is a widely used, minimally invasive outpatient procedure for the treatment of second-degree hemorrhoids. It involves the application of a rubber band at the base of the hemorrhoidal tissue, leading to ischemia, necrosis, and eventual sloughing of the tissue. The procedure is relatively simple, cost-effective, and associated with minimal discomfort and faster recovery, making it a preferred option in many clinical settings [3].

On the other hand, open excisional hemorrhoidectomy remains the definitive surgical treatment for hemorrhoidal disease, particularly in patients with recurrent or severe symptoms. Although it provides complete removal of hemorrhoidal tissue and has a lower recurrence rate, it is associated with increased

## Comparative Evaluation of Rubber Band Ligation and Open Excisional Hemorrhoidectomy in the Management of Second-Degree Hemorrhoids: An Observational Study

postoperative pain, longer recovery time, and higher morbidity compared to minimally invasive procedures [4].

Several studies have compared the effectiveness of rubber band ligation and hemorrhoidectomy in the management of hemorrhoidal disease. While rubber band ligation is associated with shorter procedure time and faster return to normal activities, hemorrhoidectomy offers more definitive treatment with lower recurrence rates. The choice between these treatment modalities often depends on patient characteristics, symptom severity, and surgeon preference [5–7].

In routine clinical practice, treatment decisions are frequently based on observational assessment rather than randomized allocation. Therefore, evaluating outcomes in an observational setting can provide valuable insights into the real-world effectiveness of these procedures.

Hence, the present study was undertaken to compare rubber band ligation and open excisional hemorrhoidectomy in the management of second-degree hemorrhoids with respect to clinical outcomes, postoperative recovery, and complications in an observational study setting [8].

### Materials and Methods

This hospital-based observational study was conducted in the Department of General Surgery, Meenakshi Medical College Hospital and Research Institute, Kanchipuram, Tamil Nadu, over a period of one year. The study aimed to compare the clinical outcomes of rubber band ligation and open excisional hemorrhoidectomy in the management of second-degree hemorrhoids in a real-world clinical setting.

A total of 75 patients diagnosed with second-degree hemorrhoids were included in the study. Patients aged between 18 and 60 years presenting with symptoms such as bleeding per rectum, prolapse, or discomfort were considered eligible. Patients with third- or fourth-degree hemorrhoids, associated anorectal conditions such as fissure or fistula, previous anorectal surgery, coagulation disorders, or those unwilling to participate were excluded from the study.

All patients underwent a detailed clinical evaluation including history taking and physical examination, followed by proctoscopic examination to confirm the diagnosis and grading of hemorrhoids. Based on routine clinical practice and surgeon preference, patients were managed either by rubber band ligation (Group A) or open excisional hemorrhoidectomy (Group B). No randomization was performed, as this was an observational study.

Group A included patients who underwent rubber band ligation, which was performed as an outpatient procedure without anesthesia or with minimal analgesia. Group B included patients who underwent open excisional hemorrhoidectomy, performed under regional or general anesthesia as per standard surgical protocols.

Postoperative outcomes were assessed and compared between the two groups. The parameters evaluated included postoperative pain (using Visual Analogue Scale), duration of procedure, time to return to normal activities, postoperative complications (bleeding, infection, urinary retention), and recurrence rates during follow-up. All data collected during the study were systematically entered into Microsoft Excel and subsequently analyzed using Statistical Package for the Social Sciences (SPSS) software. Descriptive statistics including mean, standard deviation, frequencies, and percentages were used to summarize the variables. Comparative analysis between groups was performed using the independent t test for continuous variables and the Chi-square test for categorical variables. A p value of less than 0.05 was considered statistically significant.

### Results

A total of 75 patients diagnosed with second-degree hemorrhoids were included in the study to compare the outcomes of rubber band ligation and open excisional hemorrhoidectomy.

**Table 1: Demographic Characteristics of Study Participants (n = 75)**

Variable	Rubber Band Ligation (n = 38)	Open Hemorrhoidectomy (n = 37)	p value
Mean age (years)	39.2 ± 10.6	40.5 ± 11.2	0.62
Male	22 (57.9%)	21 (56.8%)	0.91
Female	16 (42.1%)	16 (43.2%)	

The mean age in the rubber band ligation group was 39.2 ± 10.6 years, while it was 40.5 ± 11.2 years in the open hemorrhoidectomy group. The gender distribution was also similar between the two groups. The differences were not statistically significant (p = 0.62 for age and p = 0.91 for gender), indicating that both groups were comparable at baseline.

**Table 2: Duration of Procedure**

Parameter	Rubber Band Ligation	Open Hemorrhoidectomy	p value
Mean duration (minutes)	12.4 ± 3.2	32.6 ± 6.8	0.001

The mean duration of procedure was significantly shorter in the rubber band ligation group (12.4 ± 3.2 minutes) compared to the open hemorrhoidectomy group (32.6 ± 6.8 minutes). This difference was statistically highly significant (p = 0.001), indicating that rubber band ligation is a quicker procedure.

**Table 3: Postoperative Pain Scores (VAS)**

## Comparative Evaluation of Rubber Band Ligation and Open Excisional Hemorrhoidectomy in the Management of Second-Degree Hemorrhoids: An Observational Study

Time	Rubber Band Ligation	Open Hemorrhoidectomy	P value
6 hours	2.8 ± 0.9	6.4 ± 1.2	0.001
24 hours	2.1 ± 0.8	5.2 ± 1.1	0.001

Postoperative pain scores were significantly lower in the rubber band ligation group at both 6 hours (2.8 ± 0.9 vs 6.4 ± 1.2) and 24 hours (2.1 ± 0.8 vs 5.2 ± 1.1). The differences at both time intervals were statistically highly significant (p = 0.001), suggesting better postoperative comfort with rubber band ligation.

**Table 4: Time to Return to Normal Activities**

Parameter	Rubber Band Ligation	Open Hemorrhoidectomy	p value
Mean days	3.2 ± 1.1	10.5 ± 2.6	0.001

Patients who underwent rubber band ligation returned to normal daily activities much earlier (3.2 ± 1.1 days) compared to those who underwent open hemorrhoidectomy (10.5 ± 2.6 days). This difference was statistically significant (p = 0.001), indicating faster recovery with rubber band ligation.

**Table 5: Postoperative Complications**

Complication	Rubber Band Ligation	Open Hemorrhoidectomy	p value
Bleeding	3 (7.9%)	6 (16.2%)	0.28
Infection	1 (2.6%)	4 (10.8%)	0.16
Urinary retention	0	3 (8.1%)	0.08
No complications	34 (89.5%)	24 (64.9%)	-

Postoperative complications such as bleeding, infection, and urinary retention were more commonly observed in the open hemorrhoidectomy group. However, these differences were not statistically significant (p = 0.28, 0.16, and 0.08 respectively). A higher proportion of patients in the rubber band ligation group had no complications.

**Table 6: Recurrence Rate**

Parameter	Rubber Band Ligation	Open Hemorrhoidectomy	p value
Recurrence	6 (15.8%)	2 (5.4%)	0.14

The recurrence rate was higher in the rubber band ligation group (15.8%) compared to the open hemorrhoidectomy group (5.4%). However, the difference was not statistically significant (p = 0.14), indicating comparable long-term outcomes between the two procedures.

### Discussion

The present observational study compared the clinical outcomes of rubber band ligation and open excisional hemorrhoidectomy in the management of second-degree hemorrhoids. The findings demonstrated that rubber band ligation offers advantages in terms of shorter procedure time, reduced postoperative pain, and faster recovery, whereas open hemorrhoidectomy provides a more definitive treatment with a lower recurrence rate.

In the present study, the baseline characteristics such as age and gender distribution were comparable between the two groups, with no statistically significant difference (p = 0.62 and p = 0.91). This indicates that both groups were similar and comparable for outcome assessment. Similar findings were reported by Johanson JF et al [9], who emphasized that comparable baseline characteristics are essential for valid comparison between treatment modalities.

The duration of the procedure was significantly shorter in the rubber band ligation group (12.4 ± 3.2 minutes) compared with the open hemorrhoidectomy group (32.6 ± 6.8 minutes), and this difference was statistically significant (p = 0.001). This finding is consistent with the study by Shanmugam V et al [10], who reported that rubber band ligation is a quick and simple outpatient procedure requiring significantly less operative time compared to surgical hemorrhoidectomy.

Postoperative pain is a major concern in the management of hemorrhoids. In the present study, patients who underwent rubber band ligation experienced significantly lower pain scores at both 6 hours (2.8 ± 0.9 vs 6.4 ± 1.2) and 24 hours (2.1 ± 0.8 vs 5.2 ± 1.1), with a statistically significant difference (p = 0.001). Similar observations were reported by MacRae HM et al [11], who found that rubber band ligation is associated with significantly less postoperative pain compared to excisional hemorrhoidectomy.

Early return to normal activity is an important indicator of recovery. In the present study, patients in the rubber band ligation group returned to normal activities significantly earlier (3.2 ± 1.1 days) compared with the open hemorrhoidectomy group (10.5 ± 2.6 days), and the difference was statistically significant (p = 0.001). This finding is supported by Brown SR et al [12], who reported faster recovery and earlier return to daily activities following rubber band ligation.

About postoperative complications, the present study showed a higher incidence of complications such as bleeding, infection, and urinary retention in the open hemorrhoidectomy group. However, these differences were not statistically significant (p > 0.05). Similar findings were reported by Rivadeneira DE et al [13], who noted that although hemorrhoidectomy is associated with higher complication rates, the differences may not always reach statistical significance.

The recurrence rate in the present study was higher in the rubber band ligation group (15.8%) compared to the

## Comparative Evaluation of Rubber Band Ligation and Open Excisional Hemorrhoidectomy in the Management of Second-Degree Hemorrhoids: An Observational Study

open hemorrhoidectomy group (5.4%), although the difference was not statistically significant ( $p = 0.14$ ). This finding is consistent with the study by Johanson JF et al [14], who reported that while rubber band ligation is effective, it is associated with a higher recurrence rate compared to surgical hemorrhoidectomy.

The choice of treatment for second-degree hemorrhoids should be individualized based on patient characteristics and clinical presentation. Milligan ET et al [15] highlighted that open hemorrhoidectomy provides definitive treatment but is associated with increased postoperative pain. Similarly, Longo A [16] emphasized that less invasive procedures offer better patient comfort but may have higher recurrence rates. Recent studies have also highlighted the importance of balancing efficacy and patient comfort. Shalaby R et al [17] reported that minimally invasive procedures such as rubber band ligation are preferred due to reduced morbidity and quicker recovery. Furthermore, Sun Z et al [18] emphasized that treatment decisions should consider both short-term outcomes and long-term recurrence.

Evidence-based approaches in the management of hemorrhoids have been increasingly emphasized. Lohsiriwat V [19] highlighted that both rubber band ligation and hemorrhoidectomy are effective treatment options, and the choice should be guided by clinical judgment and patient preference.

### Conclusion

The present observational study demonstrated that both rubber band ligation and open excisional hemorrhoidectomy are effective treatment modalities for second-degree hemorrhoids. Rubber band ligation was associated with significantly shorter procedure duration ( $12.4 \pm 3.2$  vs  $32.6 \pm 6.8$  minutes;  $p = 0.001$ ), lower postoperative pain scores at 6 and 24 hours ( $p = 0.001$ ), and earlier return to normal activities ( $3.2 \pm 1.1$  vs  $10.5 \pm 2.6$  days;  $p = 0.001$ ). Although postoperative complications were more frequent in the open hemorrhoidectomy group, the differences were not statistically significant ( $p > 0.05$ ). The recurrence rate was higher in the rubber band ligation group (15.8% vs 5.4%), but this difference was also not statistically significant ( $p = 0.14$ ). Overall, rubber band ligation offers better short-term outcomes and faster recovery, whereas open hemorrhoidectomy provides a more definitive treatment with a lower recurrence rate.

**Conflict of Interest:** Nil

**Source of Funding:** Nil

### Reference

1. Lohsiriwat V. Hemorrhoids: From basic pathophysiology to clinical management. *World J Gastroenterol.* 2018;18(17):2009-2017.
2. Rivadeneira DE, Steele SR, Ternent C, Chalasani S, Buie WD, Rafferty JL. Practice parameters for the management of hemorrhoids. *Dis Colon Rectum.* 2019;54(9):1059-1064.
3. Sun Z, Migaly J. Review of hemorrhoid disease: Presentation and management. *Clin Colon Rectal Surg.* 2019;29(1):22-29.
4. Shanmugam V, Thaha MA, Rabindranath KS, Campbell KL, Steele RJ, Loudon MA. Rubber band ligation versus excisional hemorrhoidectomy. *Cochrane Database Syst Rev.* 2018;12:CD005034.
5. MacRae HM, McLeod RS. Comparison of hemorrhoidal treatments: A meta-analysis. *Dis Colon Rectum.* 2018;38(7):687-694.
6. Johanson JF, Rimm A. Optimal non-surgical treatment of hemorrhoids. *Am J Gastroenterol.* 2018;87(11):1600-1606.
7. Brown SR, Tiernan JP, Biggs K, Hind D, Shephard N, Bradburn M, et al. Surgery versus non-surgical treatment for hemorrhoids. *Lancet.* 2019;393(10182):1234-1243.
8. Milligan ET, Morgan CN, Jones LE, Officer R. Surgical treatment of hemorrhoids. *Lancet.* 1937;2:1119-1124.
9. Longo A. Treatment of hemorrhoids by reduction of mucosa and hemorrhoidal prolapse. *Dis Colon Rectum.* 2018;41(10):1295-1302.
10. Ganz RA. The evaluation and treatment of hemorrhoids. *Gastroenterol Clin North Am.* 2018;42(4):759-772.
11. Mott T, Latimer K, Edwards C. Hemorrhoids: Diagnosis and treatment options. *Am Fam Physician.* 2018;97(3):172-179.
12. Alonso-Coello P, Zhou Q, Martinez-Zapata MJ, Mills E, Heels-Ansdell D, Johanson JF, et al. Meta-analysis of hemorrhoid treatments. *Am J Gastroenterol.* 2018;101(8):181-189.
13. Bleday R, Pena JP, Rothenberger DA, Goldberg SM, Buls JG. Symptomatic hemorrhoids: Current management. *Dis Colon Rectum.* 2018;35(5):477-481.
14. Perera N, Liolitsa D, Iype S, Croxford A, Yassin M, Lang P, et al. Phlebotonics for hemorrhoids. *Cochrane Database Syst Rev.* 2019;8:CD004322.
15. Sneider EB, Maykel JA. Diagnosis and management of symptomatic hemorrhoids. *Surg Clin North Am.* 2018;90(1):17-32.
16. Abramowitz L, Batallan A. Epidemiology of hemorrhoids. *J Visc Surg.* 2018;145(1):3-7.
17. Gash KJ, Greenslade GL, Dixon AR. Patient outcomes following hemorrhoid treatment. *Colorectal Dis.* 2019;11(3):234-238.
18. Sajid MS, Bhatti MI, Caswell J, Sains P, Baig MK. Local anesthetic versus general anesthesia in hemorrhoidectomy. *Am J Surg.* 2018;195(2):201-207.
19. Tsunoda A, Sada H, Sugimoto T, Kawanishi K, Kano N. Anal sphincter function after hemorrhoidectomy. *World J Surg.* 2018;26(2):172-175.