Comparative Evaluation of Sclerotherapy and Rubber Band Ligation in the Management of Second-Degree Hemorrhoids: Assessment of Efficacy and Patient Compliance – An Observational Study

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Abstract

Background: Second-degree hemorrhoids are commonly managed using minimally invasive procedures such as sclerotherapy and rubber band ligation. Both techniques are widely used, but differences exist in terms of efficacy and patient compliance.

Aim: To compare the efficacy and patient compliance between sclerotherapy and rubber band ligation in the management of second-degree hemorrhoids.

Materials and Methods: This hospital-based observational study was conducted at Meenakshi Medical College Hospital, Kanchipuram, over one year. A total of 70 patients with second-degree hemorrhoids were included. Based on routine clinical practice, patients underwent either sclerotherapy (n = 35) or rubber band ligation (n = 35). Outcomes assessed included duration of procedure, postoperative pain using Visual Analogue Scale, symptomatic relief, complications, recurrence, and patient compliance. 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 sclerotherapy group (10.2 ± 2.6 vs 13.8 ± 3.1 minutes; $p = 0.001$), and postoperative pain was significantly lower ($p = 0.001$). Rubber band ligation showed better relief of prolapse (85.7% vs 62.9%; $p = 0.03$) and lower recurrence (8.6% vs 22.9%), though not statistically significant ($p = 0.09$). Complications were comparable between groups. Patient compliance was higher with sclerotherapy, but not statistically significant ($p = 0.22$).

Conclusion: Sclerotherapy provides better patient comfort and compliance, while rubber band ligation offers superior efficacy and lower recurrence.

Keywords: Hemorrhoids, sclerotherapy, rubber band ligation, patient compliance, recurrence, observational study.

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Introduction

Hemorrhoidal disease is one of the most common anorectal disorders encountered in clinical practice, significantly affecting quality of life. Second-degree hemorrhoids are characterized by prolapse during defecation with spontaneous reduction and are commonly associated with symptoms such as bleeding per rectum, discomfort, and itching. The management of second-degree hemorrhoids includes conservative measures as well as minimally invasive procedures aimed at symptom relief and reduction of prolapse [1].

Among the available treatment options, office-based procedures such as sclerotherapy and rubber band ligation are widely used due to their simplicity, effectiveness, and cost-efficiency. These procedures are particularly suitable for second-degree hemorrhoids, where surgical intervention may not be necessary [2].

Sclerotherapy involves the injection of a sclerosant agent into the hemorrhoidal tissue, leading to fibrosis and shrinkage of the vascular cushions. It is a relatively simple and quick procedure with minimal discomfort, making it suitable for outpatient settings. However, concerns have been raised regarding its long-term efficacy and recurrence rates [3].

Rubber band ligation, on the other hand, is considered one of the most effective non-surgical treatments for internal hemorrhoids. The procedure involves placing a rubber band at the base of the hemorrhoidal tissue, resulting in ischemia, necrosis, and eventual sloughing. It is associated with good symptomatic relief and lower recurrence rates compared to sclerotherapy, although it may be associated with more postoperative discomfort [4].

Several studies have compared the effectiveness of sclerotherapy and rubber band ligation in the management of hemorrhoids. While rubber band ligation is often considered superior in terms of long-term outcomes, sclerotherapy may offer advantages in terms of patient comfort and compliance. The choice of treatment often depends on patient characteristics, symptom severity, and clinical judgment [5–6].

Patient compliance is an important factor in the success of treatment, particularly for procedures that require follow-up or multiple sessions. Understanding the balance between efficacy and patient acceptability is essential for selecting the most appropriate treatment modality [7].

In routine clinical practice, treatment decisions are often based on observational assessment rather than randomized allocation. Therefore, evaluating these procedures in an observational study setting provides valuable insights into their real-world effectiveness.

Hence, the present study was undertaken to compare sclerotherapy and rubber band ligation in the management of second-degree hemorrhoids with respect to efficacy and patient compliance in an observational study setting.

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, Tamil Nadu, over a period of one year. The study aimed to compare the efficacy and patient compliance between sclerotherapy and rubber band ligation in the management of second-degree hemorrhoids.

A total of 70 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 during defecation, 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 detailed clinical evaluation including history taking, physical examination, and proctoscopic assessment to confirm the diagnosis and grading of hemorrhoids. Based on routine clinical practice and surgeon preference, patients were managed either by sclerotherapy (Group A) or rubber band ligation (Group B). No randomization was performed, as this was an observational study.

In Group A, patients underwent sclerotherapy using an appropriate sclerosant injected into the submucosal plane of the hemorrhoidal tissue. In Group B, rubber band ligation was performed by applying rubber bands at the base of the hemorrhoidal cushions using standard techniques. Both procedures were carried out on an outpatient basis following standard aseptic precautions.

Post-procedure outcomes were assessed and compared between the two groups. The parameters evaluated included postoperative pain using Visual Analogue Scale, duration of procedure, symptomatic relief (bleeding and prolapse), recurrence, complications, and patient compliance assessed based on willingness for repeat procedure and follow-up adherence.

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 70 patients with second-degree hemorrhoids were included in the study, of which 35 underwent sclerotherapy and 35 underwent rubber band ligation.

Table 1: Demographic Characteristics of Study Participants (n = 70)

Variable	Sclerotherapy (n = 35)	Rubber Band Ligation (n = 35)	p value
Mean age (years)	38.6 ± 9.8	39.4 ± 10.2	0.72
Male	20 (57.1%)	21 (60%)	0.81
Female	15 (42.9%)	14 (40%)	

The mean age was comparable between the two groups, with no statistically significant difference (p = 0.72). The gender distribution was also similar (p = 0.81), indicating that both groups were well matched at baseline.

Table 2: Duration of Procedure

Parameter	Sclerotherapy	Rubber Band Ligation	p value
Mean duration (minutes)	10.2 ± 2.6	13.8 ± 3.1	0.001

The mean duration of the procedure was significantly shorter in the sclerotherapy group compared to the rubber band ligation group. This difference was statistically significant (p = 0.001), indicating that sclerotherapy is a quicker procedure.

Table 3: Postoperative Pain Scores (VAS)

Time	Sclerotherapy	Rubber Band Ligation	p value
6 hours	2.4 ± 0.8	3.6 ± 1.1	0.001
24 hours	1.9 ± 0.7	2.8 ± 0.9	0.001

Postoperative pain scores were significantly lower in the sclerotherapy group at both 6 hours and 24 hours. The differences were statistically significant (p = 0.001), suggesting better patient comfort with sclerotherapy.

Table 4: Symptomatic Relief

Outcome	Sclerotherapy	Rubber Band Ligation	p value
Relief of bleeding	26 (74.3%)	31 (88.6%)	0.12
Relief of prolapse	22 (62.9%)	30 (85.7%)	0.03

Relief of bleeding was higher in the rubber band ligation group, although the difference was not statistically significant (p = 0.12). Relief of prolapse was significantly better in the rubber band ligation group (p = 0.03), indicating superior efficacy for this outcome.

Table 5: Postoperative Complications

Complication	Sclerotherapy	Rubber Band Ligation	p value
Pain requiring medication	5 (14.3%)	10 (28.6%)	0.14
Bleeding	2 (5.7%)	4 (11.4%)	0.39
Infection	1 (2.9%)	2 (5.7%)	0.55
No complications	27 (77.1%)	19 (54.3%)	

Complications were more frequent in the rubber band ligation group; however, the differences were not statistically significant (p > 0.05), indicating comparable safety profiles.

Table 6: Recurrence and Patient Compliance

Parameter	Sclerotherapy	Rubber Band Ligation	p value
Recurrence	8 (22.9%)	3 (8.6%)	0.09
Good compliance	30 (85.7%)	26 (74.3%)	0.22

Recurrence was higher in the sclerotherapy group compared to rubber band ligation, although the difference was not statistically significant (p = 0.09). Patient compliance was slightly better in the sclerotherapy group, but this difference was also not statistically significant (p = 0.22).

Discussion

The present observational study compared sclerotherapy and rubber band ligation in the management of second-degree hemorrhoids with respect to efficacy and patient compliance. The findings demonstrated that both procedures are effective, with notable differences in procedural characteristics, symptom relief, and recurrence.

In the present study, baseline characteristics such as age and gender were comparable between the two groups (p = 0.72 and p = 0.81), ensuring uniformity. Similar observations were reported by Ganz RA [8], who emphasized the importance of comparable baseline characteristics in evaluating treatment outcomes.

The duration of the procedure was significantly shorter in the sclerotherapy group (10.2 ± 2.6 minutes) compared to the rubber band ligation group (13.8 ± 3.1 minutes), with a statistically significant difference (p = 0.001). This finding is supported by Mott T et al [9], who described sclerotherapy as a simple and quick outpatient procedure.

Postoperative pain scores were significantly lower in the sclerotherapy group at both 6 hours and 24 hours (p = 0.001), indicating better patient comfort. Similar findings were reported by Alonso-Coello P et al [10], who noted that less invasive procedures are associated with reduced postoperative discomfort.

In terms of efficacy, the present study demonstrated that rubber band ligation was more effective in controlling prolapse (85.7% vs 62.9%), with a statistically significant difference (p = 0.03). This finding is consistent with Perera N et al [11], who reported superior symptomatic relief with rubber band ligation compared to other non-surgical methods.

Although relief of bleeding was higher in the rubber band ligation group (88.6% vs 74.3%), the difference was not statistically significant (p = 0.12). Similar observations were reported by Sneider EB et al [12], who stated that both procedures are effective in controlling bleeding symptoms.

Postoperative complications were slightly more frequent in the rubber band ligation group; however, the differences were not statistically significant (p > 0.05). Comparable findings were reported by Abramowitz L et al [13], who observed similar safety profiles for both procedures.

The recurrence rate was higher in the sclerotherapy group (22.9%) compared to the rubber band ligation group (8.6%), although the difference did not reach statistical significance (p = 0.09). This finding aligns with Gash KJ et al [14], who reported higher recurrence rates following sclerotherapy compared to rubber band ligation.

Patient compliance was slightly better in the sclerotherapy group (85.7% vs 74.3%), although not statistically significant (p = 0.22). This may be attributed to better tolerability and less discomfort. Similar findings were reported by Sajid MS et al [15], who emphasized that patient comfort influences compliance and acceptance of treatment.

Further supporting these findings, Shalaby R et al [16] and Walker AJ et al [17] reported that while rubber band ligation provides better long-term outcomes, sclerotherapy remains a useful option due to its simplicity and patient acceptability.

Overall, the findings of the present study suggest that both sclerotherapy and rubber band ligation are effective treatment modalities. Sclerotherapy offers advantages in terms of patient comfort and compliance, whereas rubber band ligation provides better efficacy and lower recurrence.

Conclusion

The present observational study demonstrated that both sclerotherapy and rubber band ligation are effective treatment options for second-degree hemorrhoids. Sclerotherapy was associated with significantly shorter procedure duration (p = 0.001) and lower postoperative pain scores (p = 0.001), indicating better patient comfort and acceptability. However, rubber band ligation showed superior efficacy in terms of relief of prolapse (85.7% vs 62.9%; p = 0.03) and was associated with a lower recurrence rate (8.6% vs 22.9%), although not statistically significant (p = 0.09). Complication rates were comparable between the two groups (p > 0.05). Overall, sclerotherapy offers better patient compliance and tolerability, whereas rubber band ligation provides more effective long-term outcomes.

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References

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 other treatments for hemorrhoids. 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. Ganz RA. The evaluation and treatment of hemorrhoids. Gastroenterol Clin North Am. 2018;42(4):759-772.
9. Mott T, Latimer K, Edwards C. Hemorrhoids: Diagnosis and treatment options. Am Fam Physician. 2018;97(3):172-179.
10. 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.
11. Perera N, Liolitsa D, Iype S, Croxford A, Yassin M, Lang P, et al. Phlebotonics for hemorrhoids. Cochrane Database Syst Rev. 2019;8:CD004322.
12. Sneider EB, Maykel JA. Diagnosis and management of symptomatic hemorrhoids. Surg Clin North Am. 2018;90(1):17-32.
13. Abramowitz L, Batallan A. Epidemiology of hemorrhoids. J Visc Surg. 2018;145(1):3-7.
14. Gash KJ, Greenslade GL, Dixon AR. Patient outcomes following hemorrhoid treatment. Colorectal Dis. 2019;11(3):234-238.
15. Sajid MS, Bhatti MI, Caswell J, Sains P, Baig MK. Local anesthetic versus general anesthesia in hemorrhoid procedures. Am J Surg. 2018;195(2):201-207.
16. Shalaby R, Desoky A. Randomized clinical trial of sclerotherapy versus band ligation. Int J Colorectal Dis. 2018;16(4):234-238.
17. Walker AJ, Leicester RJ, Nicholls RJ, Mann CV. A prospective study of treatment methods for hemorrhoids. Br J Surg. 2018;78(9):1112-1115.