



A COMPARATIVE STUDY EVALUATING THE EFFICACY OF SCLEROTHERAPY AND RUBBER BAND LIGATION VERSUS OPEN HEMORRHOIDECTOMY FOR SECOND DEGREE HEMORRHOIDS

General Surgery

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ABSTRACT

Background: Haemorrhoids are a common condition characterized by the symptomatic enlargement of anal cushions, leading to discomfort and rectal bleeding. Various treatment options exist, including rubber band ligation, sclerotherapy, and haemorrhoidectomy. **Objective:** This study aims to compare the efficacy and safety of sclerotherapy and rubber band ligation against open haemorrhoidectomy in patients with second-degree haemorrhoids. **Methods:** A prospective study was conducted with 90 patients diagnosed with second-degree haemorrhoids at the Integral Institute of Medical Sciences and Research, Lucknow, from September 2022 to March 2024. Patients were categorized into three groups: rubber band ligation, sclerotherapy, and haemorrhoidectomy. Data were collected on demographics, presenting complaints, post-operative complications, and follow-up outcomes, assessed at 6 months. **Results:** The study population comprised predominantly middle-aged males (65.6%) with a mean age of 39 years. Common complaints included bleeding (57.8%) and anal pain (55.6%). The cure rates were significantly higher in the haemorrhoidectomy group (100%) compared to rubber band ligation (90%) and sclerotherapy (76.7%). Recurrence rates were 23.3% for sclerotherapy and 10% for rubber band ligation, while no recurrences were noted in the haemorrhoidectomy group. Complications were most prevalent in the haemorrhoidectomy group, including increased pain and urinary retention, risks of anal stricture and incontinence. **Conclusion:** Rubber band ligation demonstrated fewer complications, quicker recovery, and shorter hospital stays compared to sclerotherapy and open haemorrhoidectomy. Injection sclerotherapy was associated with a higher recurrence rate and bleeding complications. These findings suggest that rubber band ligation is a viable first-line treatment for second-degree haemorrhoids.

KEYWORDS

Hemorrhoids, Sclerotherapy, Rubber Band Ligation, Haemorrhoidectomy, Second-Degree Haemorrhoids

INTRODUCTION

A hemorrhoid is described as a “symptomatic enlargement and distal displacement of the normal anal cushions”. Hemorrhoids are a common medical condition, often leading to discomfort, pain, and rectal bleeding. [1] Although hemorrhoids can occur in younger adults, the incidence increases with age. It is estimated that at least 50% of the population will experience hemorrhoids at some point in their lives, especially after the age of 50[2,3,4]. peak prevalence occurred between age 45-65 years [5]. The lifetime prevalence of hemorrhoids to be as high as 75% in India [6].

A number of risk factors have been recognized to be associated with pathogenesis and progression of hemorrhoids. These include “diet, constipation, prolonged straining, pregnancy, obesity, ageing, hereditary, derangement of the internal anal sphincter. The erect posture of humans is also a predisposing factor” [7,8,9]. The chief complaints are bleeding during or after defecation, anal pain, itching, prolapse, and perianal soiling [10].

Several treatment options are available for managing hemorrhoids, depending on the severity of the condition. Mild hemorrhoids may be managed with lifestyle changes, such as increasing fibre intake, local medical treatment with various kinds of ointments and suppositories.[11]. However, more severe or persistent hemorrhoids may require medical interventions. Three common treatment options include rubber band ligation, sclerotherapy, and hemorrhoidectomy. [12]

Rubber band ligation The technique of applying rubber bands to hemorrhoids was first described in 1963 (Baron, 1963).[13] During this procedure, a small rubber band is placed around the base of the hemorrhoid, cutting off its blood supply. The hemorrhoid eventually shrinks and falls off within a few days. This procedure is generally effective for first and second degree hemorrhoids and is performed in an outpatient setting [14].

Injection sclerotherapy is a submucosal injection of 5% oily phenol into first or second degree hemorrhoids is an alternative to banding. It is cheap and easy to perform, but it is less widely used than banding because of the high failure rate [15]. A number of sclerosants are used clinically which includes ethanolamine oleate, ethibloc, bleomycin, and sodium tetradecyl sulphate [16, 17]. These agents commonly

provide a stimulus to vascular endothelial intima, induce extra-vascular inflammatory reactions, and ultimately cause vascular fibrosis and occlusion [18].

Surgical excision of hemorrhoids should be reserved for patients for whom office-based procedures fail or who cannot tolerate these procedures, grade III or IV hemorrhoids. However, it was associated with increased pain and the highest complication rate [19].

This study aims to compare the efficacy and safety of sclerotherapy and rubber band ligation against open hemorrhoidectomy in patients with second-degree hemorrhoids.

METHODS

This prospective study included 90 patients diagnosed with second-degree hemorrhoids at the Department of General Surgery, Integral Institute of Medical Sciences and Research (IIMSR), Lucknow. The study was conducted from September 2022 to March 2024. Institutional Ethics Committee approval was obtained prior to the study. Informed consent was obtained from all the participants enrolled in the study.

Inclusion criteria for the study comprised all patients aged over 18 years diagnosed with second-degree hemorrhoids. Exclusion criteria included patients with thrombosed or recurrent hemorrhoids, those with internal hemorrhoids classified as grade 1, grade 3, or grade 4, and individuals on anticoagulant medications.

Patients presenting to the outpatient department with complaints of bleeding per rectum or mass per rectum were subjected to detailed history taking, which included demographic information such as age, sex, dietary preferences, occupation, presenting complaints, and duration of symptoms. Following this, they were subjected for clinical evaluation which included visual inspection of the anus and per rectal digital examination to assess the condition further.

Anoscopy or proctoscopy was performed to identify the presence, degree, and position of internal hemorrhoids. A systemic examination and basic investigations were also conducted. Based on the severity and type of symptoms, patients were assigned to one of three treatment groups: rubber band ligation, sclerotherapy, or hemorrhoidectomy.

Sample size was calculated using open-Epi software 3.01 version.

Sample size was calculated keeping the power of the study at 80% with level of Significance at 5%. Each treatment group consisted of 30 cases, with management conducted in accordance with ACRSI guidelines [24]. The treatment modalities were categorized into two groups: minimally invasive day care procedures (sclerotherapy and rubber band ligation, each with 30 cases) and the invasive procedure (hemorrhoidectomy, also with 30 cases). Course in the hospital was assessed by post-operative pain, bleeding per rectum, need of blood transfusions, and duration of hospital stay. Patients were followed up weekly for the first month, then monthly for three months, and again at six months. Data were collected on patient responses and complication rates, including pain, bleeding, recurrence, and discharge per anus.

At the final follow-up, outcomes were categorized as follows:

- **Complete cure:** Resolution of all symptoms.
- **Partial cure:** Improvement of symptoms.
- **Recurrence:** Deterioration or re-emergence of symptoms.

Statistical Analysis

Data obtained was digitalized using MS-Excel 2017 software. Data analysis was done using IBM SPSS Stats 25.0 Software. Continuous data has been depicted as mean $\pm$ standard deviation. Categorical/qualitative data has been depicted as numbers and percentages. Chi-square test was used to compare the categorical/qualitative data. Analysis of variance (ANOVA) was used to compare continuous/quantitative data. 'p' value less than 0.05 was considered as statistically significant.

RESULTS

The study included 90 patients with second-degree hemorrhoids, aged between 20 and 88 years. The most represented age group was 30 to 39 years, accounting for 32.2% of the cases. Most patients (65.6%) were male, while 34.4% were female. The population was predominantly composed of individuals preferring a mixed or non-vegetarian diet (61.1%). Bleeding was the most common presenting complaint, reported by 57.8% of patients, followed by anal pain at 55.6% and prolapse at 34.4%. A total of 30 (33.3%) patients each were treated using injection sclerotherapy, rubber band ligation and hemorrhoidectomy respectively. Accordingly, 60 patients (66.7%) received minimally invasive office procedures, while the remaining 30 patients (33.3%) underwent the invasive surgical procedure of hemorrhoidectomy. (Table 3)

Complications experienced by the patients after surgery was summarized in Table 4. Pain and Bleeding was significantly more prevalent in the hemorrhoidectomy group compared to the other groups ($p = 0.023$). No urinary retention difficulties were reported in the sclerotherapy and rubber band ligation groups, while it was observed in 33.3% of patients undergoing hemorrhoidectomy. Recurrence at 6 months was significantly lower in the hemorrhoidectomy group (0%) compared to injection sclerotherapy (23.3%) and rubber band ligation (10%) ($p = 0.025$). Other complications, such as discomfort, anal pain, stenosis, and anal incontinence, did not show significant differences among the groups.

DISCUSSION

The demographic profile of our study revealed a predominance of middle-aged, male, urban patients who favoured a mixed/non-vegetarian diet. This aligns with findings from Joseph et al, which also highlighted a similar demographic trend among patients aged 41 to 60 years [20].

In the present study, bleeding (57.8%), pain (55.6%) and prolapse (34.4%) were the most common presenting complaints. In the study by Shinde et al. these complaints were seen in much higher proportion of patients, viz. Bleeding (98%), pain (86%) and prolapse (84%).[21]

Table 1: Clinical profile of Study Population

SN	Age Group	No. of cases	Percentage
1.	20-29 years	14	15.6
2.	30-39 years	29	32.2
3.	40-49 years	17	18.9
4.	50-59 years	13	14.4
5.	60-69 years	13	14.4
6.	≥ 70 years	4	4.4
7	Sex		
	Male	59	65.6
	Female	31	34.4

8	Residence		
	Rural	42	46.7
	Urban	48	53.3
9	Dietary preference		
	Mixed/Non-vegetarian	55	61.1
	Vegetarian	35	38.9

Table 2: Distribution of Study Population according to Presenting Complaints

SN	Presenting complaints	No. of cases	Percentage
1.	Bleeding	52	57.8
2.	Prolapse	31	34.4
3.	Anal pain	50	55.6
4.	Constipation	22	24.4
5.	Mucous discharge	17	18.9

Table 3: Distribution of cases according to treatment modality

SN	Treatment Modality	No. of cases	Percentage
A. Minimally Invasive Office Procedures (n=60)			
1.	Inj. Sclerotherapy	30	33.3
2.	Rubber band ligation	30	33.3
B. Invasive Surgical Procedures (n=30)			
3.	Haemorrhoidectomy	30	33.3

Table 4: Comparison of post-operative complications among study subjects

SN	Complaints	Injection Sclerotherapy (n=30)		Rubber band ligation (n=30)		Haemorrhoidectomy (n=30)		Statistical significance	
		No.	%	No.	%	No.	%	χ^2	'p'
1.	Bleeding	8	26.7	5	16.7	14	46.7	3.51	0.023
2.	Discomfort	5	16.7	6	20.0	4	13.3	4.030	0.842
3.	Anal pain	12	40.0	7	23.3	23	76.7	6.32	0.042
4.	Urinary retention difficulties	0	10.0	0	20.0	10	33.3	16.67	0.0024
5.	Stenosis	2	6.7	1	3.3	7	23.3	5.35	0.069
6.	Anal incontinence	0	0	0	0	6	20	10.67	0.005
7.	Recurrence at 6 months	7	23.3	3	10	0	0	6.63	0.025

Pain was identified as the most common complication, followed by bleeding, with the complication rate being lowest in the rubber band ligation group and highest in the hemorrhoidectomy group. Compared to the present study, Patil et al. in their study noticed pain, bleeding per rectum, mucosal discharge, and urinary discharge and wound dehiscence as the most common post-operative complications. [22]

At final assessment, the cure rates were significantly higher in the hemorrhoidectomy group (100%) compared to the rubber band ligation (90%) and injection sclerotherapy (76.7%) groups. Recurrence rates were observed at 23.3% for injection sclerotherapy, 10% for rubber band ligation, and none in the hemorrhoidectomy group. Among the minimally invasive procedures, rubber band ligation demonstrated better outcomes than injection sclerotherapy. In another study by Thakkar et al. found complete cure (no prolapse) to be higher in surgically managed group (75%) as compared to that in minimally invasive rubber band ligation group (58%). [23].

The findings of the present study were only short-term outcomes and hence must not be generalized. Further studies using both retrospective and prospective data using an audit approach are recommended.

CONCLUSION

The findings of this study conclude that among the three surgical procedures assessed for the treatment of hemorrhoids, rubber band ligation demonstrated the least complications, allowed for early ambulation, and resulted in a shorter postoperative stay. Patients who underwent injection sclerotherapy experienced issues such as bleeding per rectum and recurrence. Open hemorrhoidectomy was associated with postoperative pain, urinary retention, and minimal discharge from the surgical site. Additionally, cases of recurrence from other treatment modalities were successfully managed with open hemorrhoidectomy.

though this procedure also presented risks, including anal stricture and anal incontinence.

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