



PROSPECTIVE OBSERVATIONAL STUDY TO EVALUATE THE EFFECTIVENESS OF HEMORRHOIDAL ARTERY LIGATION USING THE PALPATORY METHOD

Dr.Jeevan kumar D V^{1*}, Dr. Manojkumar V², Dr. Santosh k³

¹Assistant Professor, department of General Surgery, Dr.Chandramma Dayananda Sagar institute of Medical Education and Research, Bengaluru

²Senior Resident, department of General Surgery, Raichur Institute Of Medical Sciences, Raichur

³Assistant Professor, department of General Surgery.Sapthagiri institute of medical sciences, Bangaluru.

Abstract

Background: Hemorrhoids are enlarged and swollen vascular cushions in the anal canal . Haemorrhoids develop either due to age-related weakening of the supporting connective tissues, leading to mucosal prolapse, or as a result of abnormal blood flow through the arteriovenous shunts, causing vascular dilatation, bleeding, and eventual prolapse. They are classified as internal (above the dentate line) and external (below the dentate line). Management depends on the severity and includes conservative treatment (high-fiber diet, increased fluids, stool softeners, and topical medications), opd-based procedures (rubber band ligation, sclerotherapy, infrared coagulation), and surgical interventions (hemorrhoidectomy, stapled hemorrhoidopexy, or hemorrhoidal artery ligation) for advanced or refractory cases. Early diagnosis and appropriate treatment help relieve symptoms and prevent complications.

Methods: A observational prospective study was conducted in the Department of General Surgery at Dr.Chandramma Dayananda Sagar institute of Medical Education and Research, Bengaluru, involving 80 patients for 7 months from OCTOBER 1st 2024 to April 30th 2025. Patients aged between 20-60 years with grade II and III hemorrhoids were included in the study, to determine the effectiveness of the haemorrhoidal artery ligation via palpatory method among patients with grade II and III haemorrhoids

Results: Of the 80 patients who underwent haemorrhoidal artery ligation, 37 (43.75%) were male and 43 (53.7%) were female. The mean age was 42.76 ± 10.08 years for males and 43.52 ± 10.59 years for females. Postoperative complications occurred in 23 patients (25.3%), with rectal bleeding being the most common, followed by pain during defecation, anal fissure, fistula-in-ano, and recurrence. Most patients were discharged on postoperative day 2 and resumed normal daily activities within 5 days.

Conclusion: Palpatory haemorrhoidal artery ligation is a safe, effective, and minimally invasive treatment option for haemorrhoids. It is associated with less postoperative pain, fewer complications, and faster recovery compared with conventional open haemorrhoidectomy. Moreover, the palpatory method serves as a practical and cost-effective alternative in healthcare settings where Doppler-guided haemorrhoidal artery ligation equipment is unavailable, making it particularly valuable in resource-limited environments.

Key Words: haemorrhoidal artery ligation, haemorrhoidectomy, Doppler-guided haemorrhoidal artery ligation equipment

Introduction

Hemorrhoidal disease is one of the most common anorectal disorders, characterized by symptomatic enlargement and distal displacement of the normal vascular cushions of the anal canal. It commonly presents with painless bright red rectal bleeding during defecation, prolapse, mucus discharge, pruritus, and a sensation of incomplete evacuation, while pain is typically associated with thrombosed external hemorrhoids. Hemorrhoids develop due to age-related weakening of the supporting connective tissue, resulting in mucosal prolapse, and/or abnormal arteriovenous blood flow leading to vascular dilatation and congestion¹. They are classified as external (below the dentate line) and internal (above the dentate line), with internal hemorrhoids further graded from I to IV according to the degree of prolapse².

Management is guided by symptom severity, hemorrhoid grade, and patient-related factors such as age and comorbidities. Conservative treatment, including dietary fiber supplementation, adequate hydration, stool softeners, and lifestyle modifications, remains the first-line approach for early disease. Office-based procedures such as rubber band ligation, sclerotherapy, infrared coagulation, bipolar electrotherapy, and radiofrequency ablation are effective for selected Grade I–III hemorrhoids. For advanced or refractory disease, surgical options include conventional excisional hemorrhoidectomy, stapled hemorrhoidopexy, Doppler-guided hemorrhoidal artery ligation (DG-HAL) with or without mucopexy, laser hemorrhoidoplasty, and transanal hemorrhoidal dearterialization (THD). These minimally invasive techniques aim to reduce postoperative pain, shorten recovery, and preserve anorectal function while providing satisfactory symptom control^{3,4}.

Doppler-guided hemorrhoidal artery ligation has emerged as an effective sphincter-preserving procedure by identifying and ligating terminal branches of the superior rectal artery, thereby reducing arterial inflow and promoting regression of hemorrhoidal tissue. However, the requirement for specialized Doppler equipment limits its availability in many resource-constrained settings^{5,6}. Palpatory hemorrhoidal artery ligation, which relies on manual identification of arterial pulsations without Doppler assistance, offers a simple, cost-effective, and technically feasible alternative. The present study was undertaken to evaluate the effectiveness of palpatory hemorrhoidal artery ligation in patients with Grade II and III internal hemorrhoids^{7,8}.

Aim And Objectives Of The Study

To evaluate the effectiveness of haemorrhoidal artery ligation using the palpatory method in the management of Grade II and Grade III haemorrhoids.

Materials And Methods

Source of data :

Patients presenting to opd and admitted the Department of General Surgery at Dr.Chandramma Dayananda Sagar institute of Medical Education and Research, Bengaluru, involving 80 patients for 7 months from OCTOBER 1st 2024 to April 30th 2025

Period of study: OCTOBER 1st 2024 to April 30th 2025

Study design: observational prospective study.

Inclusion Criteria :

Patients included in the study were aged between 20-60 years with grade II and III hemorrhoids.

Exclusion Criteria:

1. Patients above 60 years and below 20 years of age
2. Patients not willing for study
3. Patients with haemorrhoids and fistula, associated with malignancies ,specific diseases like tuberculosis, Crohn's disease etc.
4. Pregnant women
5. Patients who have undergone previous anal surgeries

Methodology:

This prospective observational study was conducted in the Department of General Surgery, Dr. Chandramma Dayananda Sagar Institute of Medical Education and Research, Bengaluru, over a period of seven months from 1 October 2024 to 30 April 2025. A total of 80 consecutive patients diagnosed with Grade II or Grade III hemorrhoids were enrolled after fulfilling the eligibility criteria. Patients aged 20–60 years presenting to the outpatient department were included in the study.

All patients underwent hemorrhoidal artery ligation using the palpatory method under spinal anesthesia. After positioning the patient in the lithotomy position, a digital rectal examination followed by proctoscopic evaluation was performed to identify the hemorrhoidal cushions. A specially designed slit proctoscope was then introduced to isolate each hemorrhoidal cushion individually. The terminal branch of the superior rectal artery supplying each hemorrhoidal cushion was identified by palpation of the arterial pulsation. Using a 3-0 polyglactin (Vicryl) suture, arterial ligation was performed approximately 1–2 cm proximal to the dentate line at the point of maximal pulsation. Continuous interlocking sutures were subsequently placed along the course of the artery to ensure complete interruption of the arterial blood supply. The procedure was repeated for all identified hemorrhoidal cushions. At the conclusion of the procedure, a sterile gauze impregnated with lignocaine gel was placed within the anal canal.

All patients received standardized perioperative care. A single intravenous prophylactic dose of ciprofloxacin (200 mg) and metronidazole (100 mL) was administered preoperatively. Postoperative management was uniform for all patients and included stool softeners, oral paracetamol for analgesia, and micronized purified flavonoid fraction (Daflon® 500 mg once daily) for 10 days.

Patients were followed up at 3 weeks and 8 weeks after surgery. Clinical outcomes assessed included postoperative pain during defecation, rectal bleeding, fistula formation, anal fissure, anal stenosis, recurrence of hemorrhoidal disease, duration of hospital stay, and time taken to resume normal daily activities.

Statistical analysis

The collected data were entered into a Microsoft Excel spreadsheet and subsequently analyzed using SPSS version 17.0 (SPSS Inc., Chicago, IL, USA). Continuous variables were expressed as mean $\pm$ standard deviation (SD), while categorical variables were presented as frequencies and percentages. Statistical comparisons were performed using appropriate tests, and a p-value <0.05 was considered statistically significant.

Results

A total of 80 patients were included in the study, comprising 35 (43.3%) males and 45 (56.7%) females. The mean age was 42.76 ± 10.08 years among male patients and 45.52 ± 10.59 years among female patients. Following haemorrhoidal artery ligation, postoperative complications were observed in 25 patients (31.3%). The most common complication was postoperative pain during defecation, reported in 14 patients (17.5%), followed by per-rectal bleeding in 7 patients (8.8%). Anal fissure developed in 2 patients (2.5%), while fistula-in-ano and recurrence were each observed in 1 patient (1.3%). All patients were discharged on postoperative day 2, and the entire cohort resumed normal daily activities within 5 days.

Table 1: Post-Operative Complications

Adverse effects	Post operative complications(3rd week)	Post operative complications(8th week)
Per rectal bleed	3	1
Post operative pain	17	3
Fitula	3	2
Fissure	4	1

Reccurance	4	1
Total	31	8

Table 2: Percentage of patients responding to treatment

Gender	Numbers	Percentage
Male	31	38.75
Female	49	61.25
Total	80	100

Discussion

1. The present study evaluated treatment outcomes while considering patient age, associated comorbidities, and the severity of hemorrhoidal disease. Selection of the appropriate treatment modality was individualized based on these factors, as patient demographics, underlying medical conditions, and disease grade are important determinants of management strategy⁹.
2. Patients with malignant perianal disorders, acute perianal conditions such as abscesses, thrombosed or complicated hemorrhoids, acute or chronic fissure-in-ano, perianal sinus or fistula, previous anorectal surgery, or significant cardiovascular, respiratory, renal, hepatic, or metabolic diseases were excluded to ensure a homogeneous study population and minimize potential confounding factors^{10,11}.
3. The exclusion criteria adopted in this study are consistent with those used by Liu et al., who excluded patients with significant comorbidities while evaluating Doppler-guided hemorrhoidal artery ligation (DGHAL) in patients with Grade II and III hemorrhoids. Their study demonstrated that DGHAL is an effective minimally invasive technique for appropriately selected patients^{12,13}.
4. Similarly, Arrezo et al. emphasized that the choice of hemorrhoid treatment should be guided primarily by the severity of the disease. Conservative measures, including dietary modification and lifestyle changes, remain the first-line treatment for early-stage hemorrhoids, whereas persistent symptoms or advanced Grade II, III, and IV hemorrhoids often require surgical intervention. Common operative procedures include conventional hemorrhoidectomy, stapled hemorrhoidopexy, and Doppler-guided hemorrhoidal artery ligation¹⁴.
5. Morinaga et al. introduced the Doppler-guided hemorrhoidal artery ligation technique based on Doppler identification and suture ligation of hemorrhoidal arteries. The procedure aims to interrupt arterial blood flow to the hemorrhoidal plexus, thereby reducing vascular congestion and promoting shrinkage of the hemorrhoidal cushions. Although generally safe, reported postoperative complications include pain during defecation, rectal bleeding, proctitis, and fistula formation¹⁵.
6. The findings of the present study are comparable with previous reports demonstrating favorable outcomes following hemorrhoidal artery ligation. Earlier studies have shown that approximately 68–70% of patients remained symptom-free during follow-up without requiring additional treatment. Schuurman and colleagues similarly reported that nearly 70% of patients did not require further intervention after arterial ligation¹⁶.
7. Recurrence rates reported in the literature remain relatively low, although occasional rebleeding has been observed during long-term follow-up. Previous studies have documented recurrence rates of approximately 15%, 9%, and 38% for Grade II, III, and IV hemorrhoids, respectively. Prolapse recurrence has been reported in nearly 10% of patients, while Faucheron et al. observed a recurrence rate of 9% after 34 months of follow-up in patients with Grade IV hemorrhoids.

8. Postoperative complications reported in previous studies include pain in 10–55% of patients, postoperative bleeding in 1–12%, and hemorrhoidal thrombosis in approximately 5% of cases following arterial ligation. Comparable findings have also been reported following rubber band ligation (RBL), where postoperative complications occurred in nearly 16% of patients, minor bleeding in about 4%, and severe pain in approximately 12%, occasionally necessitating systemic analgesic therapy due to ischemia-induced discomfort¹⁷.
9. Forlini et al. reported postoperative bleeding in 2.4% of patients one week after the procedure, while El Nakeeb et al. observed postoperative pain and rectal bleeding in 4% of patients each, with vasovagal symptoms occurring in 1.3% of cases following hemorrhoidal artery ligation for Grade II and III hemorrhoids. Likewise, Wilkerson et al. demonstrated high patient satisfaction at a 30-month follow-up among patients treated with arterial ligation for Grade II and III hemorrhoidal disease, supporting the long-term efficacy and acceptability of this minimally invasive approach¹⁸.

Conclusion

Haemorrhoidal artery ligation performed using the palpatory method has been shown to be a safe, effective, and technically feasible procedure for the management of Grade II and Grade III haemorrhoids. The technique offers several practical advantages, including ease of performance, reduced operative complexity, shorter hospital stay, and rapid postoperative recovery, while maintaining satisfactory clinical outcomes. As it does not require specialized Doppler equipment, the palpatory method is particularly beneficial in resource-limited healthcare settings where Doppler-guided haemorrhoidal artery ligation is unavailable or economically unfeasible. The comparable therapeutic outcomes, combined with its cost-effectiveness and wider accessibility, suggest that palpatory haemorrhoidal artery ligation is a reliable alternative to Doppler-guided ligation for appropriately selected patients with Grade II and Grade III haemorrhoidal disease.

References

1. Iyer VS, Shrier I, Gordon PH. Long-term outcome of rubber band ligation for symptomatic primary and recurrent internal hemorrhoids. *Dis Colon Rectum*,2004;47(8):1364-70.
9. Liu H, Yang C, Chen B, Wu J, He H. Clinical outcomes of Doppler-guided haemorrhoidal artery ligation: a meta-analysis. *Int J Clin Exp Med*,2015;8(4):4932-39.
10. Arezzo A, Podzemny V, Pescatori M. Surgical management of hemorrhoids. state of the art. *Ann Ital Chir*,2011;82(1):163-72.
2. Sun Z, Migaly J. Review of Hemorrhoid Disease: Presentation and Management. *Clin Colon Rectal Surg*,2016;29(1):22-29.
3. Alonso-Coello P, Mills E, Heels-Ansdell D. Fiber for the treatment of hemorrhoids complications: a systematic review and meta-analysis. *Am J Gastroenterol*,2006;101(1):181-88.
4. Iyer VS, Shrier I, Gordon PH. Long-term outcome of rubber band ligation for symptomatic primary and recurrent internal hemorrhoids. *Dis Colon Rectum*,2004;47(8):1364-70.
5. MacRae HM, McLeod RS. Comparison of hemorrhoidal treatment modalities. A meta-analysis. *Dis Colon Rectum*,1995;38(7):687-94.
6. Morinaga K, Hasuda K, Ikeda T. A novel therapy for internal hemorrhoids: Ligation of the hemorrhoidal artery with a newly devised instrument (moricorn) in conjunction with a doppler flowmeter. *Am J Gastroenterol*,1995;90(2):610-13.
7. Wilkerson PM, Strbac M, Reece-Smith H, Middleton SB. Doppler-guided haemorrhoidal artery ligation: Long-term outcome and patient satisfaction. *Colorectal Dis*,2009;11(2):394-400.

8. Schuurman PJ. Artery ligation in the treatment of hemorrhoidal disease. Thesis, Utrecht University, the Netherlands, 2012. ISBN: 978-90-393-5820-7.
9. Jeong WJ, Cho SW. One year follow-up result of doppler-guided hemorrhoidal artery ligation and recto-anal repair in 97 consecutive patients. *J Korean Soc Coloproctol*, 2011;27(6):298-302.
19. Infantino A, Bellomo R, Dal Monte PP, Salafia C. Transanal haemorrhoidal artery echodoppler ligation and anopexy (THD) is effective for II and III degree haemorrhoids: a prospective multicentric study. *Colorectal Dis*, 2010;12(8):804-09.
20. Ratto C, Donisi L, Parello A, Litta F, Doglietto GB. Evaluation of transanal hemorrhoidal dearterialization as a minimally invasive therapeutic approach to hemorrhoids. *Dis Colon Rectum*, 2010;53(7):803-11.
10. Faucheron JL, Poncet G, Voirin D, Badic B, Gangner Y. Dopplerguided hemorrhoidal artery ligation and rectoanal repair (HALRAR) for the treatment of grade IV hemorrhoids: longterm results in 100 consecutive patients. *Dis Colon Rectum*, 2011;54(1):226-31.
11. Shantha Mohan NP, Chandrasekar R, Chetty V. Comparative study of manual anal dilatation with fissurectomy versus lateral anal sphincterotomy in chronic fissure in ano. *Int Med J*. 2016;3(2):16770.
12. Malauf AJ, Cadogan MD, Bartolo DC. Anal Canal. In: Corson JD, Robin CN, Williamson, eds. *Surgery*. Spain: Mosby; 2001;21:10-11.
- Thomas GW, Rael LT, Bar-Or R, Shimonkevitz R, Mains CW, Slone DS, Craun ML, Bar-Or D. Mechanisms of delayed wound healing by commonly used antiseptics. *J Trauma* 2009; 66: 82– 91
13. Williams NS. The anus and anal canal. In: Russell RCG, Williams NS, Bulstrode CJK, eds. *Bailey and Love's Short Practice of Surgery*. Newyork: 2017: 1252-1255.
14. Philips R, Windsor A, Thomson J. Anorectum. In: Kired RM. *General surgical operations*. England: Churchill Livingstone; 2000: 357-358.
15. Antebi E, Schwartz P, Gilon E. Sclerotherapy for the treatment of fissure in ano. *Surg Gynaecol Obstet*. 1985;160:204-6.
16. Loder PB, Kamm MA, Nicholls RJ, Phillips RKS. Reversible chemical sphincterotomy by local application of Glyceryl trinitrate. *Br J Surg*. 1994;81:1386-9.
17. Lund NJ, Scholefield JM. A randomized, prospective, double blind, placebo controlled trial of Glyceryl trinitrate ointment in treatment of anal fissure. *Lancet*. 1997;349:11-4.
18. Gul D, Cassetta E, Anastasio G, Bentivoglio AR, Maria G, Aibanese A. Botulinum toxin for chronic anal fissure. *Lancet*. 1994;334:1127-8.