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Transanal Hemorrhoidal Dearterialization Versus Conventional Hemorrhoidectomy For The Treatment Of Hemorrhoids

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Abstract

Background: Hemorrhoidal disease is a prevalent anorectal condition. Traditional hemorrhoidectomy is considered the gold standard for advanced cases but is associated with considerable postoperative pain. Transanal Hemorrhoidal Dearterialization (THD) has emerged as a minimally invasive alternative with promising outcomes. **Objective:** To compare the clinical outcomes, postoperative complications, and recurrence rates between THD and conventional hemorrhoidectomy in the management of symptomatic hemorrhoids. **Patient and Methods:** A retrospective cohort comparative study was conducted on 200 patients with symptomatic hemorrhoidal disease who underwent either THD (n=100) or CH (n=100). Parameters assessed included operative time, postoperative pain (VAS scores), complication rates, return to work, patient satisfaction at 3 months, and recurrence at 12 months. **Results:** The THD group demonstrated significantly shorter operative time (32.6 ± 8.7 vs 41.2 ± 9.5 minutes; $p < 0.001$) and lower postoperative pain on days 1, 3, and 7 ($p < 0.001$ for all). Total complication rates were significantly lower in the THD group (12% vs 26%; $p = 0.01$). Patients treated with THD resumed work earlier (5.2 ± 2.1 vs 13.1 ± 4.3 days; $p < 0.001$) and reported higher satisfaction at 3 months (94% vs 85%; $p = 0.03$). Although recurrence was slightly higher in the THD group (10% vs 4%; $p = 0.04$), most cases were mild and managed conservatively. Compared to conventional hemorrhoidectomy, THD offers significant advantages in terms of reduced postoperative pain, lower complication rates, shorter operative time, faster return to work, and higher patient satisfaction. Although the recurrence rate is slightly higher, most of the recurrences are mild and manageable without further surgical intervention. These findings support THD as a valuable and patient-friendly alternative to excisional hemorrhoidectomy, with the added benefit of preserving anorectal anatomy and function. Further prospective, multicenter trials with long-term follow-up are needed to validate these outcomes and refine patient selection criteria. **Conclusion:** Transanal Hemorrhoidal Dearterialization (THD) is a safe, effective, and minimally invasive surgical technique for the management of symptomatic hemorrhoidal disease, particularly Grades II and III, and selected cases of Grade IV.

Keywords: Transanal hemorrhoidal dearterialization, hemorrhoidal disease, minimally invasive surgery, conventional hemorrhoidectomy, doppler-guided hemorrhoid surgery.

Introduction

Hemorrhoidal disease is one of the most common anorectal disorders, affecting a significant portion of the adult population worldwide. It is characterized by symptomatic enlargement and distal displacement of the normal anal cushions. The symptoms typically include bleeding, prolapse, pruritus, discomfort, and occasionally thrombosis or soiling [1]. The severity is commonly classified into four grades according to Goligher's classification, ranging from Grade I (bleeding only) to Grade IV (irreducible prolapse) [2]. While conservative treatments such as dietary modification, topical agents, and office-based procedures are effective for early-stage hemorrhoids, advanced cases often require surgical intervention [3]. Conventional hemorrhoidectomy (CH), although effective, is associated with considerable postoperative pain, prolonged recovery, and a risk of complications such as anal stenosis or incontinence [4]. Transanal Hemorrhoidal Dearterialization (THD), first described in the 1995 by Morinaga et al. in Japan, represents a minimally invasive alternative. This technique utilizes a Doppler-guided proctoscope to identify and ligate the terminal branches of the superior rectal artery (SRA) above the dentate line, thus reducing arterial inflow and relieving symptoms. When necessary, a mucopexy is also performed to restore the anatomical position of prolapsed hemorrhoidal tissue [5]. THD offers the advantage of being a tissue-sparing, sphincter-preserving technique with significantly less postoperative pain and a faster return to normal activities. However, data

regarding its long-term efficacy and recurrence rates remain variable across published studies [6]. This retrospective cohort aims to evaluate the short- and mid-term outcomes between Transanal Hemorrhoidal Dearterialization (THD) and conventional hemorrhoidectomy in the management of symptomatic hemorrhoids at a tertiary care center and to compare the clinical outcomes, postoperative complications, recurrence rates, and patient satisfaction.

Patients and Methods:

Study Design and Setting: This study was designed as a retrospective comparative cohort study evaluating the clinical outcomes of 200 consecutive patients who underwent either transanal hemorrhoidal dearterialization (THD) or conventional hemorrhoidectomy (CH) for the treatment of Grades II–IV symptomatic hemorrhoidal disease at Burjeel Hospital, a tertiary care center. We included any adult patients (>18 years old) diagnosed with Grade II, III, or IV hemorrhoids who underwent CH or THD (THD with or without mucopexy). We excluded any patient with concomitant anorectal conditions (e.g., fissures, fistula, IBD), previous hemorrhoid surgery, incomplete medical records, or loss to follow-up. All procedures were performed by experienced colorectal surgeons with more than 10-years of experience.

Operative Steps of THD: as described by Morinaga et al. [5] (Figures 1-5).

Figure 1: Transanal Hemorrhoidal Dearterialization (THD) Apparatus with the Doppler Probe attached, used for accurate identification of Hemorrhoidal arteries.

Figure 2: Intra operative Doppler-guided detection of terminal braches of the superior rectal artery (SRA) to facilitate precise arterial ligation.

Figure 3: Transfixing ligation of the terminal branches of the superior rectal artery using a figure-of-eight using a suture technique to minimize arterial inflow.

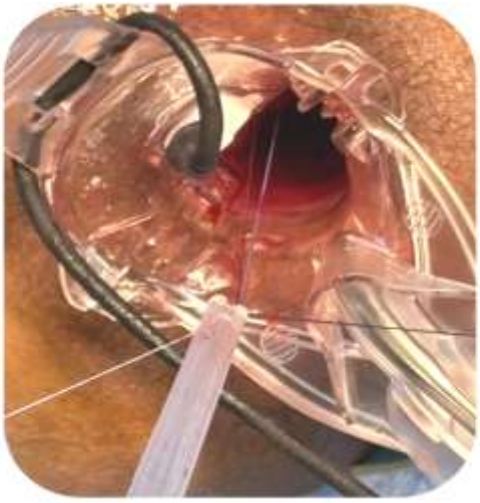

Figure 4: Use of knot pusher to secure and position the ligature above the dentate line, ensuring preservation of anodermal sensitivity

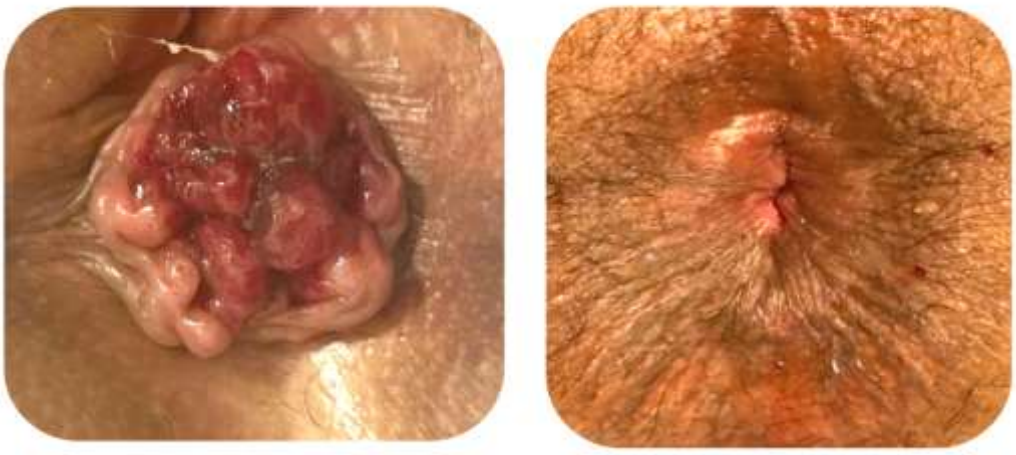

Figure 5: Preoperative view showing mucosal prolapse(left) and post-operative result following THD combined with mucopexy (right).

Operative Steps of CH: as described by Milligan and Morgan et al., [7]
Operative Steps (in short):

Patient in lithotomy position then the anal canal is gently dilated, and hemorrhoidal bundles are identified (usually three main piles at 3, 7, and 11 o'clock positions), each hemorrhoidal bundle is grasped, dissected, and excised and finally the vascular pedicle of each pile is ligated (usually with absorbable suture or diathermy). The wounds are left open (not sutured), with skin bridges preserved between excision sites to prevent anal stenosis.

Data Collection: All the preoperative data, including demographics (age, sex, comorbidities), hemorrhoids grade; operative details, including anesthesia, duration, and surgery performed. Postoperative outcomes include pain using Visual Analogue Scale (VAS) scores (range: 0–10 points, where 0 = no pain and 10 = the worst possible pain) [8], bleeding, prolapse, urinary retention, infection, recurrence, patient satisfaction, and time to return to work.

Statistical Analysis: was performed using SPSS software (version 29, IBM Corp., Armonk, NY, USA). Qualitative variables were expressed as frequencies and percentages, while quantitative variables were expressed as mean ± standard deviation (SD) after testing normality using the Kolmogorov-Smirnov test. Comparisons between the two independent groups (THD vs. CH) were made using the independent samples t-test for normally distributed continuous data and the Mann-Whitney U test for non-normally distributed data. Categorical variables were compared using the Chi-square test or Fisher's exact test when appropriate. Pearson correlation was used to assess relationships between normally distributed continuous variables, and Spearman's rank correlation was applied for non-normally distributed data. Statistical significance was set at a p-value ≤ 0.05.

Results: A total of 220 patients were included in the study. Twenty of them had lost regular follow-up visits after undergoing the procedure. The remaining 200 patients were (THD = 100; CH = 100). THD group had slightly more Grade II cases (30% vs. 25%) while the CH group had marginally more Grade IV cases (27% vs. 25%). Operative time was significantly shorter in the THD group (32.6 vs. 41.2 minutes; $p < 0.001$), emphasizing the efficiency of the minimally invasive approach. Anesthesia types differed: THD allowed for more frequent use of local anesthesia (10% vs. 0%), indicating its feasibility under less invasive anesthetic plans. Both groups had similar rates of spinal and general anesthesia otherwise. Pain scores were significantly lower in the THD group at all measured intervals. Return to work was significantly faster in the THD group (5.2 vs. 13.1 days; $p < 0.001$), which is crucial for improving patient quality of life and reducing indirect healthcare costs. Patient satisfaction at 3 months was higher with THD (94% vs. 85%; $p = 0.03$), likely reflecting the less painful recovery and earlier functional return. Interestingly, the recurrence rate at 12 months was higher in the THD group (10% vs. 4%; $p = 0.04$), indicating that while THD is less invasive, it may carry a slightly higher risk of recurrence compared to the more definitive excisional approach (table 1).

Table 1: Comparison the results between THD and CH for treatment of hemorrhoids

	THD	CH	P value
Number of cases:	100	100	----
Demographic Data: 1-Age (Mean ± SD) 2-Sex (F/M) 3-Hypertension 4-Diabetes Mellitus	 43.8 ± 9.2 60F/40M 18 14	 45.1 ± 8.6 58F/42M 22 16	 p = 0.24 p = 0.73 p = 0.46 p = 0.68
Hemorrhoids Grade: 1-Grade II 2-Grade III 3-Grade IV	 30% 45% 25%	 25% 48% 27%	 p = 0.37 p = 0.68 p = 0.72
Operative Data: 1-Operative Time 2-Anesthesia Type	 32.6 ± 8.7 min LA (10%), SA (70%), GA (20%)	 41.2 ± 9.5 min LA (0%), SA (80%), GA (20%)	 p < 0.001

Postoperative Pain (VAS) 1-Day 1 2-Day 3 3-Day 7	 3.2 ± 1.4 2.1 ± 1.2 0.6 ± 0.4	 7.6 ± 1.8 5.3 ± 1.6 2.2 ± 0.9	 P <0.001 P <0.001 P <0.001
Complications: 1-Bleeding. 2-Infection. 3-Urinary Retention. 4-Total Complications.	 5% 1% 2% 12%	 12% 6% 8% 26%	 p = 0.04 p = 0.03 p = 0.04 p = 0.01
Return to Work	5.2 ± 2.1 days	13.1 ± 4.3 days	p < 0.001
Patient Satisfaction (at 3 months)	94%	85%	p = 0.03
Recurrence (at 12 months)	10%	4%	p = 0.04

Discussion:

This retrospective comparative study highlights the effectiveness and safety of Transanal Hemorrhoidal Dearterialization (THD) as a minimally invasive approach for the treatment of symptomatic hemorrhoidal disease. Our findings align with the evidence supporting THD as a valuable alternative to conventional excisional techniques, particularly in patients with Grade II and III hemorrhoids and in selected Grade IV cases. Patients who underwent THD experienced significantly shorter operative times (32.6 vs. 41.2 minutes, $p < 0.001$), and, more importantly, reported substantially less postoperative pain at all-time points. Visual analogue scale (VAS) scores were significantly lower in the THD group on day 1 (3.2 vs. 7.6), day 3 (2.1 vs. 5.3), and day 7 (0.6 vs. 2.2), all with $p < 0.001$. This is consistent with Song et al who found that THD provided advantages in limited postoperative pain, shorter operative time, and quicker return to work compared to CH. These results reinforce the minimally invasive nature of THD and its positive impact on early postoperative recovery [9]. The complication profile further supports the safety of THD. The overall complication rate was 12% in the THD group compared to 26% in the CH group ($p = 0.01$), with fewer cases of postoperative bleeding (5% vs. 12%), infection (1% vs. 6%), and urinary retention (2% vs. 8%). Most complications were mild and managed conservatively, consistent with findings reported by Giordano et al. and Ratto et al. Series [10, 11]. Nevertheless, recurrence at 12 months was slightly higher in the THD group (10% vs. 4%; $p = 0.04$), which remains a recognized limitation of non-excisional approaches. However, most recurrences were minor and successfully managed with conservative or office-based treatments. The recurrence rate is compatible with the meta-analysis by Simillis et al. indicated that THD has higher recurrence rates compared to other excisional methods [12]. The incorporation of mucopexy in the THD procedure appears to have contributed positively to outcomes in patients with prolapsing hemorrhoids, particularly Grades III and IV, by restoring anatomical support and reducing the likelihood of symptomatic prolapse. Several studies emphasized that THD combined with mucopexy enhances effectiveness in advanced hemorrhoids [13-17]. Functional recovery was significantly improved in the THD group, with patients returning to work approximately 8 days earlier than those in the CH group (5.2 ± 2.1 vs. 13.1 ± 4.3 days; $p < 0.001$). Moreover, patient satisfaction at 3 months was higher in the THD cohort (94% vs. 85%; $p = 0.03$), agrees with other studies which are reflecting a better overall patient experience, likely due to lower pain, faster recovery, and preserved anorectal function [18]. Although the recurrence rate was slightly higher, most of the recurrences were mild and manageable without further surgical intervention. These findings support THD as a valuable and patient-friendly alternative to excisional hemorrhoidectomy, with the added benefit of preserving anorectal anatomy and function. Further prospective, multicenter trials with long-term follow-up are needed to validate these outcomes and refine patient selection criteria.

Our study's limitations include its retrospective design, single-center experience, and reliance on subjective documentation of satisfaction and symptom resolution. In addition, the relatively short follow-up period, while adequate for short and mid-term outcomes and recurrence assessment, does not capture the long-term outcomes of THD.

Conclusion

Transanal hemorrhoidal dearterialization (THD) is a safe, effective, and minimally invasive surgical technique for the management of symptomatic hemorrhoidal disease, particularly Grades II and III, and selected cases of Grade IV. Compared to conventional hemorrhoidectomy, THD offers significant advantages in terms of reduced postoperative pain, lower complication rates, shorter operative time, faster return to work, and higher patient satisfaction.

Declarations

1. Acknowledgments: None

2. Ethical Approval and Consent for Participation: All procedures performed in this study complied with institutional and/or national research council ethical standards as well as the 1964 Declaration of Helsinki and its subsequent amendments or similar ethical standards. Protocols and written informed consent for all participants were approved by ethical committee of Burjeel Royal Hospital, Alain, UAE. under the Institutional Review Board, No: (BURJ/RERC/2025/018).

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5. Author contributions: AL, SA, TA, ZF, KM, AS: manuscript preparation, protocol, data collection and management, manuscript editing. AG, SS, ME, HR, IM, AF, MI, AB, MM: Data acquisition, data analysis and management, manuscript editing. MA, HF, MA, EM, SF, MO, SR: Manuscript editing, project development; data analysis, project development. All authors have read and approved the manuscript.

6. Conflicts of interest: The authors declare no conflict of interest.

7. Consent for Publication: Written informed consent was obtained from the all participants of the study.

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