



Doppler Guided Hemorrhoidal Artery Ligation - A Minimally Invasive Treatment for Symptomatic Hemorrhoids

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Abstract

Background: Hemorrhoids remain one of the commonest conditions affecting humans. Excisional hemorrhoidectomy is classified as the best treatment for this pathology, with lower postoperative recurrence rates; however it is associated with significant morbidity. This study aims to evaluate the outcomes of Doppler guided hemorrhoidal artery ligation for the symptomatic grade III/IV hemorrhoids.

Methods: Over a period of 7 years (2010-2016) all patients having a Transanal Hemorrhoidal Artery Dearterialisation (THD) procedure by a single surgeon were included in this single centre cohort study. Patient demographics, operative outcomes and long-term results were recorded. Assessments were carried out at 3 weeks, 2 months, then at 2 years periods for symptom evaluation.

Results: 136 patients underwent THD procedure at this centre. 58% were men with a median BMI of 26. Rectal bleeding was the commonest presenting complaint. Over 75% patients received office-based procedures prior to THD. THD was successfully carried out in all patients.

Majority of procedures were performed as day case and 13% patients required an overnight stay. There were no complications in 73% of patients. Reported postoperative complications included constipation, urinary retention, anal fissure, skin tags, bleeding and perianal hematoma (Figure 3). Sustained symptomatic improvement was seen across four domains (bleeding, pain, itching and soiling) at 2 months and 2 years (Figure 4).

Conclusion: THD remains an effective and successful treatment option for the management of symptomatic hemorrhoids. Faster post-operative recovery and acceptable long-term results make this an attractive option for patients with medium to large hemorrhoids.

Introduction

Hemorrhoidal disease is one of the ancient surgical problems facing human race. Hippocrates was the first to describe the pathology and management of this condition around 400 BC. One of his favorite treatments was to apply seven to eight heated iron rods to the "forced out anus". And he suggested that the anus should be forced out as much as possible to ensure that no hemorrhoidal tissue remains. Medicine has come a long way since then and we do understand the anatomy, pathophysiology and symptomatology of hemorrhoidal disease much better. Surgical hemorrhoidectomy has remained the gold standard treatment for symptomatic hemorrhoids since 1935 when Milligan and Morgan described the technique of excisional hemorrhoidectomy [1].

Recent changes to the hemorrhoidectomy technique allow for the use of point diathermy [2], laser [3], LigaSure™ [4,5] and harmonic scalpel [6]. However, despite these changes, operative principles have remained unchanged. Thus, the excisional hemorrhoidectomy became the unchallenged gold-standard operation for 3rd and 4th degree hemorrhoids for the majority of the 20th century, with the Milligan-Morgan (MM) hemorrhoidectomy technique remaining popular in the UK and the closed hemorrhoidectomy commonly used throughout the USA [7,8].

Traditional hemorrhoidectomy has been associated with a low rate of recurrence of hemorrhoids. However, it is also known for being notoriously painful and, some argue, being the reason that many patients avoid consulting their surgeon. Indeed, as many as 30% of patients complain about significant post-operative pain following open hemorrhoidectomy [9]. Though

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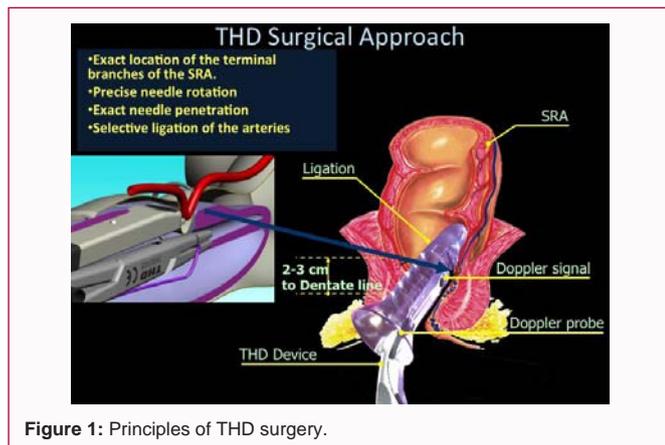


Figure 1: Principles of THD surgery.



Figure 2: Pre- THD procedure for grade IV haemorrhoids.



Figure 3: Post- THD procedure for grade IV hemorrhoids.

many methods have been suggested to reduce post-operative pain, for example lateral sphincterotomy [10], Metronidazole, anal dilation [11], etc., postoperative pain remains a significant concern following conventional hemorrhoidectomy. Apart from severe postoperative pain, other complications including secondary hemorrhage, urinary retention, fecal incontinence, sphincter damage, anal stenosis and perianal soiling are not uncommon and can be severely debilitating.

An attempt to develop minimally invasive treatment for hemorrhoids has led to the development of novel techniques such as stapled hemorrhoidectomy and Doppler guided hemorrhoidal artery ligation. Amongst the number of alternative non-excisional procedures, suture ligation of the hemorrhoidal arteries has been considered as an approach that offers lesser postoperative pain and provides fast recovery with a high potential for cure and a reduced morbidity compared to the excisional procedures [12,13].

Transanal Haemorrhoidal Dearterialization (THD) under the guidance of Doppler probe is considered an effective way of reducing the arterial supply to hemorrhoids. It offers an additional benefit of performing simultaneous mucopexy in patients with mucosal prolapse [14]. THD involves ligation of branches of the superior rectal artery above the dentate line and hence associated with reduced postoperative pain. As no tissue is excised in this procedure there are no open wounds and there is a reduced risk of infection. The anal cushions are positioned back into their normal position and thus associated with improved quality of life for the patients.

The aim of this study is to assess the efficacy and safety of provision of THD procedure for symptomatic grade III/IV hemorrhoids in a patient population referred to a specialist colorectal practice.

Methods

Patients

This study includes a case series of 136 patients with grade III to IV symptomatic hemorrhoids with or without mucosal prolapse, who underwent THD surgery at a private hospital. Patients operated in between 2010-2016 were included in this study with a median follow up of 24 months (Figure 1).

The preoperative work up included a sigmoidoscopy and proctoscopy to exclude any proximal colonic pathology and for better assessment of the hemorrhoids. Data recorded included patient demographics, proctoscopy and intraoperative findings. Patients were routinely seen at the 3 weeks and 2 months postoperative follow up. A further survey was conducted 2 years after the treatment to assess the Quality of Life (QoL) and symptoms.

Surgical technique

All patients had general anesthesia and 500 mg of intravenous Metronidazole after induction. They received a phosphate enema as part of their preoperative bowel preparation. The procedure was carried out in lithotomy position. THD slide proctoscope was inserted and point of suturing located under the guidance of the Doppler probe, where the maximum intensity of the signal was perceived. The first loop of the suture was inserted at the selected location in the standard way of the THS procedure. The hemorrhoidal vessel was lifted slightly with both ends of the suture and the suture threads kept tense, bearing in mind that the suture should not cut through the tissues; the needle was again inserted making a second loop and tied. The knot was secured to finish the dematerialization at that location. This suture was then carried out towards the dentate line by taking small superficial mucosal bites at regular intervals to perform a mucopexy. The suturing was stopped 5 mm to 10 mm above the dentate line and then tied with the tail of the suture at the top end thus resulting in a mucopexy. Further signals were sought in clockwise manner. Dematerialization performed in the similar fashion and procedure was completed. On average 6 to 7 such sutures were needed to complete the procedure.

Results

A total of 136 patients underwent a THD procedure for symptomatic grade III/IV hemorrhoids. There were 79 males. Median BMI was 26 (range 19 to 41) (Figure 2). 90% of patients were ASA grade I/II. Patient demographics are shown in (Table 1).

All patients received medical topical therapy prescribed by their general practitioners. In over 70% of cases office-based procedures

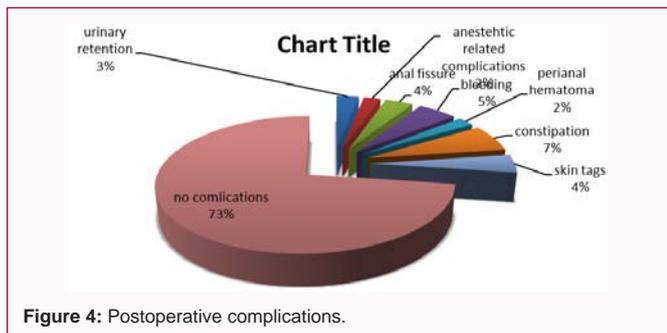


Figure 4: Postoperative complications.

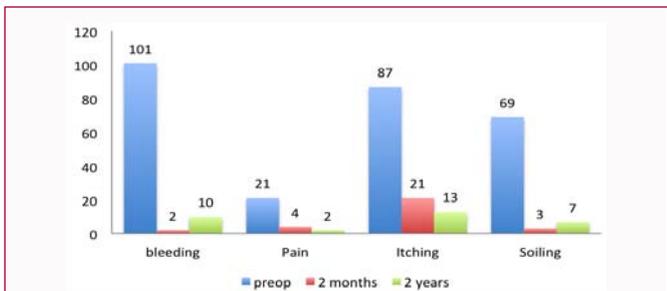


Figure 5: Symptomatic improvement across four domains.

Table 1: Patient demographics n=136.

		Number	%
Sex	Male	79	58.10%
	Female	57	41.90%
ASA grade	I/II	115	84.50%
	III/IV	21	15.40%
Median BMI (range)		26	(19-41)
Previous treatment	Anal Surgery	19	13.90%
	Office based procedures	104	76.40%
	Topical treatments	129	94.80%
Proctoscopy findings	Grade III Haemorrhoids	61	44.80%
	Grade IV Haemorrhoids	75	55.10%
	Associated conditions (tags, fissures, fistulae)	92	67.40%

(like injection sclerotherapy and/or rubber band ligation) were attempted in the past. Over 13% patients had a hemorrhoidectomy previously.

Majority of procedures were performed as day cases and 13% patients required an overnight stay. Table 2 summarizes the postoperative findings of this study. Out of 136 patients, 99 had no postoperative complications. Most frequent complications included constipation, bleeding, fissure and urinary retention, as shown in (Figure 3). Patients were assessed across 4 domains at the preoperative visit - 2 months and 2 years post operatively. Significant sustained improvement was observed for rectal bleeding, pain and soiling while improvement for itching was modest as shown in (Figure 4). Nine patients were readmitted (three had constipation; three patients with significant bleeding, two had severe pain and one with anal fissure).

Discussion

Hemorrhoids are a commonly prevalent condition, incidentally, reported at 40% of screening colonoscopies [15]. Interventions for symptomatic hemorrhoids are carried out over 30,000 times each

Table 2: Post-Operative findings.

Length of stay	Day case	118	86.70%
	Overnight stay	13	9.50%
	1-2 days	2	1.40%
	>2 days	3	2.20%
Mean Pain score (VAS)	In recovery, postoperatively:	2	
	6 hours	4	
	12 hours	5	
	48 hours	3	
Readmissions		9	6.60%

year in the UK, having a significant impact on health economics and patient recovery [16]. Hemorrhoids have been a common problem in all age groups and approximately 50% of adults above the age of 50 years are affected [17]. Over the years, there have been considerable developments in the surgical techniques for the treatment of hemorrhoids. Several alternatives have emerged to reduce the morbidity [18,19]. However, recurrence of hemorrhoids remains a concern with the non-excisional treatments.

Morinaga et al. [20] described first Doppler-guided transanal ligation of hemorrhoidal arteries to reduce the arterial supply to hemorrhoids in 1995. Few years ago, a newer technique has been introduced called Doppler-guided transanal hemorrhoidal dearterialization. It involved the use of a specially designed proctoscope that incorporates a Doppler ultrasound probe to pick up the high intensity signals from the pulsating hemorrhoidal vessels. It has also allowed the performance of a rectal mucopexy in the same sitting to reduce the mucosal prolapse [19]. Several studies have shown its safe use and efficacy in the treatment of symptomatic hemorrhoidal disease [21-24], in fourth degree hemorrhoids [25] and in emergency settings [26]. But there is limited evidence on the cause of recurrence and surgical procedure which can offer recurrence-free treatment.

This study showed that THD approach is feasible in grade III/IV hemorrhoids and has a low risk of complications. Post-operative pain scores are low and the symptomatic improvement across four domains (bleeding, prolapse, itching and soiling) is maintained at 2 years follow-up in majority of patients (Figure 5). This is however a single centre and single surgeon cohort, thus the results may not be generalizable to a larger cohort.

Conclusion

We have described earlier the results of the THD technique, which is minimally invasive, non-excisional and has shown encouraging results so far. Long term follow-up is needed to validate these results and a potential randomized trial to compare this technique with the standard hemorrhoidectomy may provide a higher-level evidence to support its efficacy.

Consent

All the patients have undergone explained and written consent process, which has been re-verified on the date of the surgery.

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