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DIGITALLY GUIDED TRANSANAL SELECTIVE HEMORRHOIDAL DEARTERIALIZATION WITH MUCOPEXY VERSUS MILLIGAN MORGAN HEMORRHOIDECTOMY FOR TREATMENT OF HEMORRHOIDS– EARLY AND LONG-TERM POSTOPERATIVE RESULTS

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ABSTRACT

Background:- Transanal Hemorrhoidal Dearterialization(THD) with Mucopexy is one of the most popular and actively studied surgical procedure for stage II-IV Hemorrhoidal disease. Studies have already established equivalent results even without use of doppler.

Aim:-To analyse prospectively, results of Digitally-guided selective THD-Mucopexy versus Conventional Hemorrhoidectomy with regard to early and long-term postoperative results, Efficacy of Digitally-guided THD in absence of doppler for hemorrhoidal artery ligation and to measure the Quality of life and patients' satisfaction after both procedures after one year followup.

Methods: This is a single-center prospective randomized interventional study. 100 patients with Grade II-IV hemorrhoids were selected and randomly divided into two equal groups of 50 each. Pre operative examination, including proctoscopy, baseline questionnaire scoring with Giordano and Vaizey incontinence score was done. THD-Mucopexy was performed in one group and Milligan-Morgan Hemorrhoidectomy in another group. A visual analog scale (VAS) was used to measure pain. Post operatively Giordano questionnaire and Vaizey score were reassessed. Clavien Dindo grading was used to grade postoperative complications. Patients, were discharged on 2nd postoperative day when adequate pain control, oral tolerance and spontaneous micturition were achieved. Telephonic conversation done on day 3 and further Out-patient follow up on day 7th and 30th postoperative day and thereafter at 3,6,12 months.

Results:- The two groups were similar regarding the stage of the disease and the basic patients' demographics. Postoperative mean VAS score for pain was significantly lower with minimal requirement of Mean total number of rescue analgesia (inj diclofenac 75mg-1 unit) 0.72±0.775 in the THD-M group as compared to MM group with mean score of 1.98±1.048 (p value-<0.001). We also found that the mean Vaizey score for anal incontinence for gas was higher among the MM group 1.26±1.09 as compared to 0.34±0.71 (p value<0.001) in the THD-M group. Prolapse (including Grade III and IV hemorrhoids) rates were higher in the THD-M group 8(16%) out of 50 cases, as compared to 4 (8%) out of 50 cases,but without any statistical difference. Recurrence of hemorrhoids including both prolapse and bleeding was found to be 12 cases (24%) out of 50 cases in both groups,showing no statistical significance. Mean satisfaction score was found to be higher in the THD-M group 3.94±1.405 as compared to 3.36±1.424 (p value-0.045).

Conclusion:- Transanal hemorrhoidal Dearterialization with mucopexy had fewer complications, comparative recurrence rate, and higher patient satisfaction than Milligan Morgan Hemorrhoidectomy even without a Doppler device. Therefore, THD-M appears to be a safe and satisfactory surgical procedure in the treatment of grade II-IV hemorrhoids. However incidence of prolapse was slightly higher in the THD-Mucopexy group in comparison with grade IV hemorrhoids.

Keywords: Hemorrhoidectomy, Dearterialization, Postoperative Outcomes

INTRODUCTION

Hemorrhoids or piles is most frequently presenting benign anorectal disorder and a well known disease since antiquity. 50–90% of people experiencing this disorder for at least once in their lifetime. Incidence of hemorrhoids seems to increase with age but not confined to older individuals,seen in patients of all ages, even in childhood [1].

It most common disease of the anal canal and caused by weakening of anal cushions and supporting tissues. Hemorrhoidal disease seems to be caused by the hypertrophy and congestion of the cushions above the dentate line, also known as "corpus cavernosum recti" [2]. There are two main reasons for this enlargement: venous congestion and the sliding down of the lower part of anal canal. Both could happen when you strain to go to the bathroom, and venous congestion might be because of the tightening of the anal sphincter or blockage of venous return (like from a pelvis mass). People with hemorrhoids have higher resting anal pressure, lower rectal compliance and excessive perineal descent [3]. Chronic congestion results in stretching of the Park's ligament and hypertrophy followed by tearing of the muscle of Treitz. This makes the mucosa no longer firmly attached to the muscle layer, so sometimes it might poke out temporarily followed by permanent prolapse. Subluxation of the cutaneous lining of the lower anal canal leads to enlargement of the external component of hemorrhoids.

Patients with Hemorrhoids usually presents with passage of painless rectal bleeding during defecation. Prolapsing hemorrhoids may cause itching or perianal discomfort, tenesmus due to increased mucous discharge or soiling [4]. If there is associated pain with hemorrhoids other painful conditions of the perianal region such as anal fissure, thrombosed hemorrhoids, abscess, or even an anorectal neoplasm must be ruled out [1].

The classical Goligher classification, which is based solely on the degree and the characteristics of the prolapse is the most widely used grading system for internal hemorrhoids [5]. As a general principle, the aim of treatment is not that all hemorrhoidal swellings should disappear, and therefore that patients with minimal symptoms must not be overtreated [6]. The choice of method should be based on the type and severity of symptoms, the degree of prolapse, the expertise of the doctor, and the equipment available. First line treatment options include dietary modifications with adequate intake of fiber and oral fluids, lifestyle changes, and sitz baths [7]. Outpatient treatments such as sclerotherapy and rubber band ligation should be used for the treatment of I, II, and III-degree HD in cases where conservative treatment fails [7][8]. Throughout the years, there are varieties of effective methods described for the treatment of hemorrhoids but for grade II hemorrhoids refractory to conservative management, Grade III and IV, recurrent hemorrhoids, the Milligan-Morgan hemorrhoidectomy remains "the gold standard", since the description of hemorrhoidectomy by Milligan and Morgan et al and Ferguson et al [9][10]. However, it is associated with significant post-operative pain and discomfort, requiring opioids as analgesic in 20-40% of patients, bleeding, infection, stenosis, possible sphincter dysfunction and fecal incontinence [11][12]. In order to reduce these complications, in 1995 a new method of treatment of hemorrhoids was described by **Morinaga et al.** Transanal hemorrhoidal dearterialization (THD) for treatment of internal hemorrhoids [13]. This method was further improved by addition of mucopexy **by Dal Monte et al.** in 2007 (synonyms: mucopexy, hemorrhoids lifting) and the concept of distal Doppler dearterialization, to achieve more precise ligation of the branches of the superior rectal artery [14]. THD with Mucopexy is one of the most popular and actively studied methods of the stage II-IV HD surgical treatment. **Symeonidis et al.** in their comparative study of Milligan-Morgan hemorrhoidectomy vs. hemorrhoid artery ligation and recto-anal repair for grade III and IV hemorrhoids [15]. **Schuurman et al.** conducted a blinded randomized clinical trial of Hemorrhoidal Artery Ligation (HAL) with or without a Doppler device in patients with grade II and III hemorrhoids and the results showed that HAL significantly reduced signs and symptoms of hemorrhoidal disease, but the Doppler transducer provide no additional beneficial effect [16]. **Naqvi et al.** also reported that in terms of postoperative pain, bleeding and patient satisfaction, HAL without Doppler guidance was an effective method to treat hemorrhoids [17]. Therefore, compared with Doppler-guided HAL under direct vision, no significant difference has been observed in patients who underwent THD-M with doppler device in terms of symptom improvement, pain, bleeding, prolapse, and other complications. Additionally, Procedure becomes cost-effective, and the operation is relatively simple. There are increasing number of studies comparing THD and CH, with most of them having focus on early post-operative results and we have limited data on long term post-operative complications and recurrences. To date, the surgical technique of THD-Mucopexy has not been standardized and different surgeons perform different number and technique of dearterializations and mucopexies. This may explain the heterogeneity of clinical outcomes in terms of postoperative morbidity, and possibly also in recurrence of hemorrhoids.

Our impression in our study is that minimizing the number of sutures in the anal canal, making selective dearterializations for only symptomatic hemorrhoids and mucopexies only when there is prolapse, achieves similar good outcomes as the original procedure, but less postoperative morbidity, especially pain and tenesmus. Doppler being a costly tool is not present in every peripheral institute as in our institute, we therefore are going to commence our study with digitally guided selective transanal hemorrhoidal dearterialization with mucopexy versus Milligan Morgan hemorrhoidectomy for treatment of hemorrhoids and comparing the early and long-term postoperative results among two groups and their satisfaction.

METHODS

This is a single-center prospective Randomized Interventional Study. Between January 2024 and January 2025, 100 patients with Grade II-IV symptomatic hemorrhoids were recruited, proctoscopy assessment was done for confirmation. They were equally divided among two equal groups of 50 each by random selection.

The Inclusion Criteria of this study were as follows: - II, III, IV-degree hemorrhoids, both sex, Age between 18 and 80 years, Ability to understand the procedure. The Exclusion Criteria of this study were as follows: - Age <18 years, Previous surgery for anal disorders, Fecal incontinence (Vaizey score ≥5), Other active Anorectal diseases, Altered cognitive status, Irritable bowel syndrome, Inflammatory bowel disease, Chronic anal fissure with severe spasm of anal sphincters, Any stage colorectal cancer, Patient on Oral anticoagulants and Pregnancy.

This study was approved by the Institutional Ethics Committee of Midnapore Medical College and Hospital, West Bengal, India. All surgeries were performed by the same surgeon.

PREOPERATIVE PREPARATION

- ✓ Patients were given normal diet at night before surgery. On the day of surgery, cleaning enema (Disodium phosphate enema) and soap water bath was prescribed.
- ✓ Preoperative medications- Inj Tetanus toxoid, Antibiotic prophylaxis with infusion Ciprofloxacin 200mg and infusion metronidazole 500mg iv single dose were given.
- ✓ The operation was performed under spinal anesthesia with patients in the Lithotomy position
- ✓ Lower end of the rectum was disinfected with 10% povidone iodine and the distribution of hemorrhoids was observed after anal dilatation.

SURGICAL PROCEDURE

- ➢ In one study group digitally-guided ligation of hemorrhoidal arteries without Doppler guidance will be performed as following:

- The exact placement of the superior rectal artery is found by intraoperative palpation with index finger at anal clock 2 to 3 cm above the anorectal junction, where we find pulsations of the artery. Then arteries are ligated with Z-shaped (figure of 8) suture using 2-0 braided polyglycolic sutures above the dentate line.
- Generally, the ligation position of arteries was 3, 7, or 11 o'clock points above the dentate line. The ligation depth should not be too shallow or too deep, and the degree was submucosa, avoiding the muscle layer in suture to avoid postoperative pain, this completes the dearterialization part of the surgery. Mucopexy is then performed. A continuous running suture was taken longitudinally just over every prolapsed hemorrhoid starting from upwards and continuing downwards with same suture after doing THD. The suture started approximately 2–3 cm above the dentate line to lift the prolapsing hhjemorrhoidal tissue. It is very crucial to stop above the dentate line to avoid postoperative pain. Neither any tissue was excised nor other procedures were performed.
  - During the operation, it is important to be cautious of the HAL points, which should not be kept in the same plane in order to prevent anal stenosis, and the ligation points should not be too numerous generally 3, 7, or 11 o'clock point vessels are ligated

Fig 01- Grade IV hemorrhoids at 3,7,11 O'clock position

Fig 02- Digital palpation of hemorrhoidal artery pulsation

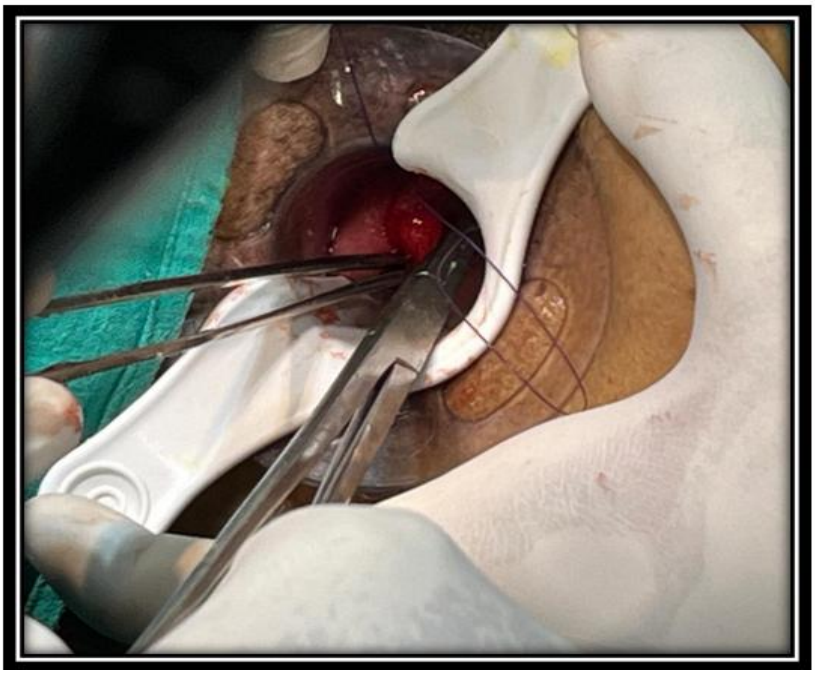


Fig 03- Ligation of superior hemorrhoidal artery above dentate line

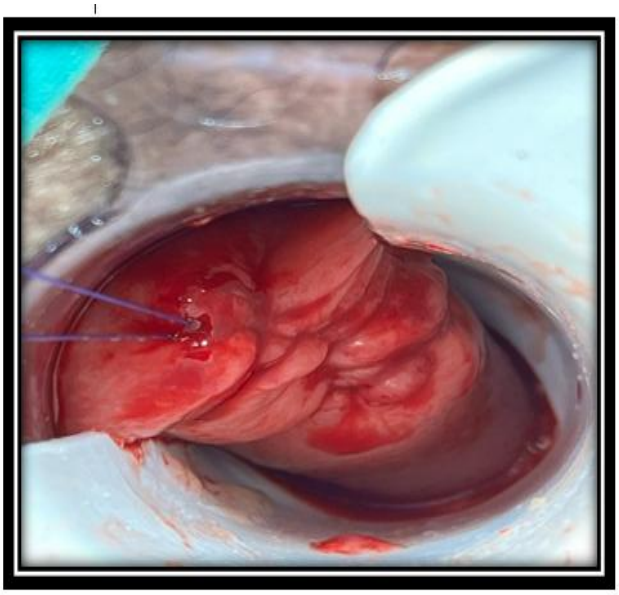


Fig 04- Mucopexy of prolapsed mucosa longitudinally downwards

Fig 05- Immediate postoperative image with complete uplift of anal mucosa

- In another group consisted of Milligan Morgan hemorrhoidectomy-A V-shaped skin incision is made on the mucocutaneous border, retraction of the pile mass with an artery forceps, submucous dissection of the hemorrhoids till the anorectal junction. The base of pedicle was transfixed with an absorbable suture 2-0 polyglycolic acid suture followed by excision, wound is kept open including mucosa and allowed to heal by secondary intention.

Fig 06- Dissection of hemorrhoidal tissue

Fig 07- Excision of hemorrhoidal tissue followed by transfixation of vascular

POSTOPERATIVE MANAGEMENT

Patients were operated during morning hours, and were kept on NPO regime for 6 hours postoperatively and on iv crystalloids, intravenous drip of antibiotics [ciprofloxacin (500mg) BD , Infusion paracetamol (1gm) iv TDS and metronidazole (500 mg) TDS] for 2 days to prevent infection, clean anus and dressing change after defecation and.Sitz bath with lukewarm water was advised thrice daily from post operative day 1.When the pain of the patient was intolerable, they were given 1 single dose of Inj diclofenac(75mg) im and the dose was recorded.

DATA COLLECTION

The levels of pain on Day 0 and 1 were assessed by providing the patients with a response sheet containing Visual Analog Scale and their response recorded during their stay in the hospital. They were discharged on 2nd postoperative day when adequate pain control, oral tolerance and spontaneous micturition were achieved. Telephonic conversation done on day 3 and further follow up on day 7th and 30th postoperative day were graded on a visual analog scale (VAS) on OPD basis. No. of rescue analgesics (1 dose of injection diclofenac-75mg) required when the pain was intolerable, was also recorded. The primary endpoints of the study were the measurements of postoperative pain, early complications (early postoperative period, time frame-30 days), and long-term outcome (recurrence of HD, anal incontinence, anal fissure and anal stenosis). The Clavien–Dindo system was used to classify surgical complications [18]. Recurrence was defined as internal hemorrhoids seen during the control examinations or on proctoscopy. For late complications after 1 month patient is being followed up on 3rd ,6th month and thereafter up to 1 year from the operation to assess the recurrence (prolapse, bleeding) rate and patients' satisfaction.

Baseline and recurrent hemorrhoid symptoms were evaluated prospectively before the surgery and at 1 year after surgery by a specific designed questionnaire by **Giordano et al.** [19]. The questionnaire assesses 5 different parameters (bleeding, prolapse, manual reduction, discomfort or pain and impact on quality of life), each scoring from 0 to 4 with 0 corresponding to no symptoms at all and 4 to the presence of the symptoms on a daily basis or with every bowel movement. A total score of 0 corresponded to the total absence of hemorrhoid symptoms, while a total score of 20 corresponded to the greatest possible intensity of symptoms. The fecal continence status before surgery and at minimum of 1 year after surgery was measured by the **Vaizey score** [20]. Need for further surgery for persisting or recurring hemorrhoid symptoms and surgery-related complications during follow-up were recorded.

DATA ANALYSIS

Statistical analysis was done to make comparisons between grades (grades II, III, IV) of hemorrhoidal disease and incidence of early and late postoperative complications (recurrence of prolapse, bleeding) between the THD-M group and MM group. Continuous variables were expressed as mean ± standard deviation, and the t-test was performed. Categorical variables are expressed as Number of patients and percentage of patients and compared across the groups using Pearson's Chi Square test for Independence of Attributes/ Fisher's Exact Test as appropriate. For making comparison between the grades, Fisher's

exact test was used with a significance level of 1% for two-tailed tests, i.e., a test was more rigorous than the significance level of 5%.
We used SPSS version 25.0 (SPSS Inc., Chicago, IL, USA) for statistical analysis.
An alpha level of 5% has been taken, i.e. if any p value is less than 0.05 it has been considered as significant.

RESULTS

Analysis of prospectively collected data base of 100 patients who underwent either Milligan Morgan hemorrhoidectomy or THD-Mucopexy in our department was conducted. There were no cases of attrition or death in this study.

Patient Characteristics

In our study total no. of cases in the THD-M group were 50 and 50 cases in the Milligan-Morgan group. Out of which there were 26 (52%) male and 24 (48%) female in the THD-M group and 24 (48%) male and 26 (52%) female (p value-0.689) in the MM group. Mean age group of our study population was 47.44 in the THD-M group and 44.08 (p value-0.214) in the MM group. In the THD-M group, out of 50 cases, there were 4 cases (8%) of Grade II hemorrhoids, 31 cases (62%) of Grade III hemorrhoids 15 cases (30%) of Grade IV hemorrhoids and in MM group, there were were 4 cases (8%) of Grade II hemorrhoids, 29 cases (58%) of Grade III hemorrhoids,17 cases (34%) of Grade IV hemorrhoids. Preoperative pain was found in 42 cases(84%) in the THD-M group and 50 cases(100%) in the MM group (p value-0.059),Bleeding was found in 47 cases(94%) in THD-M group and 47 cases (94%) in MM group (p value-0.18), Prolapse of anal mucosa was seen in 49 cases (98%) in THD-M group and 50 cases (100%) in the MM group (p value-0.11) This signifies there is no statistical significance, therefore making both groups comparable for study. The two groups were similar regarding the stage of the disease and the basic patients' demographics.

Immediate postoperative results

Postoperative mean VAS score for pain was significantly lower with minimal requirement of Mean total number of rescue analgesia (inj diclofenac 75mg-1 unit) 0.72±0.775 in the THD-M group as compared to MM group with mean score of 1.98±1.048 (p value-<0.001).
All patients were operated under Spinal Anesthesia. Incidence of postoperative urinary retention was slightly higher in the Milligan Morgan group reporting 9 (18%) out of 50 cases requiring urinary catheterization with Foley's catheter as compared to 5 (10%) out of 50 cases in the THD-M group, without any significant statistical difference.
Early postoperative bleeding was seen in 3 cases in the THD group out of which hemostasis was achieved by anal packing in 1 case, other two were managed conservatively and in the MM group there were total 7 cases, of which 2 cases required anal packing and only 1 case needed relook surgery to achieve hemostasis. However, in our study on follow up after 1 year of surgery mean score was 0.48 in the THD-M group and 1.26 in the MM group (p value<0.001) for bleeding as calculated by Giordano questionnaire score [19]. Only 1 patient in the MM group developed wound infection with perianal abscess and was drained under spinal anesthesia (Clavien-Dindo grade 3).

Follow-up results

Follow-up duration was 12 months post-surgery. In our Study mean score for fecal urgency was higher in the MM group 0.48 as compared to 0.08 in THD-M group, but no statistical difference noted (p value-0.052). We found a higher rate of incidence of anal fissure among 7 (14%) out of 50 cases (p value-0.006) and 4 (8%) cases of anal stenosis (p value-0.04) in the MM group and no such complications in the THD-M group during long term follow up. The mean Vaizey score [54] for anal incontinence for gas was higher among the MM group 1.26±1.09 as compared to 0.34±0.71 (p value<0.001) in the THD-M group. This could possibly due to loss of mucosa and submucosa with prolapsed anal cushion during MM hemorrhoidectomy.
Prolapse (including Grade III and IV hemorrhoids) rates were higher in the THD-M group 8(16%) out of 50 cases, as compared to 4 (8%) out of 50 cases, but without any statistical difference. Higher rates of prolapse in the THD-M group may be due to variation of mucosal lifting in different Grades of hemorrhoids, persistent constipation even during postoperative period and straining. Recurrence of hemorrhoids including both prolapse and bleeding were found to be 12 cases (24%) out of 50 cases in both groups, showing no statistical significance. Recurrence rates were found to be similar in both groups; however, bleeding was seen more in the Milligan Morgan group and Prolapse was seen more frequently with the THD-M group.
In the present study, we assessed patient satisfaction scores following their Hemorrhoids surgery by asking patients, during the phone and outpatient follow up interview to rate, in a 1 (very dissatisfied) to 5 (very satisfied) scale, their satisfaction out of their Hemorrhoid surgery. Mean satisfaction score was found to be higher in the THD-M group 3.94±1.405 as compared to 3.36±1.424 (p value-0.045).

Clinical characteristics of studied patients	Group THD-M	Group MM	p value
Number of patients	50	50	
Male/Female	26/24	24/26	0.689
Mean age	47.44	44.08	0.214
Pain	42 (84%)	50 (100%)	0.059
Bleeding	47 (94%)	47 (94%)	0.18
Prolapse of anal mucosa	49 (98%)	50 (100%)	0.11
Grade of hemorrhoids			
Grade II	4 (8%)	4 (8%)	
Grade III	31 (62%)	29 (58%)	
Grade IV	15 930%	17 (34%)	

Table 01: - Clinical characteristics of the studied patients.

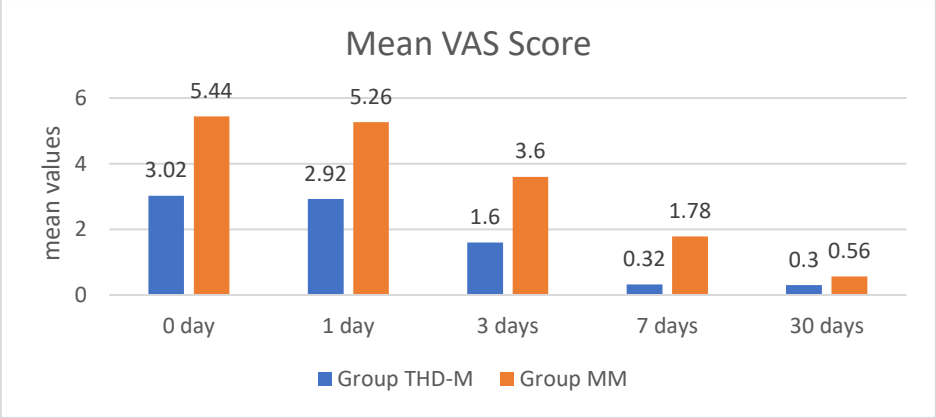


Fig 08- Mean VAS score of patients after surgery

P value- <0.001, insignificant on Day 30

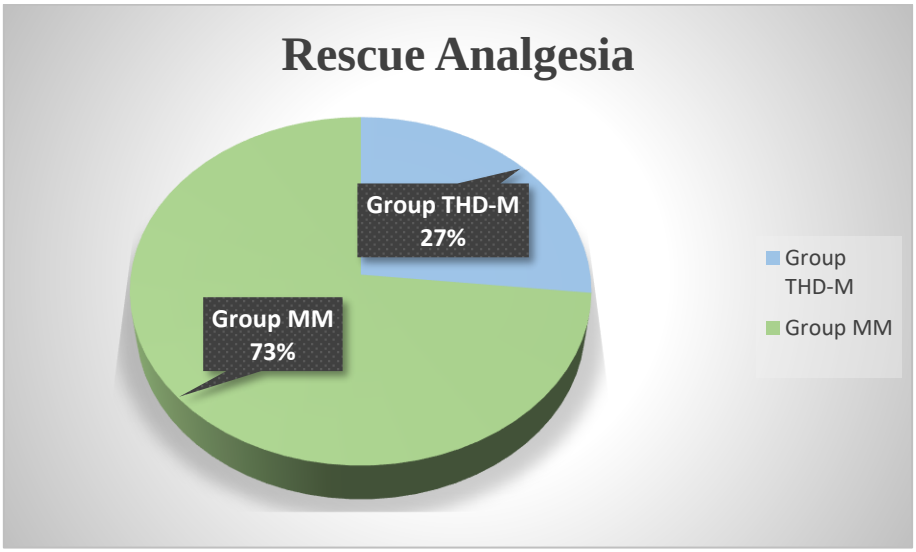


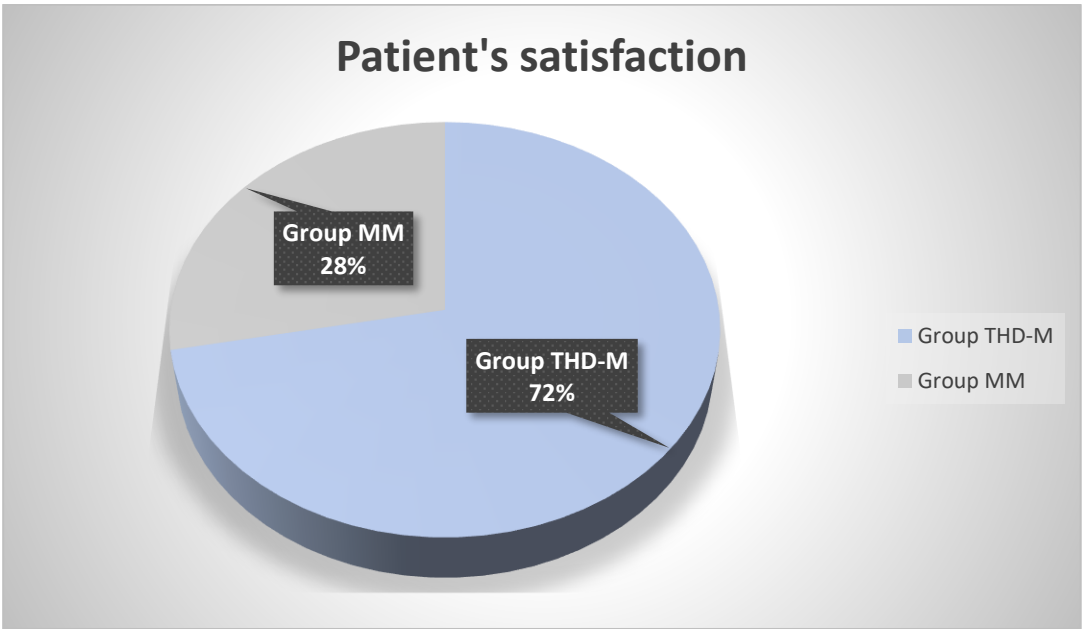
Fig 09- Requirement of Post-operative Rescue Analgesia (mean score)

Post Operative complications	Group THD-M	Group MM	p value
Pain	**0.52**	**1.14**	**0.005**
Urinary retention	**5 (10%)**	**9 (18%)**	**0.14**
Post operative bleeding	**0.48**	**1.26**	**<0.001**
Prolapse	**0.88**	**0.46**	**0.07**
Fecal urgency	**0.08**	**0.48**	**0.052**
Incontinence to solid stool	**0.36**	**0.62**	**0.283**
Incontinence to gas	**0.34**	**1.26**	**<0.001**
Anal fissure	**0 (0%)**	**7 (14%)**	**0.006**
Anal stenosis	**0 (0%)**	**4 (8%)**	**0.04**
impact on QoL	**0.54**	**0.76**	**0.317**

Table 02: - Post-operative Complications among both groups

Vaizey Score after 1 year	Group THD-M	Group MM	P value	Significance
Incont. For solid stool	0.36±0.65	0.62±0.77	0.075	Insignificant
Incont. For liquid stool	0.44±0.66	0.62±0.95	0.283	Insignificant
Incont. For gas	0.34±0.71	1.26±1.09	<0.001	Significant
Alteration in lifestyle	0.32±0.58	0.38±0.77	0.668	Insignificant
Need to wear a pad	0.1±0.36	0.16±0.54	0.520	Insignificant
Taking constipating medications	0.72±0.96	0.52±0.87	0.284	Insignificant
Fecal urgency	0.08±0.56	0.48±1.29	0.052	Insignificant
Total score	2.36±2.09	4.04±4.56	0.022	Significant

Table 03: - Comparison of mean Vaizey score between THD with mucopexy group vs Milligan Morgan group 1 year after surgery



P value- 0.045

Fig 10- Comparison of patients' satisfaction among both THD with mucopexy and Milligan Morgan hemorrhoidectomy group.

DISCUSSION

There are variety of treatment procedures available for hemorrhoids, including conservative treatment, sclerotherapy, banding, and surgical treatment, such as hemorrhoidectomy, stapler hemorrhoidectomy (SH), and Doppler-guided- HAL.

Milligan-Morgan hemorrhoidectomy is still the gold standard procedure performed very commonly for Grade III/IV hemorrhoidal disease because of its good curative effect, low recurrence rate but is associated with postoperative pain, secondary bleeding, and long recovery period having complications rates of up to 15% [21]. Significant postoperative pain is still a major problem despite multimodal pain management. **Gallardo et al**. found that 22.2% of patients after MMH procedure had to take opioid analgesics [22]. To address these complications of Milligan Morgan Hemorrhoidectomy, in selected cases we conducted Transanal hemorrhoidal dearterialization with mucopexy (THD-M) technique meeting requirements of minimal access surgery and increase patient satisfaction.

Morinaga et al. in 1995 described Transanal Hemorrhoidal Dearterialization (THD) or Hemorrhoidal Artery Ligation (HAL) based on ligation of the terminal branches of the hemorrhoidal arteries by a designated proctoscope with an attached doppler probe. They performed this procedure on 116 patients and reported good results in terms of pain resolution and control over prolapse (78%) and bleeding (95%), despite their short follow-up period [13].

An ideal surgical treatment for Hemorrhoidal disease must have the following characteristics: minimal postoperative pain allowing patients to return early to their normal activities, zero recurrence and complication rates. So far, no single available technique combines all of these features. For instance, the classic excisional procedure appears to be superior in regards to low recurrence rates at the but at the cost of increased postoperative pain. On the other hand, the non-excisional surgical procedure has the advantages of minimal local trauma, minimal postoperative pain and early recovery, however, it is associated with increased recurrence rates compared to the classic excisional procedures.

Digitally -guided selective ligation of the terminal branches of the superior hemorrhoidal artery (HAL) reduces blood supply (though it never completely blocks it), leading to atrophy of the hemorrhoidal cushions. The following step involves performing a mucopexy or rectoanal repair (RAR) to reintroduce and secure the hemorrhoids within the anal canal. Their atrophy along with subsequent posterior fibrosis will maintain their natural position, preventing recurrence and enhancing the outcomes delivered by the HAL technique when performed alone [3]. Additionally, this method is relatively easy for surgeons to learn, allowing them to acquire the necessary skills after a brief learning period. THD-Mucopexy is a minimally invasive procedure that is designed to be painless for patients, as all actions and sutures are performed endoanal and above the dentate line, facilitating a quick recovery. and facilitates an outpatient procedure. It is important to remember that postoperative pain is typically the primary worry for both patients and healthcare providers managing hemorrhoids. patients who underwent THD-M experienced less pain and less no. of rescue analgesia. Pain was usually seen associated with complications such as thrombosis, abscess or anal fissure or when the continuous line of suturing of the mucopexy includes the pectinate line or mucosa below it.

In terms of early postoperative bleeding there was no significant statistical difference seen among both groups. However, incidence of bleeding was found to be lower during 1 year follow up in the THD-M group as compared to MM group.

After follow up for 12 months, we found that the Mean Vaizey score for anal incontinence for gas was found to be higher among the Milligan Morgan group. Higher rates of prolapse was seen in the THD-M group may be due to variation of mucosal lifting in different Grades of hemorrhoids, persistent constipation even during postoperative period and straining.

Recurrence of hemorrhoids including both prolapse and bleeding was found to be 12 cases (24%) out of 50 cases in both groups, showing no statistical significance. Recurrence rates were found to be similar in both groups; however, bleeding was seen more in the Milligan Morgan group and Prolapse was seen more frequently with the THD-M group.

Satisfaction level of patient was higher with Transanal hemorrhoidal dearterialization surgery than with Milligan-Morgan hemorrhoidectomy surgery. This is possibly due to less severity of post operative pain and requirement of rescue analgesia in THD-M group, less episodes of postoperative bleeding, anal fissure, anal stricture, incontinence to gas which were higher among the THD-M group.

THD-M is a relatively recent method, and its long-term outcomes are yet to be evaluated; however, we believe it will significantly impact the management of hemorrhoids. Firstly, THD-M can be customized for each patient, allowing the surgeon to perform multiple mucopexies as needed, which facilitates personalized treatments based on the number and severity of hemorrhoidal cushions that require intervention (including grade IV hemorrhoids with circumferential venous swelling). Secondly, THD-M can be utilized as a primary treatment option (when conservative measures have proven ineffective) and may also be applied following an unsuccessful HAL-RAR procedure (with minimal pain and low complication rates). Lastly, it can be combined with other surgical methods. Therefore, open only be conducted when absolutely essential.

Table 04: - Comparison of outcomes of different studies with our study

STUDY	OBJECTIVE	FINDINGS	OUR STUDY
Elmer et al. [23]	Pain and Anal discomfort	Conducted a study comparing THD and OH and concluded that patients had lower postoperative pain after THD	Low Mean VAS score in THD-M group with less requirement of rescue analgesia compared to MM group.
Bhatia and Chalabi (2023) [24]	Pain and Anal discomfort	Less postoperative pain in comparing doppler guided THD with mucopexy and OH	Similar results (p value<0.001)
Lopez et al. [25]	Bleeding	Comparing HAL–RAR with excisional hemorrhoidectomy reported that bleeding was less in patients submitted to HAL–RAR than in patients submitted to excisional hemorrhoidectomy	Incidence of bleeding was found to be **lower during 1 year follow up in the THD-M group** as compared to MM group when calculated by Giordano questionnaire score.
Rørvik et al. [26]	Prolapse	Prolapse was reported in 59% at 12mo follow-up following THD-M	Prolapse (including Grade III and IV hemorrhoids) rates were **higher in the THD-M group** 8(16%) out of 50 cases, as compared to 4 (8%) out of 50 cases, but **without any statistical difference**
Faucheron et al. [27]	Prolapse	prolapse occurred in 9% of their 100 patients with grade IV hemorrhoidal disease who underwent THD-M surgery, after a mean follow-up of 34 months	At 1 year follow up
Trenti L et al. [28]	Fecal incontinence	Minor fecal incontinence occurred only after conventional hemorrhoidectomy in 2 (5.4%) patients.	Anal incontinence for gas was higher among the MM group (2 patients) and 0 in the THD-M group.
Trenti et al. [28]	Recurrence	Doppler-guided THD procedure is not inferior to conventional excisional hemorrhoidectomy for advanced hemorrhoidal disease in terms of postoperative complications and long-term symptom recurrence	Recurrence rates were found to be **similar in both groups**; however, **bleedin**g was seen more in the Milligan Morgan group and **Prolapse** was seen more frequently with the THD-M group
Xu et al. [29]	Recurrence	suggested statistically no difference in recurrence rates and complications when comparing THD and OH	Similar results
Symeonidis D et al [15]	Patients' satisfaction	reported that patient satisfaction rates were significantly better in the HAL–RAR group of the study	Similar results
Tempel MB [30]	Mean patient satisfaction	patients who underwent distal doppler guided THD and mastopexy procedure was 8.5 ± 0.7 (on a scale of 1-10 with 10 being the best)	Mean satisfaction score was found to **be higher in the THD-M group** 3.94±1.405 as compared to 3.36±1.424 (p value-0.045).

CONCLUSION

Transanal hemorrhoidal Dearterialization with mucopexy had fewer complications, comparative recurrence rate, and higher patient satisfaction than Milligan Morgan Hemorrhoidectomy. Therefore, THD-M appears to be a safe and satisfactory surgical procedure in the treatment of grade II-IV hemorrhoids.

Accuracy in both de-arterialization (by the THD technique) and Mucopexy (repositioning the prolapsing rectal mucosa and submucosa with complete sparing the internal hemorrhoidal tissue) seems to be the keys of therapeutic success. However, patients must be carefully advised about postoperative management like having diet rich in fibers, adequate water intake, bulk forming laxatives to be consumed when required and regular bowel movements without any straining. The limited number and severity of complications makes this procedure really safe.

Strength in our study

- Short and long-term follow-up was carried out by the same surgical team during the study period.
- Recurrence or persistence of hemorrhoid symptoms was evaluated using a symptomatic score like Giordano questionnaire score, Vaizey score that takes into consideration bleeding, prolapse, pain and impact of hemorrhoidal disease on quality of life.
- Clinical evaluation using only the Gallagher grade could cause confusion regarding true symptomatic recurrence or symptom persistence even after the procedure, the elimination of which must be considered the real goal of surgery for hemorrhoids.

Gap in our study

- Analysis done by qualitative data based on available scoring charts.
- Small sample size.
- Short follow up for 1 year duration.
- Single institutional study.
- Satisfaction based on qualitative data.

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Availability of data and materials

The datasets used during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The study protocol was approved by the Institutional Ethics Committee of the Affiliated Hospital of Midnapore Medical College and Hospital, WB, INDIA and conducted according to the principles of the Declaration of Helsinki. All methods were performed in accordance with the relevant guidelines and regulations. Written informed consent was obtained from all patients.

Consent for publication

Not applicable.

Conflicts of interest

The authors declare that they have no conflict of interest concerning this paper.

CTRI

This study is registered with the Clinical Trial Registry of India and the unique identifying number is: **CTRI/2024/01/061434**.

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