

## **Transanal Haemorrhoidal Dearterialization versus Modified Transanal Haemorrhoidal Dearterialization for the Treatment of Advanced Haemorrhoidal Disease. A Randomised Parallel Trial**

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### **Abstract**

**Purpose:** Transanal Haemorrhoidal Dearterialization (THD) is an effective technique for the treatment of haemorrhoidal disease (HD). The efficacy of THD in grade III and IV HD has been demonstrated, but in the presence of redundant prolapse the original technique can present some technical difficulties.

**Trial Design:** To compare the original THD technique with a modified THD technique (MTHD) in the treatment of grade IV HD. The technical modification is based on the ligation of the several mucopexy sites just at the end of the procedure instead than completing them one by one, in order to maintain a normal anorectal anatomy during the whole operation.

**Methods:** Thirty patients (17 males) with grade IV haemorrhoids were randomised to receive classical THD (n. 15) or MTHD (n. 15). Intra-operative data and early post-operative data were collected. Clinical follow up with a structured questionnaire took place at 6 and 12 months. Primary outcome was efficacy of the techniques based on occurrence of recurrent prolapse and/or previously reported symptoms.

**Results:** Recurrence of prolapse was present in 2 patients in THD group; symptoms recurrence occurred in 1 patient in THD group requiring an additional surgical procedure at 6 months follow up. No symptoms and prolapse recurrence was experienced in MTHD group. Operative time was shorter and post-operative pain and need of analgesics were lower in the MTHD group.

**Conclusions:** A simple modification of the THD technique can facilitate the completion of the procedure and results in a shorter time, minimal post-operative pain and better long term results.

**Keywords:** THD; Haemorrhoids; Technique; Prolapse

### **Introduction**

The association of mucopexy and dearterialization makes THD technique suitable for the treatment of fourth-degree HD, when the prolapsing component plays a major role in symptoms development [1,2]. Performing THD, as originally described [3,4], can be sometimes difficult in patients with a particularly redundant mucosal prolapse: in fact when the first continuous sutures are tied to perform the mucopexy just below the dearterialization site, the adjacent rectal mucosa fold towards the dentate line creating a mucosal “pocket” which makes the next running suture difficult to be placed. The progressive circular mucopexy causes a significant changing of the anorectal anatomy while the procedure is in progress, making the latest sites of mucopexy difficult to be identified, as they become shorter

and less straight than the first ones. With the completion of the mucopexy, the mucosal thickness progressively increases, this leading to a more difficult identification of the underlying arteries by the Doppler probe, which inevitably lies more distant from the vessels. Recently, we described a simple modification of the THD technique, which only differs from the original in the timing of sutures placing and their tying [5]. In our preliminary experience, the modification helped to correctly perform the dearterialization and mucopexy in the anorectal circumference of patients with a significant mucosal prolapse; aim of this trial is to evaluate any differences between the two techniques in terms of efficacy and operative results.

**Methods**

From August 2013 to July 2014, thirty consecutive patients with III or IV degree haemorrhoids and a clinical indication for non-excisional surgical treatment (THD) were recruited into this trial. Clinical and demographic characteristics are reassumed in table 1 and 2. Informed consent was obtained from all participants. Previous anorectal surgery was not considered as exclusion criteria, while patients with acute haemorrhoidal complications including thrombosis, acute irreducible prolapse, coexisting anorectal disease such as fistula, chronic fissure, rectal prolapse or condilomatosis, were excluded from this study (Table 3). All patients were preoperatively assessed using our dedicated symptoms questionnaire for anal diseases (Table 4) and with clinical examination and anoscopy. Preoperative rectal cleansing was performed in all patients using a phosphate enema more than 3 hours before surgery. Antibiotic prophylaxis was given with cefazoline 2 gr. and metronidazole 500 mg i.v. All patients were operated under general anaesthesia, in lithotomic position by two experienced colorectal specialists. After anaesthesia, patients were randomly assigned into either THD or MTHD haemorrhoidectomy groups using a sealed envelope method (15 patients THD group, 15 patients MTHD group). Patients in THD group were operated according to the original technique as has been widely described [3]. Patients in MTHD group were operated following a modification of the technique as is described and illustrated in a dedicated manuscript [5]. In brief, the modification consists in placing the several dearterialization and mucopexy sutures without tiding the stitches, leaving them untied (secured to the surgical area with small clips) until all the six or more points of mucopexy are placed. Doing so, there is a much better view of the mucosa up to the end of the procedure and no mucosal folds originate in the proximity of the mucopexy sites; this helps in placing linear sutures and reducing the chance of over-suturing. Picture 1 shows the appearance of the surgical area just before starting to tie the mucopexy stitches. Postoperative analgesia was based on oral acetaminophen 1 gr. three times/day for 48 hours. Rescue analgesia was Ibuprofen 400 mg if required. All patients were admitted in a Day Surgery facility and kept overnight only if considered not suitable for discharge after 8 hours from surgery. All patients were assessed daily by self-reporting of their maximal pain levels (at rest or during defecation) by the use of a 10-cm visual analogue scale for 7 days after surgery, use of analgesics was also recorded. All patients were reassessed at 7 and 28 days and 6 months after surgery.

Age/Sex	Main Symptom/Goligher grade	Previous HD treatment	6 months follow up Recurrent Prolapse	6 Months follow up Recurrent symptoms
62 M	Bleeding III		-	
50 F	Prolapse IV		< 25%	Prolapse
41 F	Prolapse IV		-	
49 F	Bleeding III	Banding	-	
73 M	Prolapse IV	PPH	-	
38 M	Bleeding III		-	
43 F	Pain/discomfort IV		-	
47 M	Prolapse IV		-	
55 M	Bleeding III		-	
78 M	Bleeding IV	SchleroTh.	-	
61 F	Prolapse IV		>50%	Prolapse
79 M	Pain/discomfort IV		-	
36 M	Bleeding III	Banding	-	

**Table 1:** Patients demographic, clinical characteristics and results, THD group.

Age/Sex	Main Symptom/Goligher grade	Previous HD surgical treatment	6 months follow up Recurrent Prolapse	6 Months follow up Recurrent symptoms
72 M	Bleeding IV	Banding	-	
49 F	Bleeding III		-	
43 F	Prolapse III		-	
28 M	Pain/discomfort III		-	
39 F	Bleeding IV	Banding	-	
65 M	Bleeding IV	SchleroTh.	-	
64 M	Bleeding III		-	
73 M	Prolapse IV	PPH	-	
46 F	Bleeding III		-	
53 F	Prolapse IV		-	
51 F	Bleeding III	Banding	-	
62 M	Prolapse IV		-	
47 F	Pain/discomfort III	SchleroTh.	-	

Table 2: Patients demographic, clinical characteristics and results, MTHD group.

Inclusion criteria	Exclusion criteria
Age 18 - 80	Acute anal disease
Sex M/F	Haemorrhoidal thrombosis
Haemorrhoidal grade (Goligher) III-IV	Acute Irreducible prolapse
Previous anorectal surgery: Yes	Perianal fistula/abscess
Compliance to clinical follow up	Chronic anal fissure
Informed consent signed	Rectal prolapse
	American Society of Anesthesiologists (ASA) Classification 3 or above
	Ongoing warfarin therapy

Table 3: Inclusion and exclusion criteria.

Name	Age	Sex M F	
<b>Main Symptom</b> <ul style="list-style-type: none"> <li>Bleeding</li> <li>Pain</li> <li>Difficulty in passing stools</li> <li>Anal Swelling-Bulges</li> <li>Itching</li> <li>Others</li> <li>_____</li> </ul>	<b>Secondary Symptoms</b> <ul style="list-style-type: none"> <li>Bleeding</li> <li>Pain</li> <li>Difficulty in passing stools</li> <li>Anal Swelling-Bulges</li> <li>Itching</li> <li>Others</li> <li>_____</li> </ul>	<b>Date of Onset</b> <ul style="list-style-type: none"> <li>&lt; week</li> <li>2 - 6 weeks</li> <li>2 - 6 months</li> <li>&gt; 6 months</li> </ul>	
<b>Bleeding</b> <ul style="list-style-type: none"> <li>Never</li> <li>Sometimes (1 - 3 month)</li> <li>Usually (once week)</li> <li>Often (more than two times/week)</li> <li>Associated Pain</li> <li>Dark/Clots</li> </ul>	<b>Difficulty in passing stools</b> <ul style="list-style-type: none"> <li>Never</li> <li>Sometimes (1 - 3 month)</li> <li>Usually (once week)</li> <li>Often (more than two times/week)</li> <li>Digitate</li> </ul>	<b>Constipation</b> <ul style="list-style-type: none"> <li>Sometimes</li> <li>Always</li> <li>Medications</li> </ul>	<b>Diarrhoea</b> <ul style="list-style-type: none"> <li>Sometimes</li> <li>Always</li> <li>Medications</li> </ul>
<b>Faecal Incontinence</b> <ul style="list-style-type: none"> <li>Never -Gas</li> <li>Sometimes -Liquid</li> <li>Always -Solid</li> <li>Wearing pads</li> </ul>	<b>Anal Pain</b> <ul style="list-style-type: none"> <li>Never</li> <li>Sometimes (1-3 month)</li> <li>Usually (once week)</li> <li>Often (more than two times/week)</li> </ul>	<b>Water Intake</b> <ul style="list-style-type: none"> <li>&lt; 1 lt/day</li> <li>1 - 2 lt/day</li> <li>&gt; 2 lt/day</li> </ul>	<b>Fibres Intake</b> <ul style="list-style-type: none"> <li>Normal</li> <li>Poor</li> <li>Very Poor</li> </ul>

<p><b>Previous Anal Surgery</b></p> <ul style="list-style-type: none"> <li>• Haemorrhoids-Fissure</li> <li>• Fistula-Abscess</li> <li>• Prolapse</li> <li>• Other</li> <li>• _____</li> </ul>	<p><b>Colonoscopy</b></p> <ul style="list-style-type: none"> <li>• Never</li> <li>• &lt; 5 years</li> <li>• &gt; 5 years</li> </ul>	<p><b>Drug History</b></p> <ul style="list-style-type: none"> <li>• Topical</li> <li>• Oral</li> </ul>
<p><b>Is your ano-rectal disease affecting your daily life?</b></p> <ul style="list-style-type: none"> <li>• Never</li> <li>• Sometimes (1 - 3 month)</li> <li>• Usually (once week)</li> <li>• Often (more than two times/week)</li> </ul>		
<p><b>Is your ano-rectal disease causing you anxiety-depression?</b></p> <ul style="list-style-type: none"> <li>• Never</li> <li>• Sometimes (1 - 3 month)</li> <li>• Usually (once week)</li> <li>• Often (more than two times/week)</li> </ul>		

**Table 4:** Proctology evaluation form.

**Results**

Mean operative time in THD was 39 +/- 5 minutes; mean operative time in MTHD was 28 +/- 3 minutes. Mean hospital stay was 16.9 hours in THD and 11.07 hours in MTHD; in THD group two patients were discharged after one day and one patient was discharged after two days; all patients did not fulfilled the discharge criteria for pain control or urinary retention. An early readmission occurred In THD group for urinary retention. One patient was kept overnight and discharged 24 hours after the procedure in MTHD group for sub optimal pain control. Intra operative blood loss was less than 20 cc in both groups. Mean pain level measured after 48 hours from surgery was 4.9 in THD and 4.1 in MTHD, the same parameter at 4 days after surgery dropped to 3.7 in THD and 2.2 in MTHD. Eight patients in THD group needed rescue analgesia (ibuprofen 400 mg) up to three days from surgery while four patients in MTHD group required adjunctive pain therapy after 72 hours. No patients required analgesics from the fourth day after surgery in both groups. Recurrent prolapse was seen at 6 months follow up in 2 of 28 patients, both cases in THD group. One patient had two quadrants (50% anal circumference) and one had only one quadrant (less than 25%) recurrent prolapse. Both patients complained of mild recurrent symptoms due to prolapse with no recurrent bleeding. Only one patient in THD group needed an excisional procedure for the relapsed prolapse. One patient in MTHD group presented an external thrombosis that was treated conservatively and resolved completely in about 10 days. Symptoms control and patients satisfaction were high in both group, with no case of residual bleeding at 6 months follow up.

**Discussion**

The efficacy of THD in the treatment of advanced HD has been established in numerous reports and randomised trials [6-9]. Prolapse recurrence rate is reported to be from 7% to 16% [10,11], while patients satisfaction generally exceeds 90% [12-14] when the follow up is aimed to establish residual symptoms or the need of adjunctive procedures. In our experience, when we are in presence of redundant prolapse with a particularly mobile mucosa (often effect of chronic constipation or long term HD), we believe that the final two-three mucopexy sites are more difficult to place since the previous sutures reduce the mucosal length and create several folds hiding the mucosa

that is supposed to be included in the suture line and shrunk by tying the knots. For that reason we decided to first place all the sutures to complete the dearterialization and the desired mucopexy and then tie them at the end of the procedure, in order to achieve the desired and optimal mucopexy in every quadrants. The risk of over-suturing the mucosa, which we believe could be a factor influencing post-operative course (post-operative pain, oedema, bleeding) and efficacy (recurrent prolapse), is minimal following the modified technique while is consistent when the timing of the original technique is adopted. This could explain the fact that in our series post-operative pain and need of analgesic was lower in the MTHD group, and operative time was shorter in favour of a reduced ano-rectal trauma, which is usually responsible of early post-operative complications as major pain or urinary retention in males. Recurrent prolapse was not experienced in MTHD group, and we believe that it could be relative to a better positioning of the mucopexy sutures following the modified technique; this also explains the reason why bleeding, as a symptom, has been well controlled in both groups, since the dearterialization of the terminal branches of the superior mesenteric artery occurs with the same efficiency in both groups. Leaving the sutures untied until the very end of the procedures does not add any particular difficulty; intra operative bleeding is not favoured by the presence of loose sutures since the anoscope offers a valid and continuous compression during the operation. Temporarily securing the sutures with small clips to the surgical area leaves the surgical field free of any adjunctive obstacles and the mucosa exposed into the operative window of the anoscope is well outstretched until the end of the procedure. Intra operative blood loss was minimal and similar in both THD and MTHD groups while post-operative major bleeding was not experienced in both groups, in line with our previous experience with classical THD as well as with widely described in literature [15]. In our opinion, the most important “taking home” message of the present paper is that any suture that is placed during a THD technique can be hold untied if the surrounding mucosa starts to be folded and hidden by the previous mucopexy points; if some difficulties are encountered during the classical operation, even the last one or two stitches can be placed according to the modified technique in order to better complete the circular mucopexy minimising the risk of over-suturing and suture misplacement.

## **Conclusions**

MTHD is a valid alternative to THD in patients with fourth degree HD and redundant prolapse. The modified technique offers the same results in terms of patient’s satisfaction and symptoms control; it seems superior to the classical technique in reducing long-term prolapse recurrence and immediate post-operative complications. Both THD and MTHD techniques are effective in controlling haemorrhoidal bleeding. MTHD is not adding any difficulty to the already simple THD procedure and the adoption of the modified technique can reduce operative time and the consequent anorectal trauma, length of stay and morbidity. The MTHD technique, in our opinion, could make dearterialization with mucopexy even more suitable for the treatment of advanced haemorrhoidal disease.

## **Statement**

The present paper add to the literature the description of a simple modification of the THD technique, that make the procedure easier in case of major haemorrhoidal prolapse.

THD procedure is a well validated treatment for haemorrhoidal prolapse. No experimental procedures were performed on human participants.

## **Conflict of Interest**

The authors declare that they have no conflict of interest.

## **Standard Informed Consent**

Informed consent was obtained from all patients described in the article.

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