



Minimal open hemorrhoidectomy

H. D. Roervik^{1,2} · A. Heiner Campos¹ · L. Illum¹ · K. F. Herlak Styr¹ · G. K. McKinstrey¹ · B. Brandstrup^{1,2} · G. Olaison^{1,2} 

Received: 18 November 2018 / Accepted: 15 December 2018 / Published online: 6 February 2019
© Springer Nature Switzerland AG 2019

Introduction

The original operation for open hemorrhoidectomy as described by Milligan–Morgan is no longer used. There is a great variation in how the operation is described in clinical trials. A number of modifications have been proposed attempting to reduce postoperative pain. An anatomical plane for the dissection was first described by Loder and Phillips [1]. They encountered small fibers passing from the internal sphincter to the anal cushions and emphasized the importance of dividing these fibers close to the cushions leaving an intact surface over the internal sphincter. Gerjy et al. described a subdermal fascia continuing into a membrane covering the internal sphincter, which was easily identified after incision of the skin of the pedicle [2]. In addition, Loder and Phillips were the first to suggest diathermy dissection and coagulation [1]. A better knowledge of hemorrhoidal vascular anatomy, demonstrating, how the arterial supply to the hemorrhoids crosses the rectal wall, has reduced the need for pedicle ligation. Seow-Chonen et al. demonstrated in a randomized study that diathermy dissection, when compared to scissor dissection, resulted in less postoperative pain and Bessa et al. showed how diathermy coagulation of the pedicle was superior to ligation in reducing postoperative pain [3, 4]. We adapted these principles and also minimized excision of the skin and the hemorrhoid. In addition, we left a part of the hemorrhoid intra-anally to reduce any impact on anal continence. We called this modification “minimal open hemorrhoidectomy” (MOH).

Materials and methods

Patients who underwent MOH, THD or OH were evaluated from a prospectively maintained hemorrhoidal disease database. The type of operation was chosen based on the surgeon’s and patients’ preferences. Patients were examined before operation and 3 months postoperatively in the outpatient clinic. Patients assessed their symptoms using the Hemorrhoidal Disease Symptom Score (HDSS) [5]. Goligher’s classification was used to grade the hemorrhoids, the surgeon also reported an overall assessment of hemorrhoidal pathology on a seven-point Likert scale (1 = “no pathology” to 7 = “severe pathology”). The Wexner fecal incontinence score was used to assess anal continence (10). After 3 months, patients also reported their satisfaction with the operation on a seven-point Likert scale (1 = very unsatisfied, 7 = very satisfied).

The patients kept a diary for 14 days postoperatively to register average pain over the day, peak pain and their use of analgesics. Pain was scored on a daily basis as, 0 = “no pain” to 10 = “worst pain imaginable”. Pain scores were summarized for the 14 days. Patients also registered recovery, as being normal wellbeing, slightly decreased, or decreased (feeling ill).

MOH patients had a preoperative enema. Antibiotic prophylaxis was not given, and anesthesia was general or spinal, supplemented by a perianal block of 40 ml ropivacaine 5 mg/ml. Operations were performed with the patients in the lithotomy position (Fig. 1).

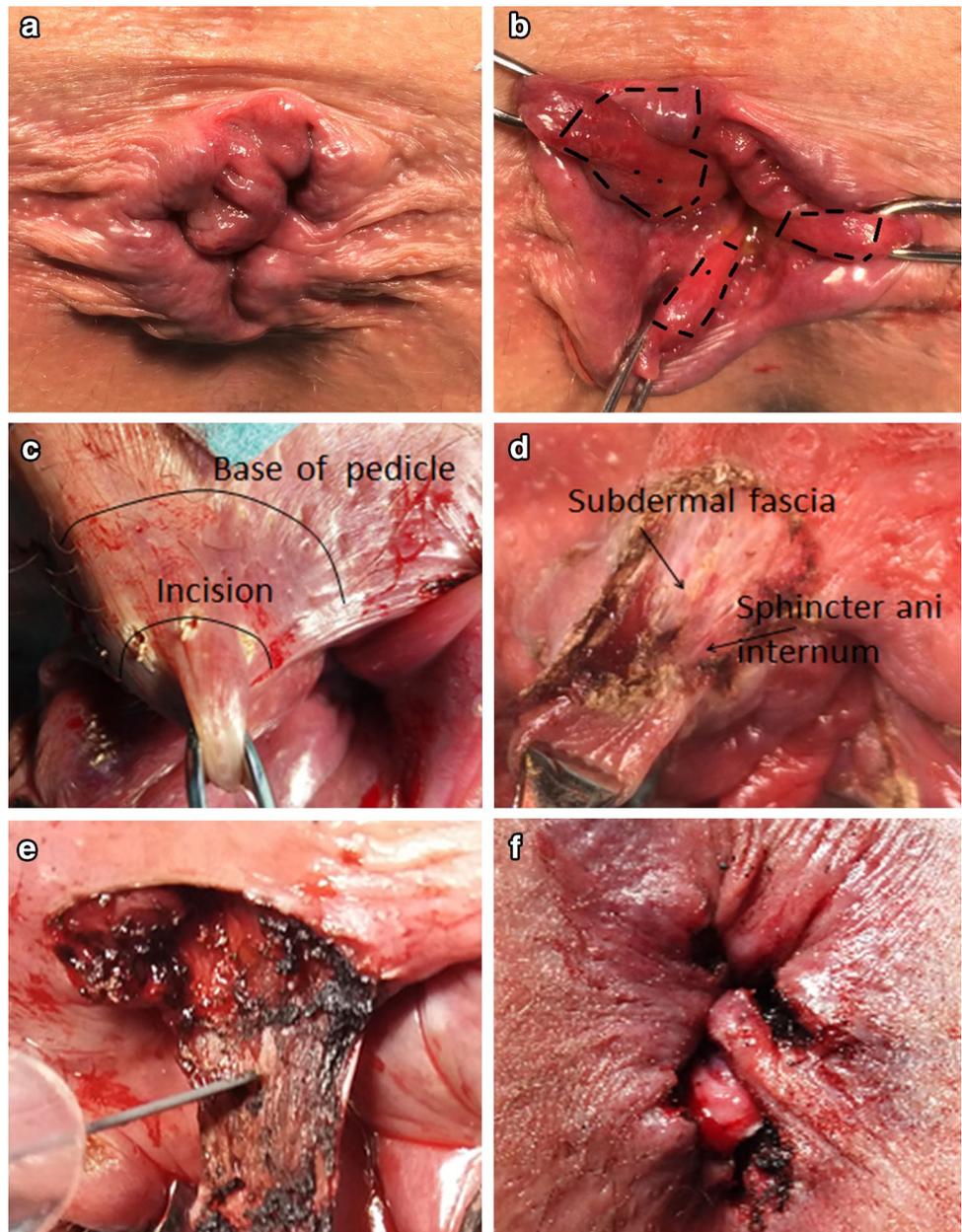
MOH: A retractor is not used. The external components are grasped by clamps using gentle traction. Diathermy is used for dissection and hemostasis. The skin is incised midway to one-third of the distance from the top of the pedicle, thus, minimizing the skin excision. The subdermal fascia continuing into a submucosal fascia covering the internal anal sphincter is identified as are fibers passing between the hemorrhoid and this fascia. The hemorrhoid is dissected free from the underlying internal sphincter in this plane, leaving the sphincter unharmed. THD and LH are performed as standard procedures, previously prescribed.

✉ G. Olaison
poo@regionsjaelland.dk

¹ Department of Surgery, Holbæk Hospital, Smedelundsgade 60, 4300 Holbæk, Denmark

² Faculty of Health and Medical Sciences, University of Copenhagen, Copenhagen, Denmark

Fig. 1 **a** Three hemorrhoids Goligher grade IV. **b** Planning the excision. The hemorrhoids are exposed after gentle traction with a clamp. The incision of hemorrhoidal mucosa is marked, in real with diathermy. Excision ends at the anal orifice. **c** Hemorrhoidal pedicle is incised one-third of the distance from top to base. Skin excision is thus minimized. **d** The subdermal fascia which continues in a membrane covering the internal sphincter is identified. Dissection is performed in front of this fascia/membrane. The internal sphincter is left unharmed. Dissection ends at the anal orifice. **e** The hemorrhoid held with gentle traction and divided at the orifice of the anus. This leaves a residual part of the hemorrhoid, that when traction is released, will have its lower end 1–2 cm orally from the anal orifice. **f** Anus after the hemorrhoidal excisions



The anal mucosa is incised at the transition from anal mucosa to hemorrhoidal mucosa and only anal mucosa overlying the hemorrhoid is excised. Only the caudal part of the hemorrhoid is excised. With the hemorrhoid held with gentle traction it is divided at the anal orifice. There will thus be a residual part of the hemorrhoid intra-anally with its caudal end 1–2 cm proximal to the anal orifice.

The number of excisions is individualized. The procedure is repeated for each hemorrhoid leaving adequate skin and mucosal bridges.

The postoperative regimen was similar for all three treatment groups. Treatment for pain was Paracetamol 1 g

four times daily, Ibuprofen 400 mg three times daily and a local anesthetic gel (lidocaine) for the first 7 days, with reduction as needed. Patients also were given eight tablets of morphine 10 mg or Tramadol 50 mg, to use as needed. They were prescribed a laxative, magnesium oxide 1 g two times daily for the first 7 days.

Demographic data were described with descriptive statistics. Fisher's exact analyzed frequencies. Kruskal–Wallis test by ranks was used for ordinal and continuous data. Significance level was 0.05 (two-sided). IBM SPSS 24 (IBM Corp, Armonk, NY, USA) was used for statistical analyses.

Results

Seventeen patients had MOH, 12 THD and 13 LH. There were no differences between the groups as regards age, sex ratio, preoperative anatomical pathology or symptoms ($p > 0.05$) (Table 1). One patient who had MOH 7 years earlier had sclerotherapy for hemorrhoids and then THD later that year. None of the other patients had previously had an

operation for hemorrhoids, treatment with rubber band ligation or sclerotherapy.

THD had a longer operation time compared to MOH and LH. Estimated bleeding was less than 50 ml for all operations.

No difference was found between the groups in summed pain scores, or for average or for peak pain. There was no difference in use of postoperative pain medication or

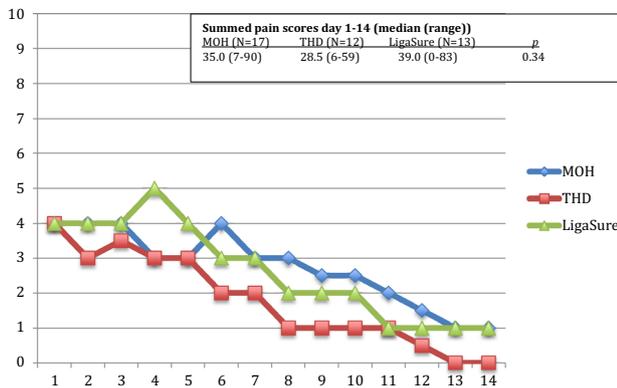
Table 1 Baseline characteristics, perioperative data, postoperative pain and recovery, data at 3 months follow-up for patients operated on for hemorrhoids with MOH, THD or LH

	MOH <i>n</i> = 17	THD <i>n</i> = 12	LH <i>n</i> = 13	<i>p</i>
Sex				
Female/male	11 (65)/6 (35)	9 (75)/3 (25)	4 (31)/9 (69)	0.07
Age (years)	64 (35–81)	56.5 (30–77)	64 (36–79)	0.53
Preoperative				
Goligher's classification anatomy				
Grade II	2 (12)	0 (0)	1 (8)	0.35
Grade III	4 (23)	4 (33)	7 (54)	
Grade IV	11 (65)	8 (67)	5 (38)	
Surgeon's Global Assessment of Pathology (1–7)	4.0 (3–6)	3.5 (3–5)	4.0 (3–6)	0.09
Hemorrhoidal Disease Symptom Score (0–20)	11.0 (5–20)	11.0 (5–16)	13.0 (5–20)	0.46
Wexner fecal incontinence score (0–20)	4.0 (0–12)	6.0 (0–15)	3.0 (0–13)	0.41
Perioperative				
Operative time (min)	30.0 (10–67)	51.5 (32–84)	27.0 (10–41)	0.001
Postoperative pain				
Postoperative average pain, summed pain scores day 1–14	35.0 (7–90)	28.5 (6–59)	39.0 (0–83)	0.34
Postoperative peak pain, summed pain scores day 1–14	57.0 (8–104)	38.0 (9–73)	66.0 (0–106)	0.24
Analgesic consumption				
Paracetamol day 1–14 (tablets à 500 mg)	64.5 (0–112)	44.0 (0–126)	75 (30–104)	0.21
Ibuprofen day 1–14 (tablets à 400 mg)	25.5 (13–43)	22 (1–36)	20 (0–47)	0.24
Morphine day 1–14 (tablets à 10 mg)	0.0 (0–6.5)	1.0 (0–12)	0 (0–10)	0.55
Recovery				
Wellbeing day 7				
Normal or slightly decreased/feeling ill	14 (82)/3 (18)	11 (92)/1 (8)	9 (69)/3 (23)	0.53
Wellbeing day 14				
Normal or slightly decreased/feeling ill	15 (88)/0 (0)	11 (92)/0 (0)	11 (85)/1 (8)	0.61
Postoperative follow-up 3 months				
Goligher's classification anatomy				
Grade I	13 (76)	7 (58)	10 (77)	0.34
Grade II	3 (18)	3 (25)	2 (15)	
Grade III	0 (0)	0 (0)	0 (0)	
Grade IV	0 (0)	2 (17)	0 (0)	
Surgeon's Global Assessment of Pathology (1–7)	1.5 (1–3)	2.0 (1–3)	1.5 (1–3)	0.08
Hemorrhoidal Disease Symptom Score (0–20)	2.0 (0–17)	4.0 (0–15)	3.0 (0–13)	0.73
Wexner Fecal Incontinence Score (0–20)	3.0 (0–12)	3.5 (1–13)	3.0 (0–16)	0.71
Patient satisfaction (1–7)	6.0 (1–7)	6.0 (1–7)	6.0 (2–7)	0.32

Values are given as median (range) or nominal (%)

MOH minimal open hemorrhoidectomy, THD transanal hemorrhoidal dearterialization, LH LigaSure hemorrhoidectomy

Average Pain



Peak Pain

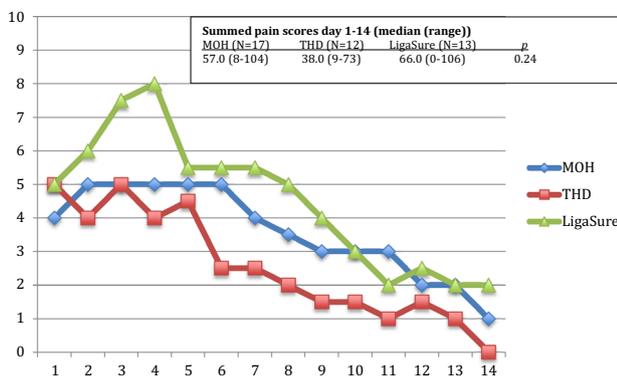


Fig. 2 Average pain and peak pain postoperatively, registered on days 1–14, in patients operated on with minimal open hemorrhoidectomy (MOH) $n=17$, transanal hemorrhoidal dearterialization (THD) $n=12$ and LigaSure hemorrhoidectomy (LH) $n=13$, values are median. Inserted are the sum of pain scores over the 14 days, values are median, range

recovery between the three groups of operated patients (Fig. 2; Table 1).

MOH patients had four perioperative adverse events (Clavien–Dindo grade 1): two were observed for postoperative bleeding with spontaneous resolution without need for intervention or transfusion; one patient had an anal fissure, conservatively treated. One patient had occasional incontinence to loose stools when using laxatives postoperatively. Among THD patients there was one case of postoperative bleeding with spontaneous resolution and no need for transfusion (Clavien–Dindo grade 1). LH patients had four adverse events (3 Clavien–Dindo grade 3B and 1 grade 1): two cases of postoperative bleeding that needed transfusions and reoperation, two patients with anal fissure, conservatively treated of whom one also had a submucosal fistula that was managed surgically.

Hemorrhoidal symptoms as evaluated by HDSS improved in all three groups with no differences. Patient satisfaction was similar. There were two grade 4 prolapses after THD. A tendency for worse “Surgeons global assessment of pathology” were noted after THD operations (Table 1).

The Wexner anal continence score improved similarly in all three groups without any difference between the groups. This improvement was mainly due to decreased soiling (Table 1).

Discussion

This study is an initial evaluation of a modified technique for open hemorrhoidectomy, MOH. The rationale for our modification was a combination of experience of hemorrhoidectomy as the operation with best long-term results, and a series of previous modifications proven to reduce postoperative pain. In addition, we postulated that the hemorrhoidal and concomitant skin excision could be smaller without inferior results. This would leave smaller wounds and a part of the hemorrhoid intra-anally, potentially lessen pain postoperatively and impact on anal continence.

When MOH was compared to THD and LH no differences in postoperative pain, need of pain medication or recovery were found. The results suggest that open hemorrhoidectomy may be performed with a postoperative pain pattern and recovery similar to non-ablative techniques like THD and a closed technique like LH. This may be due to factors such as dissection in an anatomical cleavage leaving the internal sphincter unharmed, the use of diathermy for dissection and hemostasis and a minimal extent of hemorrhoidal excision.

To our knowledge, our non-radical hemorrhoidectomy is a new concept, not previously described. Whether this poses an increased risk for recurrence can be clarified only after long-term follow-up. After a short-term follow-up, we did not note any disadvantages to using this technique. The Wexner anal continence score improved in all three patient groups. This has been observed previously after hemorrhoidal operations and is usually attributed to decreased soiling. Whether our approach to hemorrhoidal resection has a positive influence on anal continence needs further evaluation.

Conclusions

Minimal open hemorrhoidectomy is a promising option and should be evaluated in larger controlled studies with long-term follow-up.

Acknowledgements The authors would like to express our gratitude to Claus Juul, Head of Department for his support and to the study

secretary Stina Linding Johansen, R. N. Grete Bangsgaard Koester and R. N. Sonja Smed, whose effort and support made it possible to carry out this study.

Compliance with ethical standards

Conflict of interest Gunnar Olaison received in 2013 grants from Sa-coMed (the Danish distributor of THD) to attend a course on the operative technique in Transanal Haemorrhoidal Dearterialization (THD). The other authors declare that they have no conflict of interest.

Ethical approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

Informed consent For this type of study, formal consent is not required.

References

1. Loder PB, Kamm MA, Nicholls RJ, Phillips RK (1994) Haemorrhoids: pathology, pathophysiology and aetiology. *Br J Surg* 81(7):946–954
2. Gerjy R, Nyström PO (2011) Något om konsten att skära hemorrojder. *Svensk Kirurgi* 69(2):86–88
3. Seow-Choen F, Ho YH, Ho YH, Ang HG, Goh HS (1992) Prospective, randomized trial comparing pain and clinical function after conventional scissors excision/ligation vs. diathermy excision without ligation for symptomatic prolapsed haemorrhoids. *Dis Colon Rectum* 35(12):1165–1169
4. Bessa SS. Diathermy Excisional H (2011) A prospective randomized study comparing pedicle ligation and pedicle coagulation. *Dis Colon Rectum* 54(11):1405–1411
5. Roervik H, Styr K, Ilum L, André H, Campos K, Styr K, Ilum L, McKinstry GL, Brandstrup B, Olaison G (2018) The haemorrhoidal disease symptom scores and short health scale(HD): new tools to evaluate symptoms and health-related quality of life in haemorrhoidal disease. *Dis Colon Rectum*. <https://doi.org/10.1097/DCR.0000000000001234>

Publisher's Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.