

Hemorrhoidal artery ligation (HAL) and rectoanal repair (RAR): retrospective analysis of 408 patients in a single center

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Received: 16 July 2013 / Accepted: 22 April 2014 / Published online: 19 November 2014
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Abstract

Background Rectoanal repair (RAR), which combines doppler-guided hemorrhoidal artery ligation (HAL) and mucopexy via lifting of the hemorrhoidal prolapse, offers a minimally invasive alternative to conventional hemorrhoidectomy.

Methods Patients with grade II hemorrhoids were treated with HAL, and patients with grade III and IV hemorrhoids were treated with the RAR procedure by two surgeons. Postoperative follow-up was performed clinically and by proctoscopy after 8 weeks routinely, and long-term follow-up was performed using a standardized postal questionnaire.

Results The overall complication rate was 29 % ($n = 118$). After short-term follow-up, 26 % ($n = 106$) of patients reported recurrent or persistent prolapsing piles, while 21 % ($n = 86$) of patients had recurrent bleeding. After long-term follow-up, 24 % ($n = 98$) of patients reported prolapsing piles, 3 % ($n = 12$) bleeding, 3 % ($n = 12$) pruritus, and 2 % ($n = 8$) anal pain, while 20 % ($n = 82$) complained of persistent mixed symptoms.

Conclusions HAL and RAR provide prolonged relief for patients with hemorrhoidal disease whose main symptoms are bleeding, pruritus and pain but not for patients with prolapse as an initial indication.

Keywords Minimally invasive surgery · Hemorrhoidal artery ligation · Doppler-guided · Rectoanal repair

Introduction

In our civilization, hemorrhoidal disease is one of the most common diseases, with a prevalence of up to 4.4 % [1]. Surgical intervention is necessary in order to treat 5–10 % of patients with existing symptoms. Depending on the grade of prolapse and the severity of symptoms, the spectrum of treatment options includes conservative therapies, medication for grade I patients, minimally invasive procedures, such as infrared coagulation, sclerotherapy, laser therapy and cryotherapy, as well as invasive therapies, such as hemorrhoidectomy.

While conventional hemorrhoidectomy is regarded as the gold standard in terms of efficacy, it is associated with significant morbidity, and the most important and frequent symptom from the patient's perspective is pain. Other complications include sepsis, up to 5 % of patients have a transient bacteremia postoperatively, and impaired continence in up to 33 % of patients [2].

Stapled hemorrhoidopexy has been shown to be as effective as hemorrhoidectomy, with less pain and a quicker return to normal activity [3–5]. Furthermore, continence is rarely impaired due to the restoration of normal anatomy [6]. Reports of bleeding, rectal perforation, rectovaginal fistulae, and large bowel obstruction are rare [2, 7], but they highlight the treatment risks and the need to tailor treatment to the individual patient.

Doppler-guided hemorrhoidal artery ligation (HAL) has gained popularity as an alternative minimally invasive surgical technique that has proven to be safe and effective [8–12]. However, the durability of HAL has been

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questioned [13]. Follow-up results at 12 months have been published, suggesting that the early benefit is maintained [8, 11, 12]. The shortcoming of an increased re-prolapse rate for high-grade hemorrhoids resulting from the HAL method has been addressed by the development of rectoanal repair (RAR).

The purpose of this study is to identify initial symptoms that are most positively affected by the RAR procedure.

Materials and methods

Preoperative assessment and patient selection

Patients with symptomatic hemorrhoids were examined by proctoscopy by different surgeons of the department in an ambulatory setting after excluding other pathologies through colonoscopy or barium enema. Patients with stage II disease who failed conservative treatment with fiber supplements and anti-inflammatory suppositories were suitable for HAL alone. Patients with stage III and IV disease were not deemed to be suitable for HAL, and the RAR technique was performed. General anesthesia was used in all cases.

Operative technique

Following pre-surgery preparation on either an outpatient or inpatient basis, patients were operated on by two experienced surgeons. Patients were placed in the lithotomy position. The rectum was emptied at least 1 h preoperatively. The sphincter was gently dilated up to a width of two fingers using a generous amount of xylocaine jelly.

Subsequently, the HAL proctoscope was inserted. Starting at approximately 3–4 cm above the dentate line, the Doppler transducer was used to locate arterial signals. When a pulsation was located, the vessel was single-ligated or, in case of a persisting arterial signal, double-ligated with a 5/8 needle and Vicryl 2.0, and a knot pusher was used to tie the ligature. All care was taken to avoid the dentate line in order to prevent patient circumferential vessels located by Doppler guidance were ligated in this manner until proved extinction of the signal. The proctoscope was then slightly withdrawn, and a second line of circumferential vessels with detectable pulsations was ligated too discomfort and pain.

The HAL proctoscope adapted for the RAR procedure (A.M.I. Agency for Medical Innovations GmbH: Im Letten 1, 6800 Feldkirch, Austria) was used in all patients.

This enabled us to perform both HAL and mucopexy in a standard fashion. The proctoscope is provided with a slotted window, which is primarily closed during HAL. A protecting cylinder was turned and gradually opened the slotted window from proximal to distal, enabling the surgeon to place a

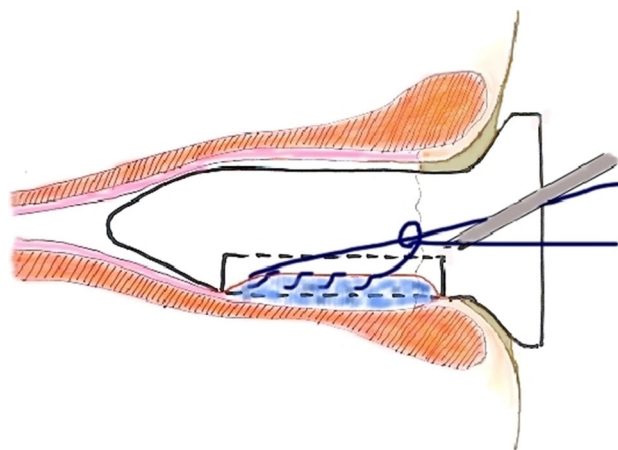


Fig. 1 Drawing of hemorrhoidal artery ligation proctoscope used for rectoanal repair

continuous longitudinal suture in the lower third of the rectum, a procedure that we have called transanal rectal mucopexy. This continuous suture can be placed repeatedly according to the extent and number of prolapsing piles, starting proximal to the initial row of ligations, sometimes with intersection of the second row of ligations, finishing shortly before the dentate line. The process of tying such a continuous suture results in shrinkage of the prolapsing tissue. As a consequence, the hemorrhoidal plexus is lifted and fixed in the anatomically correct region with immediate visual improvement (Figs. 1, 2).

The proctoscope was then completely removed. Patients were given an analgesic for postoperative pain. During the first few days, they received laxatives for stool regulation and easier defecation and in order to avoid straining.

Follow-up

Short-term follow-up was performed at 8 weeks clinically and by proctoscopy. Long-term follow-up was performed using a standardized questionnaire mailed to all patients at median 6.5 (range 6–12) years after the initial procedure. This questionnaire assessed effects of HAL and RAR on recurrent prolapse, bleeding, pruritus, and anal pain.

Results

Patient demographics

From January 2000 to July 2006, a total of 623 patients underwent stage-adapted therapy with HAL or RAR in one center. Of these, 215 (35 %) patients were lost to follow-up and were eliminated from the analysis. Therefore, 408 patients were available for both short- and long-term follow-ups. The results after a median long-term follow-up of

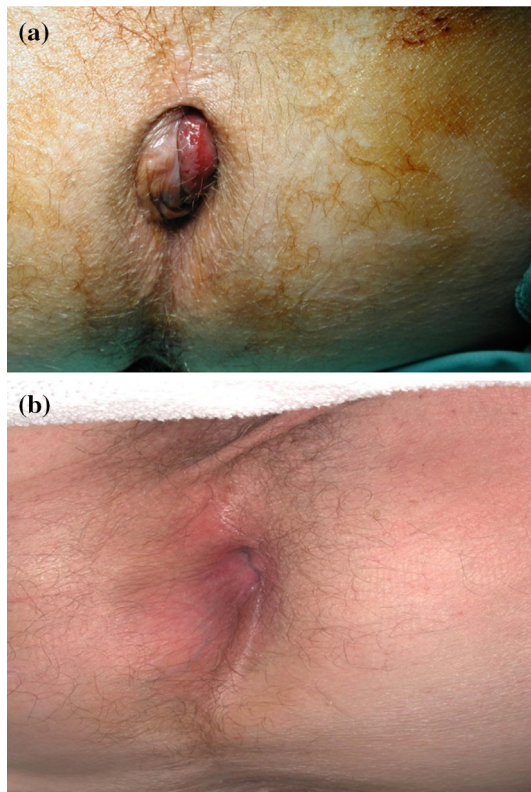


Fig. 2 Before (a) and 6 weeks after (b) rectoanal repair

6.5 (range 6–12) years are presented in this retrospective study. Patients suffering from grade II (17 %, $n = 69$), grade III (74 %, $n = 302$), and grade IV (9 %, $n = 37$) hemorrhoids were analyzed. The sex distribution was 57 % ($n = 233$) males and 43 % ($n = 175$) females. The median age was 50 (range 22–84) years. Patient symptoms leading to a surgical intervention were bleeding (38 %, $n = 155$), prolapse (83 %, $n = 339$), anal pain (24 %, $n = 98$), and pruritus (8 %, $n = 33$).

Operative results

We had to apply between 2 and 16 ligatures in order to sufficiently reduce the Doppler pulsations. The median was 6.5 ligatures, with a significant difference according to the different grades. It was also necessary to go through a learning curve of approximately 20 surgical interventions, which explains why we had such a relatively high number of ligatures (16 ligatures in one grade III patient). The higher the grade, the more ligatures we had to apply on average in order to achieve optimal results.

Postoperative pain

Analgesia was only given when requested by patients. Within the first 3–4 days, 15 % of the patients received

Table 1 Postoperative complications

	Total ($n = 408$)	Grade II ($n = 69$)	Grade III ($n = 302$)	Grade IV ($n = 37$)
Residual protrusion	65 (16 %)	0	43 (14 %)	22 (59 %)
Bleeding	23 (5 %)	1 (1,4 %)	21 (7 %)	1 (2 %)
Perianal thrombosis	13 (3 %)	1 (1,4 %)	12 (4 %)	0
Painful defecation	7 (2 %)	1 (1,4 %)	6 (2 %)	0
Fissure	5 (1 %)	1 (1,4 %)	3 (1 %)	1 (2 %)
Urinary retention	7 (1 %)	0	6 (2 %)	1 (2 %)
Urinary infection	3 (0,6 %)	0	3 (1 %)	0
Stool retention	1 (0,3 %)	1 (1,4 %)	0	0
Fistula	2 (0,3 %)	0	2 (0,5 %)	0
Proctitis	2 (0,3 %)	0	2 (0,5 %)	0
Total complication rate	118 (29 %)	5 (4 %)	97 (32 %)	25 (65 %)

postoperative pain relief therapy with orally administered nonsteroidal anti-inflammatory drugs. The average length of hospital stay was 1.8 ($\pm 1, 2$) days.

Postoperative complications

The total complication rate was 29 % ($n = 118$). The main complication was residual protrusion in patients with grade III and grade IV hemorrhoids, defined as tissue edema after surgical trauma, which resolved later on (Table 1).

Short-term follow-up

At 8 weeks, recurrent or persistent prolapse was observed in 26 % ($n = 106$) of patients. A total of 21 % ($n = 86$) of patients had persistent or recurrent bleeding which was irregular (once a week or less) in 10 % ($n = 41$) of patients and regular (twice a week or more) in 11 % ($n = 45$).

In a patient inquiry, 91 % ($n = 371$) of patients confirmed they would again ask for this type of surgery if they experienced the same problems. Over 93 % ($n = 379$) of patients would highly recommend this surgical technique to a friend. Concerning the results, 86 % ($n = 351$) of patients stated that they were satisfied or highly satisfied.

Long-term follow-up

After long-term follow-up by mailed questionnaire, 24 % ($n = 98$) of patients reported recurrent prolapsing piles, 3 % ($n = 12$) bleeding episodes, 3 % ($n = 12$) pruritus, and 2 % ($n = 8$) anal pain, while 20 % ($n = 82$) complained of persistent mixed symptoms.

Discussion

HAL was first introduced in 1995 by Morinaga et al. [8] who located the afferent vessels to the hemorrhoidal cushions in order to influence the ratio of blood flow and drainage in the hemorrhoidal cushions. Selective ligation of the afferent arteries results in a reduction in blood flow and causes the hemorrhoidal cushions to shrink. Shrinkage due to scar tissue formation causes the hemorrhoidal cushions to be lifted into the anal canal.

A number of studies on small series demonstrate the early efficacy of the procedure with success rates from 80 to 92 % [9–12]. Morinaga et al. show a better resolution of bleeding (96 %) than prolapse (78 %), while Sohn et al. report better results for prolapse (92 %) than bleeding (88 %). Bursics et al. show that hemorrhoidectomy and HAL are equally efficient at 1-year follow-up [14].

With the advent of RAR, combining HAL and mucopexy via lifting of the hemorrhoidal prolapse, outcomes for prolapse have improved but no long-term data on recurrence rates have been published. Theodoropoulos et al. [15] first published results from a 15-month follow-up of RAR patients; Zagriadskiy et al. [16] published results after a 10-month follow-up. RAR improves the clinical outcome for residual prolapse compared to HAL due to the positive effects of additional mucopexy [17, 18].

In our retrospective study after long-term follow-up, 24 % of patients reported recurrent or persisting prolapsing piles, 3 % bleeding episodes, 3 % pruritus, and 2 % anal pain, while 20 % complained of persistent mixed symptoms. The resolution of bleeding, pruritus ani, and pain can be attributed to the ligation of the arteries of the corpus cavernosum recti. In order to achieve the most effective reduction in preoperative hemorrhoidal symptoms (bleeding, pain, pruritus), ligations have to be carried out carefully during the HAL procedure. Similar rates of patients with prolapse after short- and long-term follow-up suggest a lack of further improvement and the need for early re-intervention as opposed to “wait and see.” The high recurrence rate for hemorrhoidal prolapse in our series also suggests that this procedure should not be used for advanced grades of hemorrhoids.

Our retrospective analysis did not reveal any major postoperative complications; however, postoperative complication rate was comparable to that associated with standard hemorrhoidectomy.

A major limitation of this long-term retrospective study is that 35 % of the patients were lost to follow-up. Another limitation of this study is the lack of differentiation between stages II, III, and IV disease at follow-up, and so a subgroup analysis to determine whether the stage of disease impacted on successful outcome was not possible.

Another limitation is in the use of a mailed questionnaire. Furthermore, postoperative pain was not measured except for the amount of analgesic medication required.

Conclusions

The marginal success obtained in treating prolapse with RAR in our series confirms that treating patients' symptoms rather than anatomy can be misleading and that the stage of disease is more important in selecting patients. RAR, however, is independent of disease stage, an effective surgical treatment option for patients with hemorrhoids and symptoms of bleeding, pruritus, and anal pain. Patients with prolapse as an initial indication benefit less from the RAR procedure. To evaluate the efficacy of HAL and RAR, a randomized control trial comparing the results of this procedure is needed.

Conflict of interest None.

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