Prospective Randomized Trial Comparing HAL-RAR Versus Excisional Hemorrhoidectomy: Postoperative Pain, Clinical Outcomes, and Quality of Life

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Purpose:
To compare outcomes of hemorrhoid artery ligation with recto-anal repair (HAL-RAR) and excisional hemorrhoidectomy (EH). The primary objective was to compare postoperative pain, and the secondary objectives were the following: symptom resolution rates, postoperative morbidity, recurrence, and changes in quality of life.

Method:
Prospective randomized controlled trial, including 40 patients with grades III-IV hemorrhoids who were allocated 1:1 to HAL-RAR and EH. Follow-up evaluation was performed at 15 days, 30 days, 6 months, 12 months, and then annually.

Pain was measured using a Visual Analogic Scale and was self-recorded by patients. Quality of life was measured with Short Form Survey-36 questionnaire.

Results:
Postoperative pain was lower in the HAL-RAR group during the first 30 postoperative days. Moreover, from day 7 onward more patients in the HAL-RAR group reported complete absence of pain (Visual Analogic Scale score = 0). Globally, symptom resolution was significantly higher (P = .03) in the HAL-RAR group at day 15. Bleeding resolution was observed earlier in the HAL-RAR group than in the EH group (P = .04), but no differences in the resolution of prolapse, itching, and soiling were observed during the 30-day follow-up. After a mean follow-up of 15 months (range 12-27 months), no differences in postoperative morbidity and no recurrences were observed. An improvement was observed in all sections evaluated by the Short Form Survey-36 questionnaire with both techniques.

Conclusion:
HAL-RAR provokes less postoperative pain during a shorter period than EH and achieves resolution of hemorrhoidal symptoms with less postoperative complaints. No differences in morbidity and recurrence rate were observed after 12 months of follow-up.

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Read the full publication here:
https://journals.sagepub.com/doi/10.1177/1553350618822644
Hemorrhoidal artery ligation/Rectoanal repair

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Background:
This article presents the indications, principles, operative technique and the results of hemorrhoidal artery ligation rectoanal repair (HAL-RAR). The procedure is described in a step-by-step fashion. The HALRAR is a surgical non-resecting procedure for the treatment of prolapsed hemorrhoids. It includes both the Doppler-guided ligation of the superior rectal artery branches that feed the hemorrhoidal plexus (corpus cavernosum recti) in order to reduce the arterial inflow (HAL) and mucopexy of the prolapsed tissue with a running suture (RAR).

Patients and methods:
Apart from a brief discussion of the literature we present the outcomes of the German RAR study. This study is a prospective cohort study including 498 patients from 14 hospitals and proctological clinics, which performed HALRAR for prolapsed hemorrhoids. Follow-up was realized in predefined intervals for 3 years and included an interview and a proctological examination.

Results:
There were no major complications and only few minor complications (4.2%). Patients indicated an improvement after the procedure for each of the following symptoms: no or only minor bleeding 97%, no prolapse 91%, no pain 95%, no pruritus 83%, no soiling 90%. The Beattie score dropped from initially 5.52 to 0.6.

Discussion:
The HAL-RAR is an appropriate procedure for all symptomatic prolapsing stages of hemorrhoidal disease. It can be tailored to the extent of the hemorrhoids taking individual findings into account. Complications are rare and long-term results are convincing. It can also be performed in pre-existing pathologies, such as anal incontinence, previous radiation treatment and a history of anal operations.

coloproctology 2018 April; 40: 195

Read the full publication here:
Literature Overview:
HAL-RAR Methods

DG-RAR for the treatment of symptomatic grade III and grade IV haemorrhoids: a 12-month multi-centre, prospective observational study

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Background:
Ultrasound-guided techniques represent a new treatment option in the treatment of haemorrhoids. Doppler-guided haemorrhoidal artery ligation (DG-HAL) proved efficacious in early haemorrhoidal disease, but lacks efficacy for stages III/IV. For these patients, haemorrhoidal artery ligation (HAL) has been combined with a running suture to reduce prolapsing haemorrhoidal tissue (recto-anal repair (RAR)).

Methods:
A prospective observational study was conducted in 184 patients with grade III (58%) or grade IV (42%) haemorrhoids in seven coloproctological centres. Primary endpoints were the recurrence of symptoms and need of further treatment (medical or surgical).

Results:
Post-operative complications were seen in 8% of patients. After a follow-up of 3 months, 91% of patients were free of symptoms and 91% of patients were satisfied with the result. After a follow-up of 12 months, 89% of patients were free of symptoms and 88% were satisfied with the result. Nineteen per cent of patients received further medical or surgical treatment.

Conclusions:
Doppler-guided recto-anal repair (DGRAR) proves to be an effective treatment option for the treatment of advanced haemorrhoidal disease that shows equal results to other established treatment options.

Eur Surg 2013 February; 45(1): 26-30

Read the full publication here:
Color-coded Doppler sonography of the anorectum. Is Doppler-guided hemorrhoidal artery ligation effective?

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Background:
The highest priority in treating hemorrhoids is the alleviation of transanal bleeding and prolapse in advanced stages. In addition to the traditional surgical methods, which are always associated with excision of hemorrhoidal tissue, newer methods offer a more pathogenetically oriented approach. In addition to stapled hemorrhoidopexy, reduction of the arterial flow into the corpus cavernosum of the rectum and reduction of mucosal prolapse and parts of the hemorrhoids to the regular site within the anal canal can also be used. The hemorrhoidal artery ligation (HAL) rectoanal repair (RAR) method is an effective alternative. It is questionable whether ligation of the artery is sufficient or success of the method is due to secondary mechanisms, such as fibrosis or fixation of the mucosa.

Material and Methods:
In a prospective study 15 patients were examined preoperatively and postoperatively at defined intervals following HAL/RAR using 3D endosonography and color-coded Doppler sonography.

Results:
It was found that the DG-HAL could effectively prevent the main trunks of the afferent arteries connecting to the corpus cavernosum of the rectum and was maintained even after 3 months. Smaller residual vessels remained unaffected.

Conclusion:
The DG-HAL method can effectively stop arterial inflow into the corpus cavernosum of the rectum and was demonstrated by postoperative color-coded Doppler studies.
Outcome of stapled hemorrhoidopexy versus doppler-guided hemorrhoidal artery ligation for grade III hemorrhoids

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Purpose:
To evaluate the long-term results, early and late complication rates, and overall satisfaction of patients with grade III hemorrhoids treated by stapled hemorrhoidopexy (SH) or Doppler-guided hemorrhoidal artery ligation (DGHAL).

Methods:
Operative and follow-up patients’ data were prospectively collected for patients undergoing either SH or DGHAL by a single surgeon during a 2-year period. A retrospective comparison between patients’ outcome operated by one of the two methods was made based on this data. Clinical data on postoperative pain, analgesic requirements, time to first bowel movement and functional recovery were collected at five postoperative follow-up visits (1 and 6 weeks, 6, 12, and 18 months). Data on patient satisfaction, recurrence of hemorrhoidal symptoms and further treatments were obtained by a standardized questionnaire that was conducted during the last visit 18 months postoperatively.

Results:
A total of 63 patients underwent SH (aged 52 ± 3.2 years) and 51 patients underwent DGHAL (aged 50 ± 7.3 years). DGHAL patients experienced less postoperative pain as scored by pain during bowel movement (2.1 ± 1.4 vs. 5.5 ± 1.9 for SH), and required fewer analgesics postoperatively. Hospital stay, time to first bowel movement, and complete functional recovery were also significantly shorter for the DGHAL patients. Nine DGHAL patients (18%) suffered from persistent bleeding or prolapses and required additional treatment compared with 2 (3%) patients in the SH group. SH patients reported greater satisfaction compared with DGHAL patients at 1 year postoperatively.

Conclusion:
Both SH and DGHAL are safe procedures and have similar effectiveness for treating grade III hemorrhoids. DGHAL is less painful and provides earlier functional recovery, but is associated with higher recurrence rates and lower satisfaction rates compared with SH.

Doppler-Guided Hemorrhoidal Artery Ligation and Rectoanal Repair (HAL-RAR) for the Treatment of Grade IV Hemorrhoids: Long-Term Results in 100 Consecutive Patients

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Background:
Doppler-guided hemorrhoidal artery ligation is a minimally invasive technique for the treatment of symptomatic hemorrhoids that has been applied successfully for grade II and III hemorrhoids but is less effective for grade IV hemorrhoids. Development of a special proctoscope enabled the combination of hemorrhoidal artery ligation with transanal rectoanal repair (mucopexy), which serves to lift and then secure the protruding hemorrhoids in place.

Objective:
The purpose of this study was to describe our experience with this combined procedure in the treatment of grade IV hemorrhoids.

Design:
Prospective observational study.

Setting:
Outpatient colorectal surgery unit.

Patients:
Consecutive patients with grade IV hemorrhoids treated from April 2006 to December 2008.

Intervention:
Hemorrhoidal artery ligation–rectoanal repair.

Main outcome measures:
Operating time, number of ligations, number of mucopexies and associated procedures, and postoperative symptoms were recorded. Pain was graded on a visual analog scale. Follow-up was at 2, 6, and 12 months after surgery, and then annually.

Results:
A total of 100 consecutive patients (64 women, 36 men) with grade IV hemorrhoids were included. Preoperative symptoms were bleeding in 80 and pain in 71 patients; 19 patients had undergone previous surgical treatment for the disease. The mean operative time was 35 (range, 17–60) minutes, with a mean of 9 (range, 4–14) ligations placed per patient. Eighty-four patients were discharged on the day of the operation. Nine patients developed early postoperative complications: pain in 6, bleeding in 4, dyschezia in 1, and thrombosis of residual hemorrhoids in 3. Late complications occurred in 4 patients and were managed conservatively. Recurrence was observed in 9 patients (9%), with a mean follow-up of 34 (range, 14–42) months.

Limitations:
The 2 main weaknesses of the study were the lack of very long-term follow-up and the absence of a comparison with hemorrhoidectomy or hemorrhoidopexy.

Conclusion:
Doppler-guided hemorrhoidal artery ligation with rectoanal repair is safe, easy to perform, and should be considered as an effective option for the treatment of grade IV hemorrhoids.

Dis Colon Rectum 2011; 54: 226–231
Doppler-Guided Hemorrhoid Artery Ligation with Recto- Anal- Repair Modification: Functional Evaluation and Safety Assessment of a New Minimally Invasive Method of Treatment of Advanced Hemorrhoidal Disease

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Purpose:
We present 12-month followup results of functional evaluation and safety assessment of a modification of hemorrhoidal artery ligation (DGHAL) called Recto- Anal- Repair (RAR) in treatment of advanced hemorrhoidal disease (HD).

Methods:
Patients with grade III and IV HD underwent the RAR procedure (DGHAL combined with restoration of prolapsed hemorrhoids to their anatomical position with longitudinal sutures). Each patient had rectal examination, anorectal manometry, and QoL questionnaire performed before 3 months, and 12 months after RAR procedure.

Results:
20 patients completed 12-month followup. There were no major complications. 3 months after RAR, 5 cases of residual mucosal prolapse were detected (25%), while only 3 patients (15%) reported persistence of symptoms. 12 months after RAR, another 3 HD recurrences were detected, to a total of 8 patients (40%) with HD recurrence. Anal pressures after RAR were significantly lower than before (P < 0.05), and the effect was persistent 12 months after RAR. One patient (5%) reported occasional soiling 3 months after RAR.

Conclusions:
RAR seems to be a safe method of treatment of advanced HD with no major complications. The procedure has a significant influence on anal pressures, with no evidence of risk of fecal incontinence after the operation.

Scientific World Journal; 2011;2012:324040
Transanal Doppler-guided Hemorrhoidal Artery Ligation and Recto Anal Repair vs Closed Hemorrhoidectomy for treatment of grade III-IV hemorrhoids. A randomized trial

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Objective:
HAL-RAR is a technique whereby Doppler-guided ligation of hemorrhoidal arteries is combined with a mucopexy of the mucosal prolapse, known as Recto Anal Repair (RAR). HAL-RAR is presented here as an alternative to hemorrhoidectomy. Early and 1-year follow-up results of the procedure are presented and compared with those of closed-scissors hemorrhoidectomy (CH) in a prospective randomized study.

Patients and methods:
One hundred and thirty-five patients with grade III-IV hemorrhoids were randomized for HAL-RAR (n - 65) or CH (n - 70). All operations were done under general anesthesia and local block as day-case surgery.

Results:
Comparing the two groups, there was no significant difference between them in terms of the operating time (36.2±2.3 vs 35.5±3.1 p>0.05), or when the first postoperative bowel movement occurred. The median pain score was higher for the CH group during the first ten days (p<0.05). The average need for minor analgesics was 32.3±12.6 mg (ketorolac trometamin) in the HAL-RAR group, and 46.1±7.7 mg in the CH group (p<0.001). Patients in the HAL-RAR-group spent 18.3±3.5 hours in the hospital postoperatively, and those in the CH-group 62.0±12.4 hours. Patients in the HAL-RAR group returned to normal daily activities after 2.8±0.7 days, and those in the CH group after 21.1±2.7 days (p<0.001).
Complications occurred in a total of five patients within 30 days of surgery: three patients from the CH group suffered from urinary retention, one patient from the CH group from bleeding, and one from the HAL-RAR group from a thrombosed hemorrhoid. The appearance of skin tags (HAL-RAR 9 vs. CH 1, p=0.047) significantly differed between the groups. Neither the re-appearance of prolapse (3HAL-RAR vs. 0 CH patients) nor the recurrence of the symptoms bleeding (HAL-RAR 2 vs. 1 CH patients) or pain (HAL-RAR 0 vs. 1 CH patients) differed significantly between the two groups.

Conclusion:
HAL-RAR appears to cause less postoperative pain and results in better patient-satisfaction in the early postoperative period than closed hemorrhoidectomy. Doppler-guided hemorrhoidal artery ligation fulfills the requirements of minimally invasive surgery and appears to be ideal for 1-day surgery.

Pelviperineology 2011; 30: 107-112

Read the full publication here:
Early Experience of Doppler-Guided Hemorrhoidal Artery Ligation and Rectoanal Repair (DG-HAL & RAR) for the Treatment of Symptomatic Hemorrhoids

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Purpose:
This study is to introduce our preliminary experience of the Doppler-guided hemorrhoidal artery ligation and Rectoanal repair (DG-HAL & RAR) as a new treatment for symptomatic or prolapsed hemorrhoids.

Methods:
A Doppler probe incorporated proctoscope was inserted under the lithotomy position and the location of the hemorrhoidal artery was identified. The identified artery was ligated as a 'figure of eight' method with an absorbable suture into the submucosa. Then the prolapsed hemorrhoidal pile was lifted at the rectal mucosa by continuous suture to 5 mm above the dentate line and tied. The procedure was repeated at the 1, 3, 5, 7, 9, and 11 o’clock positions. We evaluated post-operative hospital stay, degree of pain, time to return to work, and recurrence.

Results:
The patient’s mean age was 50.2±15 years old and the mean follow-up time was 415±75 days. The constitution of the type of internal hemorrhoids was as follows: Grade II: 13, Grade III: 16, and Grade IV: 5. The mean operation time was 35 minutes and post-operative hospital stay was 1.4 days. The mean time it took to return to work was 1.8 days. There were no severe pains requiring injection of analgesics or other severe complications. So far, 2 patients have had recurrence of symptoms.

Conclusion:
The DG-HAL & RAR is a safe and less painful procedure. The DG-HAL & RAR is an effective alternative for the treatment of symptomatic or prolapsed hemorrhoids.

Doppler-guided hemorrhoidal artery ligation (DG-HAL): a safe treatment of II-III degree hemorrhoids for all patients. Could it be potentially also good prophylaxis?

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Aim:
Doppler-guided hemorrhoidal artery ligation (HAL Doppler) is an innovative hemorrhoid treatment mainly utilised for II-III degree where bleeding is a predominant system. This procedure aims at dearterialization of the internal hemorrhoidal plexus by ligation of the terminal branches of the superior rectal artery detected using a special proctoscope and ultrasound system; the procedure is performed entirely above the dentate line, so it is genuinely painless. The aim of this study was to evaluate the efficacy, safety and invasivity of HAL Doppler technique to treat II and III degree hemorrhoids.

Methods:
The authors treated 148 patients, from May 2002 to December 2007, principally affected by II-III hemorrhoids characterized by bleeding and pain at evacuation. These patients were examined in a retrospective observational study of 128 patients, 86% of the group. Follow-up varied from 5 up to 72 months with an average observation time of 36.5 months.

Results:
Success was registered in 90% of patients affected by II-III degree hemorrhoids and the absence of major complications (hemorrhage, incontinence, stenosis, perforation, sepsis).

Conclusions:
The authors suggest the safety, efficacy and low invasivity of HAL Doppler for treatment of II-III degree hemorrhoids, which also found in the literature, and highlight its use in treating patients with unhealthy conditions which are a contraindication to the usual surgical treatments. Moreover they suppose the use of HAL Doppler in low degree hemorrhoids as a therapeutic and also prophylactic rule of advanced degree.

Minverva Chir 2010;65:259-65
DG-RAR (Doppler-Guided Recto-Anal Repair):
A New Mini Invasive Technique in the Treatment of
Prolapsed Hemorrhoids (Grade III–IV):
Preliminary Report

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We present preliminary data from a prospective observational study on an initial group of 40 patients, selected from our Department, affected by grade III–IV hemorrhoids and treated with a new less invasive technique called Doppler-guided recto-anal repair [DG-RAR; Agency for Medical Innovations GmbH (AMI), Feldkirch, Oesterreich, Austria]. This study was performed by analyzing bleeding, pain, and prolapse in the preoperative period and after surgery. Follow-up ranged from 5 to 37 months. We used this technique to treat the "vascular factor" with a Doppler-guided suture of the terminal branches of the hemorrhoidal arteries (HAL Doppler), and then we reduced hemorrhoidal prolapse [rectoanal repair (RAR)]. Recto-anal repair was performed with a special proctoscope with an oblique slot that when rotating shows a progressively wider portion of anorectal mucosa and submucosa in a longitudinal direction. Furthermore, this rotation enables the performance of a longitudinal pexy where the prolapse is located. The result is an immediate reduction of hemorrhoidal prolapse. Postoperative follow-up showed disappearance of pain and no bleeding. Relapse of prolapse occurred in 2 (5%) patients. Complications included 2 rectal impactions and 2 cases of thrombosis. The data appear encouraging for grade III–IV hemorrhoids treated with DG-RAR because of reduced trauma and a lower rate of complications with respect to other techniques used for prolapse reduction.

Int Surg 2010;95:265–269
Haemorrhoidal artery ligation

NATIONAL INSTITUTE FOR HEALTH AND CLINICAL EXCELLENCE
National Health Service, UK

Guidance
1.1 Current evidence on haemorrhoidal artery ligation shows that this procedure is an efficacious alternative to conventional haemorrhoidectomy or stapled haemorrhoidopexy in the short and medium term, and that there are no major safety concerns. Therefore this procedure may be used provided that normal arrangements are in place for clinical governance, consent and audit.

Interventional Procedure Guidance 342; Issue date: May 2010
Doppler-guided haemorrhoidal artery ligation with recto anal repair: a new technique for the treatment of symptomatic haemorrhoids

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Purpose:
Doppler-guided haemorrhoidal artery ligation (DGHAL) is a minimally invasive surgical technique used to treat symptomatic haemorrhoids. In 2005, the DGHAL proctoscope was redesigned to incorporate a window through which a recto anal repair (RAR) could be performed to improve the outcome in patients with significant prolapse symptoms. The aim of this study was to observe the outcome of a series of consecutive DGHAL–RAR procedures.

Method:
Seventy-seven consecutive patients (49 male) underwent DGHAL–RAR for symptomatic haemorrhoids and were reviewed for a minimum of 6 months post-surgery. Results Fifty-seven (74%) of patients presented with both prolapse and bleeding symptoms. The median number of DGHALs performed was six, and the median number of RARs was two. Most (96%) patients were discharged the same day. At follow-up, 11 patients complained of recurrent symptoms, five of prolapse, four of bleeding and two of pruritus. Eight patients suffered with post-operative anal fissures. The procedure is recommended by 84.4% of patients 6 weeks post-surgery.

Conclusion:
DGHAL–RAR is safe, effective and well tolerated. It reduces the need for potentially dangerous excisional procedures. The RAR component is an effective addition to DGHAL in the short term for the treatment of prolapse, but longer follow-up will be required to demonstrate durability of the technique.

Doppler-Guided Hemorrhoid Artery Ligation Reduces the Need for Conventional Hemorrhoid Surgery in Patients who Fail Rubber Band Ligation Treatment

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Purpose:
This study was designed to assess whether Doppler-guided hemorrhoid artery ligation can prevent patients from needing conventional surgery when rubber band ligation of their hemorrhoids has failed to achieve symptomatic relief.

Methods:
All patients who underwent treatment for hemorrhoids in two hospitals between September 2004 and June 2007 are reported.

Results:
A total of 203 patients (121 women; mean age, 44 (range, 17Y84) years) were treated by rubber band ligation for two (181 patients) or three hemorrhoids (22 patients) during the study period. Fifty-four of these patients (27 percent) continued to suffer symptoms of bleeding (38 patients) or bleeding and prolapse (16 patients) after three clinic assessments. Fifty-two of these 54 patients subsequently underwent Doppler-guided hemorrhoid artery ligation. Two other patients had stapled anopexy. After a median follow-up of 18 (range, 6Y33) months, 12 of the 52 patients (23 percent) who underwent Doppler-guided hemorrhoid artery ligation have returned with recurrent symptoms of bleeding (6 patients) and/or prolapse (6 patients). Four patients with recurrent symptoms were treated by single quadrant hemorrhoidectomy, and the remaining eight underwent Doppler-guided hemorrhoid artery ligation with rectoanal repair.

Conclusion:
Doppler-guided hemorrhoid artery ligation reduces the need for conventional hemorrhoid surgery where rubber band ligation has been unsuccessful.

Dis Colon Rectum 2009; 52: 127-130
Recto Anal Repair (RAR): a viable new treatment option for high-grade hemorrhoids. One year results of a prospective study

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Recto Anal Repair (RAR) is a new, minimally-invasive treatment option for high-grade hemorrhoids which combines HAL (Hemorrhoidal Artery Ligation) and “lifting” of the hemorrhoidal prolapse, known as a mucopexy, in one procedure. Our prospective study evaluates both the early and long-term clinical outcomes of this procedure. 83 patients (43% female, 57% male, mean age 56 years (range 20-83)) with high-grade hemorrhoids (90% grade III, 10% grade IV) were treated using the RAR technique (equipment: A.M.I. GmbH, Austria) by the same surgeon in two different hospitals. Follow-up was carried out at 1 week, and then at 1, 3, 6 and 12 months, whereby clinically relevant parameters such as hemorrhoidal symptoms and re-prolapse were recorded and the spatial distribution of treated arteries analysed.

Results:
The number of patients showing relief of hemorrhoidal symptoms at 12-month follow-up was high. Bleeding was resolved in 89% of the patients, itching in 95%, burning in 100% and soiling in 100%. The recurrence of prolapse at 12 months was low, with no re-prolapse being recorded in 89% of the patients. Patient satisfaction was consistently high (>90%) at all follow-up intervals and the complication rate was low. In addition, data indicated that course of the branches of the superior rectal artery (SRA) into the corpus cavernosum recti (CCR) is unpredictable and varies considerably from patient to patient. Recto Anal Repair not only has several perioperative advantages – minimally-invasive surgery, low pain levels and no major complications – but also offers prolonged relief for all hemorrhoidal symptoms and for reprolapse. RAR is an effective form of treatment for high-grade hemorrhoids.

Pelviperineology 2009; 28: 37-42

Read the full publication here:
Doppler-Guided Haemorrhoidal Artery Ligation (DGHAL), Rectoanal Repair (RAR), Sutured Haemorrhoidopexy (SHP) and Minimal Mucocutaneous Excision (MMCE) for Grade III-IV Haemorrhoids: A Multicenter Prospective Study of Safety and Efficacy

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Objective: The isolated use of Doppler-guided haemorrhoidal artery ligation (DGHAL) may fail for advanced haemorrhoids (HR) (grades III, IV). Suture haemorrhoidopexy (SHP) and mucopexy by rectoanal repair (RAR) result in haemorrhoidal lifting and fixation. A prospective evaluation was performed to evaluate the results of DGHAL combined with adjunctive procedures.

Methods: The study included 147 patients with haemorrhoids (males:102; grade III:95, IV:52) presenting with bleeding (73%) and prolapse (62%).

Results: More ligations were required for grade IV than III haemorrhoids (10.7+2.8 vs 8.6+2.2, p<0.001). SHP (28 patients) and RAR (18 patients) at 1-4 positions were deemed necessary in 46 (31%) patients. Minimal (muco) cutaneous excision (MMCE) was added in 23 patients. SHP/RAR were applied more frequently in Grade IV HR (60% vs 16%, p<0.001). In patients not having MMCE, SHP/RAR were added in 57% of grade IV cases (p<0.001). Complications included residual prolapse (10; 2 second surgery), bleeding (15; 2 second DGHAL), thrombosis (4), fissure (3) and fistula (1). No analgesia was required by 30%, 31%, 16%, 14% of the patients on days 1-3, 4-7 and >7 respectively. SHP/RAR was associated with greater discomfort (17% vs 6%, p<0.001). No differences were found between SHP and RAR. At an average follow-up of 15 months, 96% of patients were asymptomatic and 95% were satisfied.

Conclusions: DGHAL with the selective application of SHP/RAR is a safe and effective technique for advanced grade haemorrhoids.

Colorectal Dis 2010; 12: 125-134
Modern surgical management of haemorrhoids

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Haemorrhoidal disease is one of the commonest anorectal disorders. Treatment options are dependent upon the severity of symptoms and the extent of haemorrhoidal prolapse with up to 10% of patients requiring surgical intervention. The traditional surgical treatment for haemorrhoids is excisional haemorrhoidectomy. The Milligan Morgan technique, first described in 1937, is the most popular technique and remains the gold standard for surgical intervention. However haemorrhoidectomy is recognised as a painful procedure with a risk of significant complications and remains unpopular with the general population. Using advances in medical equipment and an understanding of the pathophysiology of haemorrhoidal disease new approaches to the surgical treatment of haemorrhoids have now been developed. Stapled haemorrhoidopexy reduces haemorrhoidal tissue prolapse by excising a ring of the prolapsed anal mucosa above the dentate line, using a specific circular stapling device. Haemorrhoidal artery ligation (HAL) uses a Doppler transducer to identify haemorrhoidal arteries which can then be ligated, reducing haemorrhoidal venous plexus pressures and haemorrhoidal artery ligation with recto anal repair (HAL-RAR) combines HAL with a procedure to plicate and draw up prolapsing haemorrhoidal tissue. This article reviews the evidence for the different surgical techniques; focussing on treatment outcomes including rates of recurrent disease and post operative complications.

Pelviperineology 2008; 27: 139-142

Read the full publication here:
Doppler-guided recto-anal repair: A new minimally invasive treatment of hemorrhoidal disease of all grades according to Scheyer and Arnold

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We have performed hemorrhoidal artery ligation at our department since 2000 and have further refined this technique through the introduction of Doppler-guided recto-anal repair (DG-RAR), a combination of hemorrhoidal artery ligation and a new procedure that we developed and have called transanal rectal mucopexy. DG-RAR allows us to perform both hemorrhoidal artery ligation and mucopexy according to the anopexy technique, while still avoiding the dentate line. For this purpose, the hemorrhoidal artery ligation proctoscope was adapted and provided with a slotted window, which is primarily closed during hemorrhoidal artery ligation. A protecting cylinder gradually opens the slotted window from proximal to distal and enables the surgeon to place a continuous longitudinal suture in the lower third of the rectum (transanal rectal mucopexy). This continuous suture can be placed repeatedly according to the extent and number of prolapsing piles. Hemorrhoidal artery ligation is performed as a first step in order to ligate, if possible, all of the detectable artery pulsations. In the case of existing prolapses in grade III and grade IV patients (according to the maximum point of prolapse), the proctoscope as described above is used in a second step. It is, however, inserted through the anal canal in mucopexy position so that a continuous suture can be placed, starting approximately at 5 cm proximal to the dentate line and finishing shortly before it. Patients are operated in lithotomy position following presurgery preparation either on an outpatient basis or in hospital. The rectum is emptied at least one hour preoperatively. Once the patient has received local anesthesia and sedation, the sphincter is gently dilated up to a width of two fingers using a generous amount of Xylocain Gel®. After the procedure the proctoscope is removed completely and the patient is given an analgesic in the case of postoperative pain. While Doppler-guided hemorrhoidal artery ligation leads to a reduction of the blood flow and shrinkage of hemorrhoidal cushions, transanal rectal mucopexy results in a lifting of the hemorrhoidal plexus and its fixation in the anatomically correct region. With a success rate of over 90% in our first 72 DG-RAR procedures and a high patient satisfaction rate, this minimally invasive treatment of hemorrhoidal diseases of all grades allows, in most cases, for the restoration of the normal anatomy and substantially reduced patient pain.

Gastroentérologie Clinique et Biologique (2008) 32, 664
Haemorrhoidal disease is one of the most common diseases of the anal region, and 10% of patients require surgical intervention. We have performed haemorrhoidal artery ligation (HAL) at our department since 2000 and have further refined this technique through the introduction of Doppler guided recto-anal repair (RAR), a combination of HAL and transanal rectal mucopexy (TRM).

From January 2000 to July 2006, we performed HAL in 623 patients. Our results show a good success rate for haemorrhoidal treatment with high patient comfort in patients with grade II, grade III, and grade IV haemorrhoids. A recurring prolapse rate of 13% in grade III patients and a far too high rate of almost 60% in grade IV patients were, however, not satisfactory. Based on our own experience and references in the literature we developed RAR, a combination of Doppler guided HAL and TRM. A proctoscope, specially designed for this purpose, enables a standardised application of HAL and the use of continuous sutures for narrowing the prolapse. While Doppler guided HAL leads to a reduction of the blood flow and shrinkage of haemorrhoidal cushions, TRM results in a lifting of the prolapse. On the whole, this technique allows for the restoration of the normal anatomy through minimally invasive surgery with substantially reduced patient pain.

We report our first 72 Doppler guided RAR procedures. Our results show that this new minimally invasive procedure for the treatment of haemorrhoids of all grades achieves high patient satisfaction and a success rate of over 90%.

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Doppler-guided haemorrhoidal artery ligation: long-term outcome and patient satisfaction

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Objective:
Conventional Milligan–Morgan haemorrhoidectomy is associated with significant pain and potentially hazardous complications. Doppler-Guided Haemorrhoidal Artery Ligation (DGHAL) may offer a lower risk, pain-free alternative. We present our early and long-term outcome experience with DGHAL, combined with patient views and satisfaction with the procedure.

Method:
One hundred and thirteen DGHALs were performed over a 13 month period by two surgeons in a single centre. Patients graded the severity of postoperative pain on visual-analogue scales. Clinical follow-up was at 6 weeks (n = 103), with long-term follow-up (n = 90) by postal questionnaire at median of 30 months.

Results:
Seven out of one hundred and three (6%) patients reported postoperative discomfort requiring analgesia. Ninety-three out of one hundred and three (90%) patients reported complete relief or significant improvement in their symptoms at 6 weeks, dropping to 77/90 (86%) at 30 months. Anal fissures developed in 2/103 (2%) patients, both treated with Diltiazem ointment. Further surgery was required in 8/90 (9%) patients. Eighty-two out of ninety (91%) patients said they would undergo DGHAL again.

Conclusion:
DGHAL is a relatively painless, safe, and effective procedure for symptomatic stage I–III haemorrhoids, for which we have demonstrated long-term durability and acceptability. Its role lies between office based procedures and more invasive operative interventions.

Colorectal Disease, 11, 394–400
Transanal doppler-guided hemorrhoidal artery ligation / recto anal repair (HAL-RAR®) for treatment of Grade 3-4 hemorrhoids: a new mini-invasive technology

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Postoperative pain is the main adverse effect of formal hemorrhoidectomy. RAR (Recto Anal Repair) - a new technique based on HAL - Doppler-guided Hemorrhoidal Artery Ligation of the terminal branches of the su-perior hemorrhoidal artery combined with TRM (Transanal Rectal Mucopexy) - is presented as an alternative to hemorrhoidectomy.

Methods:
This non-controlled, prospective study includes 85 patients (male: 57, female: 28, mean age: 44 years) treated for Grade III-IV hemorrhoids. By means of a special new modified proctoscope, the arteries leading to the hemorrhoidal cushions were located in the pain-free area of the rectum above the dentate line and ligated under Doppler guidance. A transanal rectal mucopexy was then performed to lift and secure the hemorrhoidal prolapse back in place.

Results:
Time of operation ranged from 24 to 45 minutes (32±5.21). Postoperative discomfort was measured with a visual analog scale (1-10) and resulted in a mean score of 33.2 ± 0.52 mm (range: 2.1-4.8 mm) on the first day, and a mean score of 16.5 ± 0.10 mm (range: 0-4.0 mm) over five days. Patients were examined at intervals of 6, 8 and 12 months thereafter. The mean follow-up was 10 months (range: 6-12). Bleeding re-solved in 82 patients (96.5 percent), prolapse in 78 patients (91.8 percent). The complication rate was low.

Conclusion:
RAR (Recto Anal Repair) - a combination of Doppler-guided ligation of the hemorrhoidal arteries (HAL) with transanal rectal mucopexy (TRM) - is a safe and effective alternative to hemorrhoidectomy, and associated with minimal discomfort and a low risk of complications.

Pelviperineology 2008; 27: 151-155

Read the full publication here:
Doppler-Guided Hemorrhoidal Artery Ligation for the Treatment of Symptomatic Hemorrhoids: Early and Three-Year Follow-up Results in 100 Consecutive Patients

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Purpose:
Doppler-guided ligation of the hemorrhoidal arteries was described as an alternative to hemorrhoidectomy. The authors report their experience with this procedure.

Methods:
From 2002 to 2004, 100 consecutive patients underwent hemorrhoidal artery ligation procedure for symptomatic hemorrhoids and were reviewed at one month and at three years.

Results:
There were 54 females. Seventy-eight patients had Grade III hemorrhoids. Eighteen patients had previously been treated for the disease. The mean operative time was 28 minutes. On average, 8.4 ligatures were placed. Seventy-nine patients were discharged the same day. Six patients presented with early complication: isolated pain in one, pain and bleeding in three, isolated bleeding in one, and obstructed defecation in one. Late complications occurred in six patients: anal pain in one, fissure in two, and thrombosis of residual hemorrhoids in three. Twelve patients presented with a recurrence at a mean delay of 12.6 months, which was treated by repeat hemorrhoidal artery ligation (n=1), hemorrhoidopexy (n=7), and hemorrhoidectomy (n=4).

Conclusions:
Hemorrhoidal artery ligation procedure is safe, easy to perform, and should be considered as an alternative for the treatment of symptomatic hemorrhoids, even with a recurrence rate of 12 percent, which can be treated by the same technique or another.

Dis Colon Rectum 2008 51: 945–949
5 Years of HAL: Experience and Long-Term Results.  
A Prospective Study

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Background and Purpose:
In recent years, hemorrhoidal artery ligation (HAL) has been part of the therapeutic spectrum of hemorrhoids. Its importance is discussed controversially. The objective of this long-term study was to evaluate compiled results and compare them to other therapeutic options.

Patients and Methods:
556 HALs on hemorrhoids of stages I–III were performed from September 1, 2001 to January 31, 2007. The results of 200 patients monitored prospectively for 5 years are reported. Data collection took place as follows: by a follow-up examination after 6 months as well as questionnaires and, partly, examinations after 2 and 5 years.

Results:
Results obviously depend on time and stage of the disease. The primary success rate was 80.5% after 6 months (stage I: 92.8%; stage II: 81.6%; stage III: 52.5%), 79% after 2 years (stage I: 90%; stage II: 81.6%; stage III: 52.5%), and 73.5% after 5 years (stage I: 84.5%; stage II: 80.3%; stage III: 40%). In 26.5% complaints remained unchanged or required an operative procedure (stage I: 15.5%; stage II: 19.7%; stage III: 60%).

Conclusion:
HLA is superior to sclerotherapy in stage I and more effective than rubber band ligation in stage II regarding the success rate as well as the relapse rate. HLA is only the therapy of second choice in stage III. Relative contraindications to HLA are a bold funnel-shaped anus, an overlong anal channel, and a broad-based hemorrhoidal area.
Treatment of Grade 2 and 3 Hemorrhoids with Doppler-guided Hemorrhoidal Artery Ligation


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Aim:
We evaluated the results of the Doppler-guided hemorrhoidal arterial ligation (DG-HAL) in the management of symptomatic grade 2 and 3 hemorrhoids.

Patients and Methods:
Between June 2005 and March 2006, 110 consecutive patients with symptomatic grade 2 and 3 hemorrhoids according to the DG-HAL method were treated. All procedures were performed in daycare under spinal anesthesia. The primary objective was the reduction in hemorrhoidal gradation as determined by proctoscopy; the secondary was patient satisfaction. This was measured by interviewing patients over the telephone.

Results: The average age was 47.6 years. 42 patients had grade 2 hemorrhoids, 68 grade 3. An average of 7.3 ligations were placed. Proctoscopy showed that, after 6 weeks, 97 (88%) patients had a significant improvement in their hemorrhoidal gradation. After an average follow-up of 37 weeks, 93 of the 110 (84.5%) patients were satisfied with the postoperative result. Mortality was 0% and morbidity 3%.

Conclusion: DG-HAL is a safe and effective treatment in the management of symptomatic grade 2 and 3 hemorrhoids.

Dig Surg 2007;24:436-440
Two-center experience in the treatment of hemorrhoidal disease using Doppler-guided hemorrhoidal artery ligation: functional results after 1-year follow-up


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Introduction:
Doppler-guided hemorrhoidal artery ligation (DGHAL), as a method of treating hemorrhoidal disease, is currently used in many centers across Europe, Asia, and Australia. The aim of our study was to evaluate the clinical effectiveness and functional results of DGHAL as estimated by means of anorectal manometry.

Materials and methods:
Between 2000 and 2006 the DGHAL procedure was performed on 507 patients with II–IV degree hemorrhoids in two centers (Poland and Austria). Three hundred eight patients were included in the initial phase of the study, designed to estimate the method's effectiveness. During the second phase (199 patients) selected functional results were also assessed. Patients were classified as having grade II (144), III (319), and IV (44) hemorrhoids.

Results:
There were no intra- and immediate postoperative complications. Good results were reported by 351 patients (69.2%), and were acceptable in a further 75 cases (4.8%). When the patients were grouped according to the stage of hemorrhoidal disease, 133 out of 144 patients (92.4%) with grade II and 272 out of 324 (84%) with grade III had very good or good results. Only 18 out of 44 patients (41%) with grade IV were satisfied with the operation. Fifty-nine patients after anorectal folds, fissure or anal canal polyp excision required analgesics for 1–2 days. Apart from lower contraction amplitude and contraction speed after 1 month there were no differences in anorectal functional tests.

Conclusion:
Based on our results we may conclude that DGHAL is a safe and effective method and may offer an important alternative to operative hemorrhoidectomy with no risk of postoperative stool incontinence, minimal postoperative pain, and early return of patients to their normal activities. Nevertheless, this is a fairly new procedure with a short-term follow-up. Until 5-year observations of large, multicenter, randomized trials are published we cannot recommend this method as a gold-standard procedure, although it still can offer significant benefits to patients.

Doppler-guided hemorrhoidal artery ligation

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Background:
In 1995, Morinaga [1] reported a new technique for the treatment of hemorrhoids, hemorrhoidal artery ligation (HAL), which uses a specially designed proctoscope coupled with a Doppler transducer for identification and ligation of hemorrhoidal arteries.

Methods:
Because the arteries carrying the blood inflow are ligated, internal pressure of the plexus hemorrhoidalis is decreased.

Results:
We report the results of the first 308 patients (189 male and 119 female: median age 50.1 years) who have been treated at our department since 2002 and followed-up for a median period of 18 months. Eighty-nine patients had grade II, 192 patients had grade III, and 27 patients had grade IV hemorrhoids. The acute symptoms of hemorrhoids were treated immediately by performing HAL.

Conclusions:
Our study showed that HAL is painless, effective, and has a low rate of complications. It can be applied in an outpatient setting and is a good alternative to all other hemorrhoid treatment methods.

Purpose:
This study was designed to examine the benefits of a Doppler-guided hemorrhoidal artery ligation technique in terms of surgical outcome, functional recovery, and postoperative pain.

Methods:
Using local, regional, or general anesthesia, 100 patients with symptomatic Grades II or III hemorrhoids underwent sonographic identification and suture ligation of six to eight terminal branches of the superior rectal artery above the dentate line. Visual Analog Scales were used for postoperative pain scoring. Surgical and functional outcomes were assessed at 6 weeks and 3, 6, and 12 months after surgery.

Results:
There were 42 (42 percent) males and 58 (58 percent) females (mean age, 42 years; median duration of symptoms, 6.3 years). The mean operative time was 19 minutes. Local anal block combined with intravenous sedation (n = 93) or general or spinal (n = 7) anesthesia was used. Only five were hospitalized overnight. There was no urinary retention, bleeding, or mortality in the immediate postoperative course. The mean pain score decreased from 2.1 at two hours postoperative to 1.3 on the first postoperative day. All patients had a complete functional recovery by the third postoperative day. Ninety-four patients remained asymptomatic after a mean follow-up of six months; four patients required additional surgical excision, and two required rubber band ligations for persistent bleeding. On follow-up, there was no report of incontinence to gas or feces, fecal impaction, or persistent pain.

Conclusions:
Our experience indicates that Doppler-guided hemorrhoidal artery ligation is safe and effective and can be performed as an outpatient procedure with local or regional anesthesia and with minimal postoperative pain and early recovery.
Purpose:
Postoperative pain is the main adverse effect of formal hemorrhoidectomy. A new technique based on Doppler-guided ligation of the terminal branches of the superior hemorrhoidal artery was introduced in 1995 as an alternative to hemorrhoidectomy. The authors report a preliminary experience with this procedure.

Methods:
The Doppler-guided hemorrhoidal artery ligation technique uses a special proctoscope bearing a Doppler transducer that allows identification and suture ligation of the hemorrhoidal arteries. Sixty-eight consecutive patients (mean age, 48 years; range, 21–74 years) with Grade 3 hemorrhoids were treated.

Results:
Intraoperative discomfort was measured by a visual analog scale (1–10) and resulted in a mean score of 2.3 (range, 1.3–2.8). Only 38 percent of patients required postoperative analgesia. Patients were examined at 1 week, 1 month, and 3 months and every 6 months thereafter. The mean follow-up was 11 (range, 3–18) months. Bleeding resolved in 91 percent of patients, pain in 73 percent, and prolapse in 94 percent. Complications were recorded in five patients and included persistent pain for more than two days in two patients (3 percent), swelling and thrombosis of one of the hemorrhoids in two patients (3 percent), and a secondary hemorrhage in one patient (1.5 percent).

Conclusion:
Doppler-guided ligation of the hemorrhoidal artery is a safe and effective alternative to hemorrhoidectomy and is associated with minimal discomfort and low risk of complications.

Dis Colon Rectum 2005; 48: 2090–2093
Comparison of early and 1-year follow-up results of conventional hemorrhoidectomy and hemorrhoid artery ligation: a randomized study

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Background and aims:
Doppler-guided hemorrhoid artery ligation is a new approach for treating hemorrhoids. Early and 1-year follow-up results of the procedure are presented and compared with those of closed scissors hemorrhoidectomy in a prospective randomized study.

Patients and methods:
Sixty consecutively recruited patients were randomized into two groups; group A (n=30) was treated with standardized closed scissors hemorrhoidectomy and group B (n=30) with Doppler-guided hemorrhoid artery ligation. The follow-up period was 11.7±4.6 months.

Results:
The average need for minor analgesics was 11.7±12.6 doses in group A and 2.9±7.7 in group B. Patients in group A spent 62.9±29.0 hours in hospital postoperatively and those in group B 19.8±41.8 hours. Return to normal daily activities took 24.9±24.5 days in group A and 3.0±5.5 days in group B. Neither the disappearance (26 vs. 25 patients) nor the recurrence of preoperative symptoms (5 vs. 6 patients) differed significantly between the two groups.

Conclusion:
Both procedures were effective in treating hemorrhoids. The 1-year results of Doppler-guided hemorrhoid artery ligation do not differ from those of closed scissors hemorrhoidectomy. Doppler-guided hemorrhoid artery ligation seems to be ideal for 1-day surgery, and it fulfills the requirements of minimally invasive surgery.

Results (Short- and Medium-Term) after Doppler-Guided Hemorrhoid Artery Ligation (HAL)

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Background:
Hemorrhoid Artery Ligation (HAL) is a new method to treat 1º and 2º hemorrhoids. Using a Doppler transducer hemorrhoidal arteries, that feed the hemorrhoidal cushions are identified and ligated.

Patients and Methods:
In the years of 2000 and 2001 133 patients (71 males, average age 49 years) were operated (51 with iv-sedation or anesthesia, 82 without). In the beginning patients who failed to react to other forms of therapy were included (pre-treatment: sclerosing therapy 29, rubber bands 50, stapled hemorrhoidectomy seven, other forms twelve, HAL in three patients). Most of the times three arteries could be identified and ligated. Complications (bleeding, pain, anal urge, submucosal hematoma) in ten patients.

Results:
More than 80% of the patients were satisfied (no or only minor problems) 6–12 weeks after operation. Follow-up 6 months or more after the operation showed, that only 61% of the patients were still satisfied.

Conclusions:
Preliminary experience with HAL shows, that it is simple method (both for patient and surgeon) to treat hemorrhoids and it has few complications. HAL is an alternative to other methods to treat hemorrhoids, if these cannot be performed. The effect after HAL is not instantaneously, but with some lag.

coloproctology 2003;25:146–53

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In 1995, Morinaga et al. (Japan) reported on a new technique in the treatment of hemorrhoids. We report the results of our first 105 patients thus treated. By a specially designed proctoscope coupled with a Doppler transducer, the hemorrhoidal arteries are looked for and ligated. All stages of hemorrhoid [sic] were treated. This method is painless, successful, and has a low rate of complications. It is for outpatients and is an alternative to all other methods in the treatment of hemorrhoids.

Chirug 2002. 73:269-273
A Novel Therapy for Internal Hemorrhoids: Ligation of the Hemorrhoidal Artery with a Newly Devised Instrument (Moricorn) in Conjunction with a Doppler Flowmeter

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Objectives:
To assess the usefulness of hemorrhoidal artery ligation (HAL) for internal hemorrhoids with a newly devised instrument (the Moricorn).

Methods:
We devised a new instrument (the Moricorn) that is used in conjunction with a Doppler flowmeter. This instrument allows for easy and safe ligation of the hemorrhoidal artery. HAL with the Moricorn was performed on 116 patients with internal hemorrhoids who had episodes of anal pain, bleeding, and prolapse. One month after treatment, the effect was evaluated on the basis of improvement of symptoms and the shrinkage of hemorrhoidal tissue.

Results:
The treatment's effect was observed in 50 of 52 patients (96%) with pain, 50 of 64 (78%) with prolapse and 92 of 96 (95%) with bleeding. No patient required anesthesia throughout the entire procedure. No major complications were encountered with this treatment.

Conclusions:
HAL with the Moricorn is a simple, safe and effective method. However, further observations predicated on a longer follow-up, a larger number of patients, and comparisons with other conventional treatments are called for.

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