

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, 17–84) 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 anorectomy. After a median follow-up of 18 (range, 6–33) 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.

KEY WORDS: Hemorrhoids; Rubber band ligation; Doppler-guided hemorrhoid artery ligation; Doppler-guided hemorrhoid artery ligation with rectoanal repair; Hemorrhoidectomy.

The majority of patients with symptomatic hemorrhoids are treated by dietary modification, fiber supplements combined with injection sclerotherapy, or rubber band ligation because of low complication rates and the feasibility of outpatient treatment. If these measures fail, then surgery in the absence of any contraindications may be offered. Surgery continues to have a small risk of morbidity, most commonly postoperative pain as well as less common but more serious risks of bleeding, anal sphincter injury, stenosis, or sepsis.

Doppler-guided hemorrhoid ligation (DGHAL) represents a minimally invasive, relatively painless method to surgically treat hemorrhoids with reported low morbidity and satisfactory short-term outcomes.^{1–6} The recent development of DGHAL with rectoanal repair (DGHAL-RAR) in 2006 has allowed patients with more significant elements of reducible hemorrhoidal prolapse to undergo similarly minimally invasive surgery. The majority of patients who undergo DGHAL or DGHAL-RAR still require general anesthesia or regional block. It is likely for the present time that DGHAL and DGHAL-RAR represent an intermediary option between clinic-based treatment and formal excisional surgery. The technique potentially offers a safe bridge between office-based procedures, such as injection sclerotherapy or rubber band ligation, and more invasive surgical procedures, such as conventional hemorrhoidectomy or stapled anorectomy.

This study was designed to assess the value of DGHAL and DGHAL-RAR as methods of treating patients with symptomatic second- or third-degree hemorrhoids in which rubber band ligation has been unsuccessful. Additionally, the extent of any subsequent

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hemorrhoidectomy required where DGHAL/DGHAL-RAR have failed was analyzed.

PATIENTS AND METHODS

A total of 203 patients presenting to one surgeon (RF) at the West Berkshire Community Hospital, Thatcham or the Capio Hospital, Reading, with symptomatic Grades 2 or 3 hemorrhoids treated by suction rubber band ligation between September 2004 and June 2007 are reported. Each patient was assessed by rigid sigmoidoscopy and proctoscopy by the senior author. Hemorrhoids were staged by using the Goligher classification: Grade 1 (no prolapse), Grade 2 (prolapse on straining, spontaneous reduction), Grade 3 (prolapse, manual reduction required), or Grade 4 (prolapse, reduction impossible).⁷ Colonoscopy, barium enema, or flexible sigmoidoscopy also was subsequently performed where appropriate, based on patient age, their presenting symptoms, and any relevant family history.

Patients had their age at presentation, sex, presenting symptoms (bleeding, prolapse, bleeding and prolapse, pruritus ani with bleeding), number of rubber band ligations per clinic attendance, and the number of clinic attendances recorded. Fifty-two patients who underwent subsequent DGHAL surgery had the number and grade of hemorrhoids found at surgery, the number of vessel ligations required, and the length of surgery noted. A postoperative review three months after surgery by the senior author recorded any residual symptoms combined with proctoscopic inspection of the anal canal. The difference in the grade of hemorrhoidal tissue present was assessed statistically using the Wilcoxon's rank-sum test using SPSS® software package version 12 (SPSS Inc., Chicago, IL). Details of any subsequent clinic-based or surgical treatments for these patients were recorded.

DGHAL and DGHAL-RAR Operative Techniques

All patients were scheduled as day-case procedures. No bowel preparation or antibiotics were prescribed. Patients were anesthetized by total intravenous anesthesia using propofol and remifentanyl and underwent anesthetic monitoring. All patients were positioned in lithotomy.

Plain gel was placed on a PS02™ proctoscope (KMed, London, United Kingdom), which was then attached to a Doppler probe and light source. The probe was inserted transanally and slowly turned until a typical Doppler sound flow could be heard. The identified arteries were individually ligated using 3/0 Vicryl on a 26 mm curved tapered needle at a distance of 3 to 4 cm proximal to the dentate line through a window in the side of the Doppler ultrasound proctoscope. Each signal was ligated by using a figure-of-eight configuration, and loss of audible signal was used to confirm satisfactory vessel

ablation. Two additional sutures were then placed at each site to “pexy” the ligation site, allowing fixation of prolapsing hemorrhoids to their normal anatomic positions. The Doppler proctoscope was gently turned through the full circumference of the anal canal so that the procedure of suture ligation could be repeated for each detected flow signal. Each procedure typically involved a median of 7 (range, 6–14) vessel ligations and lasted approximately 20 (range, 12–24) minutes.

Patients who subsequently represented with continued symptoms of bleeding and prolapse after DGHAL underwent DGHAL with rectoanal repair (DGHAL-RAR). This technique uses a wider Doppler ultrasound proctoscope (CJ Medical, Bucks, United Kingdom) with a larger aperture window at the apex of the proctoscope, allowing a mucopexy to be performed as part of the vessel ligation process. The mucopexy consisted of a continuous 3/0 Vicryl suture incorporating vessel ligation based on Doppler signal and continuing cephalad away from the dentate line, typically consisting of four to six bites of mucosa and submucosa.

RESULTS

A total of 391 patients with symptomatic hemorrhoids were assessed by the senior author between September 2004 and June 2007: 148 had Grade 1 hemorrhoids treated by dietary modification and phenol injections; 21 patients had Grades 3 or 4 hemorrhoids with symptomatic anal tags treated by Milligan-Morgan hemorrhoidectomy; 19 with circumferential hemorrhoidal prolapse underwent stapled anopexy. These 188 patients have not been included in this study.

Two hundred three patients (121 women; mean age, 44 (range, 17–84) years) with Grade 2 (174 patients) or Grade 3 (29 patients) hemorrhoids were treated initially by rubber band ligation and fiber supplementation, 181 patients (89 percent) had two rubber band ligations per clinic attendance, and 22 (11 percent) had three hemorrhoids banded per clinic attendance. All were given three monthly follow-up appointments to reassess for persistent symptoms or symptom resolution.

Fifty-four of 203 patients (26 percent) with Grade 2 (38 patients) or Grade 3 (16 patients) hemorrhoids treated by serial rubber band ligation in this way suffered continued symptoms of bleeding or bleeding with prolapse. All had undergone rubber band ligation in two or three positions per clinic attendance, and each was treated at three monthly intervals on three separate occasions before a decision to offer surgery was undertaken.

Fifty-two (19 women; median age, 51 (range, 27–79) years) of the 54 patients with persistent symptoms of bleeding and/or prolapse were treated by DGHAL. One

of these 52 patients additionally had an anal skin tag excised. Two other patients with Grade 3 hemorrhoids requested stapled anopexy after discussing the available treatment options. All 52 patients treated by DGHAL were treated as day cases with no readmissions or postoperative morbidity.

At three-month follow-up, two patients were symptomatic with prolapse. Both had a single residual Grade 3 hemorrhoid and subsequently underwent single quadrant hemorrhoidectomy.

Of the remaining 50 patients who were asymptomatic three months after DGHAL, 18 (36 percent) had no residual hemorrhoids, 19 (38 percent) had Grade 1 residual hemorrhoids, 11 (22 percent) had Grade 2 hemorrhoids, and 2 (4 percent) had Grade 3 hemorrhoids ($P < 0.001$, Wilcoxon's rank-sum test).

After a median follow-up of 18 (range, 6–39) months, 10 of 50 patients (20 percent) who were asymptomatic three months after DGHAL reattended clinic with recurrent symptoms of bleeding (6 patients) and/or prolapse (4 patients). Of these, two underwent a single quadrant hemorrhoidectomy and the remaining eight underwent a DGHAL with rectoanal repair (DGHAL-RAR). Subsequent clinic assessment three months after surgery has found satisfactory resolution of symptoms in all but one patient, who is awaiting single quadrant hemorrhoidectomy.

During the study period, 47 of 149 patients who had undergone rubber band ligation of their hemorrhoids and were subsequently discharged reattended with further hemorrhoidal symptoms. All underwent repeat rubber band ligation without further intervention.

DISCUSSION

A previous meta-analysis of 18 prospective, randomized trials of office-based hemorrhoidal treatments found rubber band ligation to be the most effective.⁷ Bayer *et al.* reported their 12 year experience of treating hemorrhoids by rubber band ligation and showed a 79 percent cure rate in 2,934 patients.⁸ Relapse after rubber band ligation is common; between 17 and 86 percent of patients seeking retreatment.^{7–9} Because treatment failures are frequent, with repeated visits to the outpatient clinic a common experience, patients whose hemorrhoids do not settle after rubber band ligation often are offered day-case hemorrhoidectomy.

Retreatment after conventional surgical treatment of hemorrhoids is less common.⁹ Hemorrhoidectomy is more painful compared with rubber band ligation.⁹ Postoperative pain after hemorrhoidectomy is a common cause of anxiety for patients. There are additionally other more serious but less common complications, such as anal canal stenosis or incontinence.^{10,11}

At present most DGHALs are still performed under regional or general anesthesia, making it an intermediary option between clinic-based and surgical options for the treatment of symptomatic hemorrhoids. Earlier studies have described use of DGHAL in which rubber band ligation has been used in a minority of patients usually on one occasion.^{2–5} With increasing experience, it is foreseeable that the procedure could be performed in an outpatient setting using anesthetic gel or local anesthetic where rubber band ligation has failed. The recent development of DGHAL-RAR offers an additional option for the treatment of significant prolapse. Previous reports have found that DGHAL causes little postoperative pain with a small risk of postoperative perianal hematoma or anal fissure.^{1–6}

In this study, 52 of 54 patients with symptomatic hemorrhoids who had failed rubber band ligation were treated by DGHAL. Two others opted for stapled anopexy. These patients would previously have been offered day-case Milligan-Morgan hemorrhoidectomy. Forty remain asymptomatic after their DGHAL with a median of 18-month follow-up.

Four patients who had a DGHAL with persistent or recurrent postoperative symptoms eventually required hemorrhoidectomy. All underwent single quadrant, rather than more extensive two or three quadrant hemorrhoidectomy described in earlier papers, after DGHAL had failed.^{2–6} These procedures were performed before DGHAL-RAR became available.

Eight other patients with recurrent symptoms of bleeding and prolapse underwent the recently developed DGHAL-RAR procedure. One patient has experienced recurrence of their symptoms and is awaiting a single quadrant hemorrhoidectomy. DGHAL-RAR appears to offer the option as a salvage procedure for those patients who fail DGHAL and should probably be offered as a first-line treatment for those with more extensive prolapse instead of DGHAL alone.

CONCLUSIONS

Therefore, DGHAL and DGHAL-RAR represent minimally invasive surgical options for those patients who have failed rubber band ligation. They offer symptom resolution for the majority combined with no or minimal risk of trauma to the anal canal.

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