

Doppler-guided haemorrhoidal artery ligation with recto anal repair: a new technique for the treatment of symptomatic haemorrhoids

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Abstract

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.

Keywords Haemorrhoids · Rectal bleeding · Prolapse · Haemorrhoidal artery ligation · Recto anal repair

Introduction

Surgery is frequently the treatment of choice for grade III–IV haemorrhoids, grade II haemorrhoids that have failed to respond to non-surgical treatments, and circumferential grade II haemorrhoids [1]. The most widely practised surgical technique is excisional haemorrhoidectomy, using either the “open” Milligan-Morgan or closed Ferguson method [2, 3]. Haemorrhoidectomy is currently considered the gold standard for surgical management but is recognised as a painful procedure with a risk of significant complications and remains unpopular with the general population [4].

Doppler-guided haemorrhoidal artery ligation (DGHAL) is a relatively new surgical technique for the treatment of haemorrhoids. First described by Morinaga in 1995 [5], it uses a specially designed proctoscope coupled with a Doppler transducer for identification and ligation of haemorrhoidal arteries [6]. Ligation of these arteries disrupts the inflow of blood to the haemorrhoidal venous plexuses and subsequently results in cessation of haemorrhoidal bleeding and shrinkage of haemorrhoidal tissue [5]. To date, studies have demonstrated the technique to be well tolerated [7], to be relatively painless, have reduced complication rates [8], and to be effective in the treatment of symptoms of bleeding and pruritus [5]. However, improvement in symptoms of prolapse may not be durable [6, 9].

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In order to resolve the problem of symptomatic redundant haemorrhoidal tissue remaining following DGHAL, the technique was modified at the end of 2005 to additionally include recto anal repair (DGHAL–RAR). The principle is to apply mucopexy sutures above prolapsing haemorrhoidal pedicles. The DGHAL proctoscope was redesigned to enable conventional arterial ligation as well as to facilitate simple insertion of the mucopexy sutures.

Our institution has demonstrated that this combined DGHAL–RAR procedure can be successfully used to treat recurrent symptoms post-primary DGHAL, and it was stated that it should probably be offered as a first-line treatment for those with more extensive prolapse instead of DGHAL alone [10]. This study reports an early series in which all patients were initially treated with DGHAL–RAR. End points are pain, symptomatic recurrence and patient satisfaction, both post-operatively and up to 6 months.

Materials and methods

Between January 2007 and March 2008, 80 consecutive patients underwent DGHAL–RAR treatment at one institution. Indications for surgery were symptomatic haemorrhoids (including bleeding, prolapse, pruritus/discharge, previous thrombosis and pain) where conservative measures (high-fibre diet, laxatives and avoiding straining) had failed and where symptoms persisted following outpatient rubber band ligation or injection sclerotherapy. Haemorrhoids were staged using the Goligher classification system: grade I (no prolapse), grade II (prolapse on straining, spontaneous reduction), grade III (prolapse, manual reduction required) or grade IV (prolapse, reduction impossible) [11]. Patients with circumferential prolapsing haemorrhoids (grade IV), acute thrombosed haemorrhoids or anal sepsis were excluded. The study was approved by the local ethics committee.

Surgery

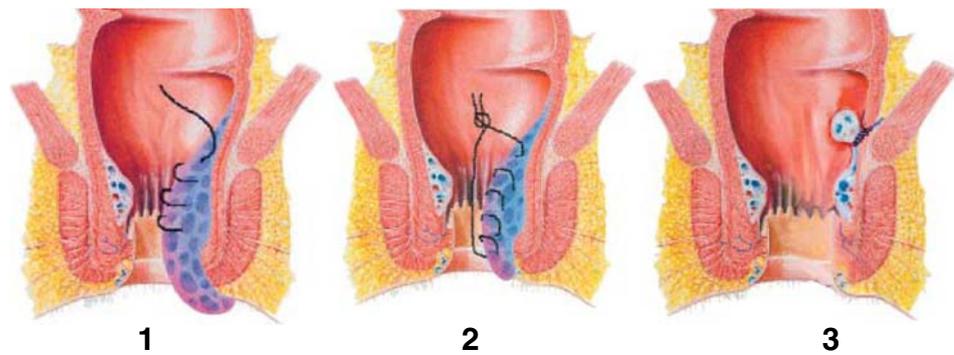
Surgery was performed electively by one surgeon in the recruiting institution as a planned day case procedure. Where appropriate, patients were investigated on surgery with colonoscopy, flexible sigmoidoscopy or barium enema to exclude other causes of symptoms. A uniform protocol of pre- and intra-operative care was applied to all patients. All received a single phosphate enema 2 h prior to surgery with no antibiotic prophylaxis given. Following anaesthetic assessment and discussion with the patient, either general anaesthetic, spinal anaesthesia or patient-controlled sedation was administered.

Patients were placed in the lithotomy position, with iodine-based skin preparation. A modified DGHAL Doppler Ultrasound Proctoscope (CJ Medical, Buckinghamshire, UK; Fig. 1) was introduced into the anal canal. A conventional haemorrhoidal artery ligation was carried out in all cases such that the terminal branches of the superior rectal artery were identified circumferentially under Doppler guidance and transfixed using a 2/0 polyglactin 910 suture on a 5/8 curved tapered needle. RAR was then performed above the identified sites of haemorrhoidal prolapse. This involved a running suture, from proximal to distal, the lowest of three bites being taken just proximal to the dentate line, to limit post-operative pain. Upon tying the two ends of the suture together, prolapsing tissue lifts back up into the anus (Fig. 2). No tissue was excised. Twenty millilitres of 0.5% bupivacaine was infiltrated into the mucopexy sites. Post-operative symptoms and patient satisfaction following the procedure were documented. Pain symptoms were graded using a visual analogue scale (VAS) from 0 to 5 (0 representing no pain–5 very severe pain). Patients were discharged according to our local day case unit criteria.

Data were collected prospectively on all patients undergoing DGHAL–RAR. All patients were reviewed in the outpatient department at 6 weeks. A single investigator, who had not performed the surgery, subsequently reviewed the patients by telephone contact for up to at least 6 months post-surgery. Telephone contact included detailed questioning of current symptom status including any recurrent prolapse. Prolapse severity was determined by identifying its ability to reduce, spontaneously, manually or not at all. Results were recorded as median (range), mean \pm standard deviation (SD) or as a percentage of total number of patients analysed.



Fig. 1 DGHAL–RAR proctoscope

Fig. 2 Recto anal repair

1: Prolapsing haemorrhoidal tissue is transfixated with a continuous running suture, passing the needle 3 times over the haemorrhoid, from proximal to distal.

2: Upon tying the two ends of the suture together the prolapsing tissue is lifted up into the anus.

3: The retracted tissue scars over and integrates back into the anal tissue.

Results

Three patients were excluded from the study due to follow-up of less than 6 months post-surgery. Seventy-seven (49 males) patients were assessed with median age of 50 (mean (SD), 51.35 (13.39)) years. Follow-up ranged from 6 to 21 months with mean (SD) follow-up of 13.21 months. Table 1 demonstrates the presenting symptoms of patients undergoing surgery. Twelve patients had grade II haemorrhoids; 65 patients had grade III haemorrhoids. Fifty-seven (74%) DGHAL–RAR procedures were carried out for symptoms of both prolapse and bleeding.

Surgery

Fifty-three cases were carried out under general anaesthesia, two under spinal anaesthesia and 22 received a combination of sedation and patient-controlled analgesia. Two of the cases carried out under sedation were converted to general anaesthesia due to intra-operative pain. The median (range) number of arterial ligations performed was six (one to nine). The median (range) number of RARs performed was two (one to five). RAR mucopexy sutures were most commonly required above the expected three, seven and 11 o'clock positions. Seventy-four (96.1%) patients were discharged the same day. Two patients stayed overnight, and one patient stayed for 3 days due to continuing pain. Figure 3 demonstrates pre- and post-operative results.

Post-operative follow-up

Immediate post-operative pain occurred in 87% of patients (32% of patients graded pain as 3 or 4, whilst 6% graded

pain as five). Thirty-three percent reported pain persisting 1 week following surgery, 6% of patients at 1 month and none by 6 months. Post-operative rectal bleeding was experienced by 29% of patients post-operatively, but this decreased to 12% by 7 days, 4% after 1 month and 2.6% at 6 months.

Post-operative recurrent symptoms were found in 11 (14.3%) patients (Table 2). One patient went on to have a successful repeat DGHAL–RAR, and one had a stapled haemorrhoidopexy, both at least 6 months post-initial surgery. Five (6.5%) patients complained of recurrent prolapse, four (5.2%) complained of recurrent pain and two (2.6%) complained of recurrent pruritus/discharge symptoms. The other documented complications consisted of anal fissure in eight (10%) patients, post-defaecation bleeding in one patient, transient incontinence in one patient and urinary retention in one patient (Table 2). All patients identified with anal fissures were successfully treated with a 6-week course of topical 2% diltiazem cream. Following treatment, all patients were asymptomatic, and healed fissures were confirmed by clinical examination. Post-defaecation bleeding was treated conservatively following examination at 6 months after the procedure; transient incontinence was also treated conservatively and had resolved within 1 one month of

Table 1 Pre-operative haemorrhoidal symptoms

Symptoms	Patients (%)
Prolapse	63 (81.8)
Bleeding	64 (83.1)
Pruritus/discharge	8 (10.4)
Previous thrombosis	6 (7.8)
Pain	4 (5.2)



Pre operative



Post operative

Fig. 3 Doppler-guided haemorrhoidal artery ligation and recto anal repair results

surgery whilst the patient with urinary retention required catheterisation the day following surgery and successfully completed a trial without catheter 48 h later.

When asked about their overall satisfaction, 6 weeks post-surgery, 65 (84%) patients would recommend the procedure, six (8%) would not recommend it, and six (8%) were neutral.

Discussion

Haemorrhoids are the most common anal condition [6] with approximately 10% of patients requiring surgical intervention due to severity of the disease or failure of conservative treatment [12]. The commonest grading system is based on the extent of tissue prolapse (Goligher's classification (I–IV)) [11] although symptoms also include rectal bleeding, pruritus ani and mucus discharge or faecal leakage [13]. Pain is not characteristic unless there has been thrombosis or strangulation of the haemorrhoid [14]. It should be noted that severity of symptoms do not necessarily correlate with

Table 2 Post-operative symptoms/complications

Symptoms	Patients (%)
Prolapse	5 (6.5)
Bleeding	4 (5.2)
Pruritus/discharge	2 (2.6)
Anal fissure	8 (10.4)
Anal skin tag	3 (3.9)
Transient faecal incontinence	1 (1.3)
Urinary retention	1 (1.3)
Post-defaecation haemorrhage	1 (1.3)

the degree of haemorrhoidal prolapse [15], and in our institution an approach has been adopted whereby symptoms govern the therapeutic decision [16].

Conventional surgical haemorrhoidectomy is based on Frederic Salmon's excision ligation procedure, first described over 100 years ago [17]. Many surgeons carry out a Milligan-Morgan procedure or its diathermy modification [18]. However, these procedures are recognised as painful with a risk of significant complications and remain unpopular with the general population [4]. Stapled haemorrhoidopexy, first described in 1998 by Longo, is an alternative to excisional haemorrhoidectomy [19]. It has been demonstrated to be a less painful procedure, with quicker post-operative recovery and better patient acceptance [20]. However, longer-term follow-up has demonstrated increasing problems of symptom recurrence [21, 22]. Moreover, there have been reports of serious surgical complications including life-threatening pelvic sepsis, rectal occlusion, rectal perforation, massive haemorrhage and staple-line dehiscence [23, 24].

Doppler-guided haemorrhoidal artery ligation is a minimally invasive alternative technique for the surgical treatment of haemorrhoids. It is based on the identification and ligation of the terminal branches of the superior rectal artery using a proctoscope equipped with a Doppler probe [25]. It is easy to perform and learn, associated with less post-operative pain and has been reported to have success rates between 78% and 97% [9, 10, 26]. The largest published study to date (Scheyer et al.) found recurrence rates of 15.6% mainly due to residual prolapse in patients treated for grade IV haemorrhoids [6]. In 2005, a modification to the original DGHAL probe enabled a recto anal repair to be performed in addition to the conventional DGHAL. This involves plication of mucosa above prolapsing pedicles, drawing it back up into the anus where the tissue scars and integrates back into the anal tissue. It was expected that this additional mucopexy would be beneficial in the treatment of prolapse symptoms [10].

Results from this study demonstrate that RAR can successfully be performed in combination with DGHAL. Similar in approach to DGHAL alone, this procedure takes a little longer but is well tolerated and can be performed under sedation as a day case procedure. As the institution's experience grew, the proportion of procedures performed under sedation increased. It is thought that the two patients requiring conversion to general anaesthesia was because suturing of the prolapsed tissue was performed too close to the dentate line. Hospital admission was short with 96% of patients discharged home on the day of procedure.

Previous studies investigating the DGHAL procedure alone [6, 26] found residual protrusion to be the main complication. In this DGHAL–RAR series, recurrent prolapse symptoms were suffered in only 6.5% of patients. This seems to suggest an additional benefit of the RAR procedure although these results must be interpreted with caution in that circumferential prolapsed haemorrhoids were excluded from this study and to date follow-up has been relatively short. However, since the conclusion of this study, the authors have carried out successful DGHAL–RAR procedures on patients with circumferential prolapsed haemorrhoids.

Our institution has previously demonstrated the benefit of using this combined procedure in patients who have had recurrent symptoms post-initial DGHAL therapy [10], and this current study demonstrated that DGHAL–RAR can be repeated with successful results. As when DGHAL is performed alone, it is also possible to switch at any time after DGHAL–RAR to another procedure such as haemorrhoidectomy or stapled haemorrhoidopexy, as was performed for one patient within this group.

Interestingly, 10% of this series developed anal fissures. We hypothesise that this is related to either, or both of, dramatic devascularisation of the anal canal or the slightly greater diameter of the modified proctoscope and its twin-sleeve design. All patients responded to a course of diltiazem cream, and their symptoms subsided a few weeks later. Given the increased surgical intervention, including proctoscope diameter, it is of note that only one patient in this study suffered with transient incontinence after the procedure. However, we accept that a formal scoring of faecal incontinence before and after the procedure would enable a more objective assessment of any impact the HAL–RAR had on continence.

Overall patient satisfaction following DGHAL–RAR was high with 84% of patients stating they would recommend it to a friend or family member with similar symptoms. The results from this study demonstrate that the technique is safe with clear clinical benefits and thus provides justification of its inclusion within a randomised controlled trial to compare outcomes with other treatment modalities. There is a spectrum of haemorrhoidal disease,

and the extent of therapeutic intervention should appropriately correlate to this. It will be necessary to determine where DGHAL–RAR fits within the range of therapeutic armamentarium and what haemorrhoidal disease is most effectively treated.

Conclusion

Modern surgical treatment of haemorrhoids should be guided by patient symptoms. It should treat these symptoms to the patient's satisfaction with low impact on the individual. DGHAL–RAR is a safe and effective minimally invasive technique that can be used for symptomatic haemorrhoids. It can be performed as a day case procedure, under sedation. It is easy to learn, and although more painful than DGHAL alone, is well tolerated with high patient satisfaction rates. The addition of RAR appears to improve the outcome of DGHAL in improving the outcome for patients suffering prolapse as a prominent symptom.

Recurrent symptoms following DGHAL–RAR can be treated by repeat DGHAL–RAR or any other form of therapeutic intervention. However, it is now rarely necessary to perform conventional, painful and potentially dangerous excisional procedures. In the future, more procedures will be carried out under sedation and field block and may ultimately become office-based. Further larger, randomised studies with longer-term follow-up will be necessary to establish the potential benefits of DGHAL–RAR compared to DGHAL and other surgical techniques and to demonstrate its durability.

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