

Embolization of the Superior Rectal Arteries for Hemorrhoidal Disease: Prospective Results in 25 Patients

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ABSTRACT

Purpose: To evaluate efficacy and safety of superior rectal artery embolization of hemorrhoidal disease as a first-line invasive treatment.

Materials and Methods: This prospective study was conducted between 2014 and 2015 on 25 consecutive patients (16 men and 9 women with a mean age of 53 y [range, 30–76 y]) with grade II–III hemorrhoids refractory to medical treatment. A transfemoral superselective superior rectal artery branch embolization was performed using 2- and 3-mm diameter microcoils. Over the following 12 months, clinical outcomes were evaluated using the French bleeding score, Goligher prolapse score, visual analog scale (VAS) score for pain, quality-of-life score. The primary endpoint was relief of symptoms by 12 months based on a 2-point minimum improvement on VAS score and bleeding score.

Results: At 12 months after embolization, clinical success was obtained in 18 patients (72%), 8 of whom had 2 embolizations. VAS score decreased from 4.6 to 2.3 ($P < .01$), and bleeding score decreased from 5.5 to 2.3 ($P < .01$). Quality-of-life and prolapse scores also showed improvement ($P < .05$), and no patients experienced any early or late complications. Complete clinical failure was observed in 7 patients. After coil embolization, the collateral supply to the hemorrhoidal cushions was significantly related to any recurrence ($P = .001$).

Conclusions: Hemorrhoidal artery coil embolization was found to be safe and effective treatment for grade II–III hemorrhoids.

ABBREVIATIONS

DGHAL = Doppler-guided hemorrhoidal artery ligation, DSA = digital subtraction angiography, VAS = visual analog scale

Hemorrhoidal disease has a 5%–40% occurrence and is the most frequent proctologic pathology (1). Hemorrhoids comprise a dense anastomotic arteriovenous network, known as corpus cavernosum recti, which contributes to the anal canal's continence (2). The pathology results from hypertrophied hemorrhoidal cushions (2–4). This hypertrophy seems to be sustained by an overexpression of endothelial growth factors (5), which leads to a chronic increase in arterial hemorrhoidal flow and is the origin of congestive

symptoms (6). Chronic bleeding is the main symptom of internal hemorrhoids located at the anorectal junction and may or may not be associated with hemorrhoidal prolapse. External hemorrhoids, located at the anal margin, manifest as painful inflammatory crises that are sometimes associated with thrombosis (1).

Hemorrhoidal disease treatment usually involves hygiene and dietary measures; oral venotonic treatments such as micronized purified flavonoid fraction; and nonsurgical

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Tables E1–E3 and Video 1 are available online at www.jvir.org.

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minimally invasive therapies such as rubber band ligation, infrared photocoagulation, and sclerosing injection (1). However, 10% of patients still require surgical treatment consisting of excision of the hemorrhoidal cushions and ligation of the vascular pedicles (7). Hemorrhoidectomy and stapled hemorrhoidopexy are validated and effective surgical techniques but are associated with long, painful postoperative courses with a significant complication rate (7,8). Doppler-guided hemorrhoidal artery ligation (DGHAL) offers a minimally invasive surgical alternative. It was developed a decade ago following the anatomical work of Aigner et al (6,9), which confirmed the vascular theory of hemorrhoids (2–4) and the arterial supply of the corpus cavernosum recti by the superior rectal artery branches (9). DGHAL shows good results, reduces morbidity (10,11), and is achieved by ligating the terminal superior rectal artery branches at the upper part of the anal canal through an anoscope (12).

Following the same principle, hemorrhoidal artery embolization, termed the emborrhoid technique by Vidal et al (13), has emerged as another treatment option. This technique involves endovascular occlusion of the distal branches of the superior rectal artery arising from the inferior mesenteric artery. Its feasibility and safety were initially supported by case reports of life-threatening acute hemorrhoidal bleeding that was successfully managed by arterial embolization (14,15). This technique has also shown good short-term results in the treatment of chronic hemorrhagic symptoms in patients who require compassionate care and have surgical contraindications (16,17). The main objective of the present study was to evaluate the efficacy of superior rectal artery embolization in treating hemorrhoidal symptoms in a prospective cohort of patients with no prior surgical history. The secondary objectives were to evaluate postoperative morbidity and to identify predictive factors of treatment failure.

MATERIALS AND METHODS

This prospective study (ClinicalTrials.gov Identifier: NCT02303925) was registered on November 19, 2014, and was approved by the institutional review board. An informed written consent was obtained for each patient.

Patients

Between December 2014 and June 2015, 27 patients were screened for participation in the trial. Two patients declined to participate in the trial. The remaining 25 consecutive patients (16 men and 9 women with a mean age of 53 y [range, 30–76 y]) with disabling hemorrhoidal disease were included prospectively for embolization of the superior rectal artery. All patients were referred to the study by a surgical proctologist with 20 years of experience within this institution. Each patient underwent a proctologic examination. Clinical data were prospectively collected using a standardized questionnaire. The severity of symptoms was

Table 1. Patient Characteristics (N = 25)

Characteristic	Value
Age, y	53 ± 10
Sex	
Male	16 (64%)
Female	9 (36%)
Main symptom	
Bleeding	17 (68%)
Pain	8 (32%)
Anemia	4 (16%)
Anticoagulants	4 (16%)
Stage of prolapse (Goligher)	
Stage II	17 (68%)
Stage III	8 (32%)
VAS	4.6 ± 2.8
Bleeding score	5.5 ± 2.7
Quality of life	2.8 ± 0.85

Note—Values are mean ± SD or number (%).
VAS = visual analog scale.

assessed using the French bleeding score (Table E1 [available online at www.jvir.org]) (15), Goligher prolapse score (Table E2 [available online at www.jvir.org]), visual analogue scale (VAS) for pain, and quality-of-life score (Table E3 [available online at www.jvir.org]). The French bleeding score assessed the intensity of hemorrhoidal bleeding with scores ranging from 0 (no bleeding) to 9 (daily bleeding with anemia requiring blood transfusions). The Goligher classification assessed the degree of internal hemorrhoid prolapse from I (no prolapse) to IV (irreducible prolapse). The quality-of-life score evaluated disease impact with scores ranging from 0 (absence of discomfort) to 4 (permanent discomfort).

The inclusion criteria were as follows: patients 18–75 years old with disabling hemorrhoidal disease, with stage II–III prolapse, requiring surgical treatment following failure of hygiene and dietary measures, medication, or nonsurgical minimally invasive interventions. Exclusion criteria included patients with prior hemorrhoidal surgery, stage IV Goligher prolapse, acute hemorrhoid complications, chronic anal or perianal fissures, history of colorectal surgery, chronic intestinal inflammatory disease, severe atheromatous pathology, or an absolute contraindication to contrast medium. Clinical characteristics of the patients are summarized in Table 1.

Preprocedural Imaging

Following enrollment in the study, participants underwent computed tomography (CT) angiography of the pelvis (Discovery CT750 HD; GE Medical Systems, Milwaukee, Wisconsin), to identify any technical contraindications to embolization (stenosis or occlusion of the inferior mesenteric artery and the iliac arteries) and study the hemorrhoidal vasculature. The CT angiography protocol used settings of

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