

Emorrhoid technique in hemorrhoidal disease: Retrospective analysis of data from a single center

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ABSTRACT

BACKGROUND: This study evaluates the safety and effectiveness of coil embolization of the superior rectal artery for both emergency and elective treatment of rectal bleeding caused by Goligher grade 4 hemorrhoids, where surgery is contraindicated.

METHODS: Between 2019 and 2024, 18 patients (11 males, 7 females) with a mean age of 65±10.3 years were included in the study. Hemorrhoid grading was performed according to the Goligher classification, and rectal bleeding grading was assessed using the Paris bleeding severity score. Femoral artery access was utilized for embolization in all patients, and superior rectal artery branches were embolized exclusively with coils. All patients were treated electively except one who developed hemodynamic instability due to massive rectal bleeding while monitored in the intensive care unit. Follow-up was conducted via clinical examination and rectoscopy at 1, 3, and 6 months.

RESULTS: All patients underwent successful treatment with 100% technical success. No procedure-related ischemic complications or femoral artery puncture-related complications were observed in any patient. All patients were classified as grade 4 according to the Goligher classification prior to treatment. The mean Paris bleeding severity score was 6.6±1.1 before treatment, 3.4±1.5 at the first month, 3.8±1.61 at the third month, and 3.6±1.29 at the sixth month. Recurrence occurred in one patient at the first month and in another at the third month. Clinical success was 95% at the first month and 85% at the third and sixth months. Re-embolization was not performed in patients with recurrence.

CONCLUSION: In conclusion, this study demonstrates that coil embolization of the superior rectal artery branches is a safe and effective minimally invasive procedure for both the emergency treatment of bleeding due to grade 4 hemorrhoidal disease and the elective treatment of patients unsuitable for surgical intervention.

Keywords: Emorrhoid technique; emergency treatment of active rectal bleeding; hemorrhoidal disease; superior rectal artery embolization.

INTRODUCTION

The hemorrhoidal plexus is a complex structure composed of vascular components, a smooth muscle layer, and elastic connective tissue located above the dentate line.^[1] Hemorrhoidal disease is the most common anorectal condition in the population, characterized by the dilatation of these vascular structures in the lower rectum that assist in anal continence. Patients typically present with chronic, recurrent, painless rectal

bleeding.^[2] Although chronic bleeding rarely leads to anemia, it significantly reduces the quality of life for affected individuals. Pain generally arises when complications such as thrombosis or fissures occur.

The majority of patients can be managed with non-surgical methods, including lifestyle modifications, medical therapy, photocoagulation, or elastic band ligation. However, approximately 10% of patients require surgical intervention.^[3] While

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non-surgical treatments are generally well-tolerated, recurrence rates of up to 50% have been reported.^[4] Although Milligan and Morgan open hemorrhoidectomy, described in 1937, is the reference standard, alternative surgical techniques have been developed in recent years to address its high morbidity. These alternatives include circular stapler anopexy and Doppler-guided hemorrhoidal artery ligation (DGHAL). Doppler-guided hemorrhoidal artery ligation is a minimally invasive procedure in which the terminal branches of the superior rectal artery supplying the hemorrhoidal plexus are ligated to reduce the size of the enlarged plexus.^[5] While the reduced size of the hemorrhoidal plexus continues to aid in continence and the morbidity of the procedure is significantly lower than that of open hemorrhoidectomy, complications such as anal sphincter trauma, pain, and infection are still problematic.

In 2014, Vidal et al.^[3] described the emborrhoid technique, developed based on the DGHAL method, which involves coil embolization of the superior rectal artery branches. Studies have demonstrated that the diameter and blood flow of the superior rectal artery increase in hemorrhoidal disease.^[6] Digital subtraction angiography (DSA) effectively visualizes the enlarged superior rectal artery and its terminal branches, while DGHAL facilitates the embolization of these terminal branches. Coils were initially used as embolizing agents, with the option to combine them with particles.^[7] The emborrhoid technique has become a significant alternative to surgery for the treatment of hemorrhoidal disease, offering low morbidity and high efficacy, particularly for patients unsuitable for surgery due to comorbidities or the use of antiaggregant or anticoagulant drugs. The most important advantages over surgical methods include the absence of anal sphincter damage and shorter hospitalization times.

This study aimed to evaluate the technical success, procedural complications, and clinical outcomes of patients with hemorrhoidal disease treated with coil embolization of the superior rectal artery at our center.

MATERIALS AND METHODS

Patients

This retrospective study was approved by İstanbul University-Cerrahpaşa review board (Date: 08. 05. 2024, Decision/Protocol No: 83045809/604.01-980842), and the requirement for informed consent was waived. Between 2019 and 2024, 18 patients (11 men, 7 women) with chronic rectal bleeding due to grade 4 hemorrhoids and a French bleeding score of 4 or higher were treated using the emborrhoid technique. Hemorrhoids were graded according to the Goligher classification, and rectal bleeding was graded using the French bleeding severity score by a proctologist with 15 years of experience. None of the patients had undergone previous surgery for hemorrhoids. One patient, who was receiving low molecular weight heparin for deep vein thrombosis prophylaxis while in the intensive care unit due to pneumosepsis, required urgent treatment for hemodynamic instability caused by massive rectal bleeding (Fig. 1). The other patients received treatment under elective conditions. One patient with hemophilia A and one patient treated emergently had anemia requiring transfusion, while another patient on oral anticoagulants for atrial fibrillation had anemia not requiring transfusion due to chronic rectal bleeding (Fig. 2). All patients were evaluated by a multidisciplinary team and classified as American Society of Anesthesiologists (ASA) grade 4, with surgery considered contraindicated.

Procedure

All patients were treated by the same interventional radiologist (A.B.), who was trained in hemorrhoid embolization and had 14 years of interventional radiology experience. Using the Seldinger method under local anesthesia, a 5 French (F) vascular sheath was placed in the right common femoral artery. The inferior mesenteric artery was catheterized with a 4 F Simmons catheter. Following superselective catheteriza-

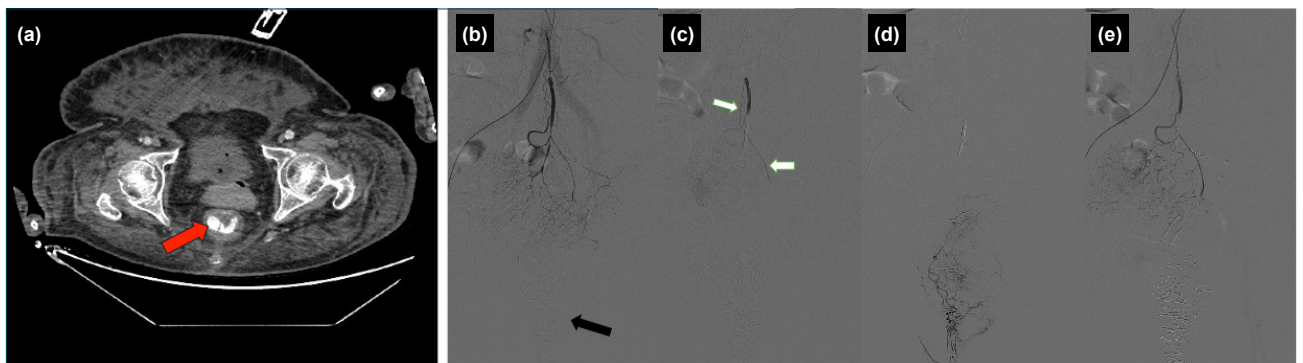


Figure 1. (a) A 73-year-old patient followed up in intensive care unit developed massive rectal bleeding and CT examination performed with only intravenous contrast material without oral and rectal contrast material showed active contrast extravasation (red arrow). (b) DSA images obtained after IMA catheterization of the same patient showed no active contrast extravasation. The black arrow shows an anal tampon applied by the general surgery team. (c) SRA is observed with developed spasm due to bleeding (white arrows). (d) Superselective catheterization of the spastic SRA shows contrast enhancement of the hemorrhoidal plexus and CCR. (e) No residual SRA branch was observed after embolization with 2mm and 3mm coils.

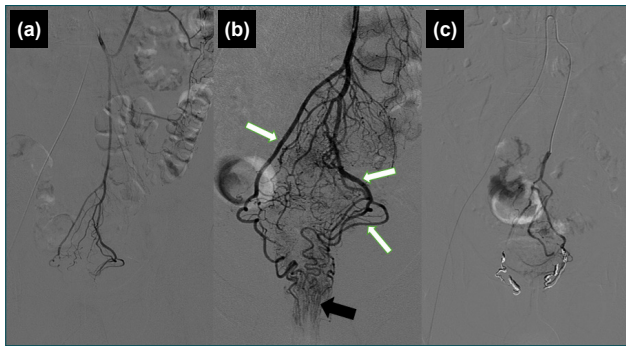


Figure 2. SRA embolization in a 67-year-old man with Goligher grade-4 hemorrhoids who developed anemia due to chronic rectal bleeding. (a) IMA catheterization with 4F Simmons catheter. (b) Microcatheter ejection shows hypertrophic SRA branches (white arrows) and contrast enhancement of the CCR (black arrow). (c) Successful embolization of all SRA branches without opacification under the pubic symphysis.

tion of all branches of the superior rectal artery using a 2.7 French microcatheter (Progreat, Terumo), embolization was performed using coils of appropriate diameter and length. Only coils were used for embolization, with diameters ranging between 2 and 4 mm. Coils enabled distal, non-terminal embolization, reducing the risk of potential ischemic complications. The technical success of the procedure was defined as achieving occlusion of all visible branches of the superior rectal artery (SRA) as distally as possible, just above the pubic ramus, with no contrast filling observed in the hemorrhoidal plexus. After the procedure, the femoral artery was compressed, and a compression bandage was applied to the puncture site. Patients were discharged after 6-8 hours of bed rest if no complications developed.

Statistical Analysis

SPSS software version 26.0 (IBM Corp., Armonk, NY) was used for statistical analysis. The Pearson chi-square test or Fisher's exact test was employed to compare categorical data. The Kolmogorov-Smirnov test and Shapiro-Wilk test were used to evaluate the normality of distribution for continuous variables. Nonparametric tests (Kruskal-Wallis or Mann-Whitney U test) were applied for non-normally distributed data, and analysis of variance (ANOVA) or the t-test was used for normally distributed data. A p value of <0.05 was considered statistically significant.

Follow-Up

All patients were clinically examined at the first, third, and sixth months to evaluate treatment efficacy and detect any potential complications. During these examinations, changes in the symptoms of hemorrhoidal disease were assessed, and hemorrhoid grading was performed using proctologic examination and rectoscopy. A decrease of 2 or more points in the French bleeding severity score was considered a clinical success.

RESULTS

Baseline and follow-up data for the patients are summarized in Table 1. The ages of the treated patients ranged between 47 to 78 years, with a mean age of 65 ± 10.3 years. Prior to treatment, all patients were classified as grade 4 according to the Goligher classification. The mean French bleeding severity score was 6.6 ± 1.1 before treatment, 3.4 ± 1.5 at the first month, 3.8 ± 1.61 at the third month, and 3.6 ± 1.29 at the sixth month. On average, 3.4 ± 0.8 branches of the SRA were treated with 8.2 ± 2 coils. The number of hypertrophic SRAs detected in patients with high bleeding severity scores was significantly greater than in those with lower scores ($p < 0.05$).

All procedures were technically 100% successful. No complications related to femoral artery puncture were observed in any patient. No ischemic complications related to the procedure occurred, and no patient reported anorectal pain. Rectal bleeding ceased in all patients by the day after the procedure. However, minimal resumed rectal bleeding occurred on the second day post-procedure in one patient with hemophilia A and the patient who received emergency treatment; this bleeding lasted for one week. By the second day of treatment, the need for transfusion had been eliminated in patients who previously required it.

All patients were followed up at 1, 3, and 6 months. Clinical success was 95% at the first month and 85% at the third and sixth months. Recurrence was observed in the patient with hemophilia A at the first month and in the patient with atrial fibrillation at the third month. Both patients declined additional treatment, stating that the bleeding did not affect their quality of life.

DISCUSSION

Hemorrhoidal disease, the most common anorectal condition in the population, poses both medical and socioeconomic challenges as it reduces patients' quality of life, and approximately 10% of cases require surgical intervention. Although the emborrhoid technique has a lower success rate compared to Milligan-Morgan hemorrhoidectomy, it demonstrates similar success rates to DGHAL, while offering lower morbidity and shorter hospital stays than both methods.^[8,9] While DGHAL and the emborrhoid technique do not directly address external hemorrhoids and prolapse, some authors suggest that the reduction in arterial blood flow following these treatments may alleviate congestion. This may result in gradual improvement in prolapse, as observed in some cases after DGHAL.^[10,11]

The emborrhoid technique, which is not yet included in the guidelines for the treatment of hemorrhoidal disease, is emerging as a significant alternative due to its low morbidity and high success rates, particularly in cases where surgery is contraindicated. The ability to treat without causing anorectal trauma eliminates the risk of anal sphincter damage, which could lead to incontinence.

Table 1. Demographics and clinical details of included patients

Patient No	Age (in years)	Sex	Before Treatment French Bleeding Score	Before Treatment Goligher grade	Technical Success	French Bleeding Score at 1st month post-treatment	French Bleeding Score at 3rd month post-treatment	French Bleeding Score at 6th month post-treatment
1	74	Male	7	4	Yes	4	3	3
2	61	Male	6	4	Yes	3	2	2
3	75	Female	5	4	Yes	3	3	2
4	71	Male	7	4	Yes	3	4	3
5	67	Female	9	4	Yes	8	7	7
6	49	Male	6	4	Yes	3	3	3
7	75	Female	7	4	Yes	3	4	4
8	66	Male	5	4	Yes	3	2	2
9	47	Male	9	4	Yes	5	6	6
10	75	Female	7	4	Yes	4	4	3
11	62	Female	7	4	Yes	3	4	5
12	57	Male	6	4	Yes	3	4	4
13	78	Male	6	4	Yes	3	4	4
14	66	Female	7	4	Yes	4	3	5
15	48	Male	5	4	Yes	0	2	3
16	73	Male	7	4	Yes	3	4	4
17	54	Female	6	4	Yes	3	3	4
18	73	Male	7	4	Yes	3	4	4

The process, which began with coil embolization in 2014, has demonstrated that particles can be safely used for embolization alongside coils. According to the literature, the technical success rate of the procedure ranges from 93% to 100%, while the clinical success rate ranges from 63% to 94%.^[12] In our study, the technical success rate was 100%, and the clinical success rate was 95% at the first month and 85% at the sixth month, aligning with the literature. Although we used only coils for embolization, adding particles to the coils may improve clinical success by reducing recurrence rates in advanced-stage hemorrhoidal disease (Grade 4), as included in our study. Additionally, we believe that a follow-up period of six months may be insufficient to determine whether rectal bleeding will occur.

Ischemic complications, a serious concern in any embolization procedure, have not been observed in superior rectal artery embolizations performed with either coils or particles. This has been attributed to the continued blood supply to the anorectal region from the middle and inferior rectal arteries.^[12] In our study, no ischemic complications related to embolization were observed.

While the hemorrhoidal plexus is primarily supplied by branches of the SRA, approximately 36% of patients may have unilateral and 12% may have bilateral middle rectal artery (MRA) feeders.^[13] The MRA typically originates from the

internal iliac artery, and failure to embolize these feeders is a significant cause of treatment failures and recurrences due to incomplete embolization. Cross-sectional angiographic imaging prior to treatment can identify all arterial branches involved in the vascularization of the hemorrhoidal plexus. This enables proper planning, which can prevent incomplete embolization and reduce recurrence rates.^[9] In our study, hypertrophic MRA was not detected in any patient; however, we may have missed detecting MRA as a potential cause of recurrence since patients with recurrence declines re-embolization.

The most common indication for SRA embolization is in patients with Goligher grade 2 and grade 3 hemorrhoids. However, this method can also be used for the treatment of grade 4 hemorrhoids in patients for whom surgery is not feasible. All the patients in our study had grade 4 hemorrhoids and were not candidates for surgery. Our study is one of the few that specifically focuses on this particular patient group.

The primary limitations of our study include its retrospective design, the small number of patients, and the exclusive use of coils for embolization.

CONCLUSION

Hemorrhoidal disease is not an uncommon cause of anemia, yet few studies have evaluated the safety and effectiveness of emergency surgical intervention in cases of hemorrhoidal

disease with profuse bleeding that may require transfusion. Data on the emergency treatment of hemorrhoidal bleeding is limited; however, emergency hemorrhoidectomy is known to carry risks of complications such as portal abscess, secondary bleeding, anal stenosis, and anal incontinence. We believe that coil embolization of the superior rectal artery is a valuable alternative to surgery for patients who are either unsuitable for surgical intervention or who refuse it. Additionally, it is an effective emergency treatment for patients experiencing anemia or hemodynamic instability due to active rectal bleeding. Current literature supports the efficacy and safety of this treatment modality; however, studies since its initial description in 2014 are still limited. Prospective multicenter randomized controlled trials comparing the efficacy and safety of this procedure with surgical methods and evaluating different embolizing agents are needed.

Ethics Committee Approval: This study was approved by the İstanbul University-Cerrahpaşa Ethics Committee (Date: 08. 05. 2024, Decision No: 83045809/604.01-980842).

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Conflict of Interest: None declared.

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ORJİNAL ÇALIŞMA - ÖZ

Hemoroidal hastalıkta emboroid tekniği: Tek merkeze ait verilerin retrospektif analizi

AMAÇ: Bu çalışmanın amacı cerrahinin kontrendike olduğu Goligher grade 4 hemoroide bağlı rektal kanamanın acil ve elektif tedavisinde süperior rektal arterin coil embolizasyonunun güvenilirliğini ve etkinliğini değerlendirmektir.

GEREÇ VE YÖNTEM: 2019-2024 yılları arasında yaş ortalamaları 65 ± 10.3 olan 18 hasta (11 erkek, 7 kadın) çalışmaya alındı. Hemoroid derecelendirmesi Goligher sınıflamasına göre, rektal kanama derecelendirmesi ise Paris kanama şiddeti skoruna göre yapılmıştır. Tüm hastalarda embolizasyon için femoral arter girişi yapılmıştır ve süperior rektal arter dalları yalnızca koiller ile embolize edilmiştir. Yoğun bakım ünitesinde takip sırasında masif rektal kanama nedeniyle hemodinamik instabilite gelişen bir hasta dışında tüm hastalar elektif olarak tedavi edildi. Takipler 1., 3., ve 6. ayda klinik muayene ve rektoskopi ile yapılmıştır.

BULGULAR: Hastaların tamamı %100 teknik başarı ile tedavi edildi. İşleme bağlı herhangi bir iskemik komplikasyon izlenmedi ve hiçbir hastada femoral arter ponksiyonuyla ilgili komplikasyon gözlenmedi. Tedavi öncesinde Goligher sınıflamasına göre tüm hastalar grade-4 olarak tespit edilmiştir. Paris kanama şiddeti skoru tedavi öncesi ortalama 6.6 ± 1.1 olup 1. ayda bu skor 3.4 ± 1.5 , 3. ayda 3.6 ± 1.29 ve 6. ayda 3.6 ± 1.29 olarak bulunmuştur. 1 hastada 1. ayda ve 1 hastada 3. ayda nüks görüldü. 1. ayda klinik başarı %95, 3. ay ve 6. ay kontrolleri sonrası %85 olarak bulunmuştur. Nüks görülen hastalara re-embolizasyon yapılmadı.

SONUÇ: Sonuç olarak, bu çalışma grade-4 hemoroidal hastalığa bağlı kanamanın hem acil tedavisinde ve hem de cerrahi tedaviye uygun olmayan hastaların elektif tedavisinde süperior rektal arter dallarının coil embolizasyonunun güvenli ve etkili minimal invaziv bir prosedür olduğunu göstermiştir.

Anahtar sözcükler: Aktif rektal kanamanın acil tedavisi; emboroid tekniği; hemoroidal hastalık; süperior rektal arter embolizasyonu.