



ORIGINAL ARTICLE

Ligation under vision in the management of symptomatic hemorrhoids: A preliminary experience



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Summary *Aim:* To evaluate the surgical outcomes of 47 patients who underwent hemorrhoidal arterial ligation under vision (LUV) for symptomatic Grade II and Grade III hemorrhoids. *Methods:* A total of 47 patients who underwent LUV between May 2005 and February 2009 were analyzed retrospectively. The patients were evaluated with regard to demographic data, grade of the disease, symptoms, medical and/or surgical treatment previously received, operation time, pain scores, analgesic requirement, length of hospital stay, and complications related to the procedure.

Results: The study population ($n = 47$) included 31 (65.9%) men and 16 (34.1%) women with a median age of 37.4 ± 11.7 (range, 19–63) years. Of these 47 patients, 18 (38.3%) patients had Grade II hemorrhoidal disease (HD) and 29 (61.7%) patients had Grade III HD. On average, six ligatures (range, 3–8) were used. The mean operation time was 27 ± 4.8 (range, 15–35) minutes. No major complication that required surgical intervention occurred in the early postoperative period for any of the patients except for two patients with rectal submucosal hematoma. The mean hospital stay was 1.2 ± 0.65 (range, 1–4) days. The median follow-up period was 21.5 ± 7.7 (range, 12–44) months. At the last follow-up, 38 (80.8%) patients remained asymptomatic; two (4.2%) patients with Grade II HD and four (8.5%) patients with Grade III HD were still suffering from bleeding but with a reduction in the frequency; prolapsed hemorrhoids were detected only in three (6.3%) patients.

Conflicts of interest: All contributing authors declare no conflicts of interest.

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Conclusion: LUV is a safe and easily applied alternative technique with low postoperative complications for the surgical treatment of symptomatic Grade II and III HD.

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1. Introduction

Hemorrhoidal disease (HD) is one of the most common pathological conditions encountered in gastroenterology and colorectal surgery units.^{1,2} Symptomatic Grade I and Grade II hemorrhoids can generally be treated conservatively, whereas Grade III and Grade IV hemorrhoids are usually resistant to medical therapies and often require surgery.² Although many surgical methods have been proposed, the ideal treatment for HD remains a subject of debate.^{3,4} Hemorrhoidectomy is accepted as the gold standard for the surgical treatment of HD for many years, although the procedure is associated with severe postoperative pain, long recovery period, and serious complications (e.g., anal stenosis, incontinence, and bleeding after surgery).^{4–6} In recent studies, the physiology and anatomy of the anorectal region are well defined.⁷ Consequently, the vascularization and the importance of hemorrhoidal piles in anal continence are well understood. Following these major improvements, the nonexcisional methods, which are based on the principle of disrupting the blood flow of hemorrhoidal piles, such as stapled hemorrhoidopexy (SH)⁸ and Doppler-guided transanal hemorrhoidal dearterialization [Doppler-guided hemorrhoidal artery ligation (DGHAL)]⁹ have been introduced in the surgical treatment of HD. These methods have successful outcomes with lower complication rates and offer obvious advantages such as less postoperative pain and early recovery period.¹⁰ Unfortunately, these techniques can be performed only in major surgical centers by advanced colorectal surgeons because these procedures require experience and expensive specialized instruments. By contrast, as Bronstein et al² indicated, the hemorrhoidal arterial ligation procedure can be easily performed under vision without using any specialized instruments and Doppler device. In this study, we aimed to evaluate the outcomes of 47 patients who underwent hemorrhoidal arterial ligation under vision (LUV) for symptomatic hemorrhoids.

2. Patients and methods

Forty-seven patients who underwent hemorrhoidal arterial LUV for Grade II and Grade III HD between May 2005 and February 2009 were analyzed retrospectively. The procedure was performed only after obtaining written informed consent from the patients. Patients who had thrombosis and/or Grade IV prolapsed hemorrhoids were excluded from this study. A complete medical history was obtained from all patients. The anorectal region was examined by digital examination and rectoscopy to stage the disease and rule out other anorectal conditions.

2.1. Surgical technique

A fleet enema (250 mL) was used for preoperative preparation. All patients underwent the surgical procedure in the jackknife position under spinal anesthesia. Initially, the procedure was performed by exposing the anal canal using the Hill–Ferguson anoscope but for the last 17 patients, a videoanoscope (Medbar Medical Products, Izmir, Turkey) was used because of its advantages such as better viewing and lighting.¹¹ Following the insertion of the anoscope, the hemorrhoidal cushions were observed at 3 o'clock, 7 o'clock, and 11 o'clock positions. The submucosal tissue of pile base was transfixed at a depth of 0.5 cm with two polyglactin 2/0 stitches above 2–3 cm of the dentate line. Ligation was performed between 3 o'clock and 5 o'clock, 7 o'clock and 9 o'clock, and 11 o'clock and 1 o'clock positions. The number of necessary ligations required ranged from three to seven for each patient. Three minutes following the ligation, the hemorrhoidal cushions began to congest. The ligated piles turned pale and decreased in size in 5 minutes.

The patients were evaluated with regard to demographic data, grade of the disease, symptoms, medical and/or surgical treatment previously received, operation time, pain score, analgesics requirement, length of hospital stay, and complications related to the procedure. Postoperative pain was assessed using visual analog scale (VAS). Intramuscular diclofenac sodium was applied for pain management. The disease was staged according to Parks' scale. The patients were examined following discharge after 1 week, 1 month, 6 months, and 1 year. To evaluate the effectiveness of the procedure, we considered only the results after 1 year of follow-up.

2.2. Statistical analysis

The data obtained were summarized in a computerized spreadsheet and statistical analyses were performed using SPSS version 11.5 for Windows (SPSS Inc., Chicago, IL, USA). The χ^2 test was used to compare categorical variables and Student *t* test for parametric values. Numerical data were presented as mean \pm standard deviation and categorical data were expressed as number and percent. Statistical significance was set at $p < 0.05$.

3. Results

The study population ($n = 47$) included 31 (65.9%) men and 16 (34.1%) women with a median age of 37.4 ± 11.7 (range, 19–63) years. Of these 47 patients, 18 patients (38.3%) had Grade II HD and 29 patients (61.7%) had Grade III HD. Rectal

bleeding and tenesmus were the main symptoms in all the cases. All patients were symptomatic for at least 5 months and had previously received various medical or surgical therapies. Eight patients with Grade II HD and two patients with Grade III HD had a history of band ligation. Four patients with Grade III hemorrhoids had undergone hemorrhoidectomy.

The mean operation time was 27 ± 4.8 (range, 15–35) minutes. On average, six ligatures (range, 3–8) were used. No complication occurred during the operation. The mean VAS scores 6 hours, 12 hours, and 24 hours after the operation were 4.8 ± 1.48 (range, 2–8), 4.2 ± 2.6 (range, 2–8), and 3.8 ± 2.2 (range, 1–6), respectively. A total of 38 patients required a single dose of analgesic, whereas the remaining patients required more analgesic doses. No major complication that may require reintervention occurred in the early postoperative period. As a minor complication, submucosal hematoma was observed in two patients 8 hours after the operation, which was treated by pressure dressing with warm water.

The mean hospital stay was 1.2 ± 0.65 (range, 1–4) days. The median follow-up was 21.5 ± 7.7 (range, 12–44) months. At the last follow-up, 38 (80.8%) patients remained asymptomatic; two (4.2%) patients with Grade II HD and four (8.5%) patients with Grade III HD were still suffering from bleeding but with a reduction in the frequency. Anal fissure was detected in three of these patients, which was treated using 0.4% glyceryl trinitrate rectal ointment. Prolapsed hemorrhoids were detected only in three (10.3%) patients with Grade III HD 8 months, 13 months, and 18 months after the operation, respectively. Hemorrhoidectomy was performed on two patients, whereas one patient underwent SH due to mucosal prolapse. Considering the stage of the disease, the recurrence rate of bleeding in Grade II and Grade III patients was 11.1% and 13.7%, respectively. The recurrence rate of prolapsed hemorrhoids was 10.1% in Grade III patients. There was no mortality during the study period.

4. Discussion

HD is an important proctologic problem of public health affecting up to 36% of people in Western countries.¹ Although several theories have been proposed about its development, none of them has completely elucidated the pathophysiology of the disease.^{3,12}

HD is a benign disorder of the anorectum, and therefore, overtreatment should be avoided. Surgical treatment should be considered only when symptoms such as severe bleeding, pain, and defecation problems are present.¹² The adequate treatment protocol for HD can be determined using Parks' four-stage classification.¹³ Symptomatic Grade I and Grade II hemorrhoids can generally be treated conservatively, whereas Grade III and Grade IV hemorrhoids are usually resistant to medical therapies and often require surgery.² The ideal surgical treatment for HD can be defined as safe, painless, and minimally invasive with minimal costs.¹⁰ Although various methods have been proposed for the treatment of HD, none of them completely meets these features. Hemorrhoidectomy is still widely accepted as the most adequate procedure for the surgical treatment of HD

by many surgeons due to its effective outcomes. However, major complications such as sphincter dysfunction, severe pain, and postoperative bleeding may occur after the surgery. Furthermore, recurrence can occur in up to 30% of the patients.¹⁴

In the early 1960s, Stelzner¹⁵ well described the role of arteriovenous anastomoses in the development of HD and the role of hemorrhoidal piles in anal continence. Thereafter, efforts are being made to develop less invasive but effective nonexcisional methods for the surgical treatment of HD. The main contributory factor is imbalance of arteriovenous blood flow, which causes increased blood flow to the corpus cavernosum recti (CCR) in the development of HD.^{3,7} Based on the principle of disrupting the blood flow of hemorrhoidal piles, two new methods were introduced, namely, DGHAL by Morinaga et al⁹ in 1995 and SH by Longo⁸ in 1997. Both techniques have captured the attention of surgeons. Many studies comparing SH with conventional hemorrhoidectomy have demonstrated SH to be less painful. However, it was less effective in preventing recurrence, more expensive, and liable to rare but severe complications such as rectal perforation, obstruction, retroperitoneal hematoma, Fournier's gangrene, and rectovaginal fistula.^{16–18}

DGHAL is an effective, minimally invasive alternative procedure for the surgical treatment of HD.^{3–6,9,12,19} The procedure has obvious advantages such as less postoperative pain, early recovery period, and is associated with fewer complications. In a prospective randomized study published by Infantino et al,¹⁰ DGHAL is reported to be as effective as SH in treating HD. Despite the effectiveness of DGHAL, the need for specialized instrument and experience limit its widespread use. The technique can only be performed in major surgical centers, but many surgical centers do not have the capacity to use these devices due to economical limitations. Therefore, many surgeons are unable to perform the procedure. However, as Bronstein et al² indicated and based on our results, hemorrhoidal arterial ligation can be easily performed under vision with similar outcomes without using any specialized instruments.

The localization of the terminal branches of the superior rectal artery (SRA) is usually constant. These branches reach the submucosal layer of the rectum 4 cm above the dentate line and contribute to the blood flow in the CCR.^{20,21} Based on anatomical studies suggesting that the hemorrhoidal arteries are identified almost constantly at 1 o'clock, 3 o'clock, 5 o'clock, 7 o'clock, 9 o'clock, and 11 o'clock positions of the low rectum,^{2,19} these localizations correspond to the anatomic localization of hemorrhoidal piles. Therefore, we were able to reach the terminal branches of the SRA by following the piles until its base. Thus, hemorrhoidal arterial ligation can be easily performed under vision without requiring any specialized instrument. The LUV procedure can be considered "blind" surgery.¹⁹ Nevertheless, hemorrhoidal arterial ligation cannot be performed completely even with Doppler device because of transmuscular collateral vessels.^{7,20} It is important to note that the main purpose of hemorrhoidal arterial ligation is not to cut the arterial supply completely, but rather reducing its inflow sufficiently and increasing the venous outflow from the CCR.^{4,5}

The LUV procedure is almost painless.^{5,10,19,22} Suture application in the area above the dentate line minimizes the risk of postoperative pain and complications. Postoperative pain may possibly be related to the closer placement of the suture to the dentate line. Anal trauma caused by the manipulation of the anoscope during the procedure may induce postoperative pain or discomfort. Pain after DGHAL was reported in up to 12% of patients, whereas none of our patients estimated their pain as "severe".^{4,5,11,23} Although some of our patients experienced minor discomfort in the rectum 6 hours after the operation, all patients were discharged from hospital within 24 hours except two patients with early postoperative complications.

The procedure is associated with a lower rate of complication. In our series, no clinically significant perioperative complications occurred. There were only two cases of submucosal hematoma that were treated conservatively. The incidence of postoperative recurrent bleeding after DGHAL at follow-up varies from 1% to 15%.^{4,9,19,24} In our series, 12.7% of the patients complained of bleeding but with a reduction in frequency, of which 6% was associated with anal fissure. All these patients were treated conservatively.

The recurrence after DGHAL was reported in 3–20% of the patients.^{3–6,19} The recurrence rate in our study was 10.4%. The main possible reason of recurrence is related to inadequate technique—leaving behind an arterial branch unsutured. As Aigner et al²⁰ indicated, all branches should be sutured to prevent recurrence. However, recurrence was mostly detected in Grade IV patients (recurrence rate, 50–70%).^{12,25} Mucosal prolapse, which may impair venous drainage, is the main symptom in such patients. Mucopexy might reduce recurrence by repositioning the mucosa and improving the venous drainage.³ Another possible reason that can cause recurrence is the continuing unhealthy habits of the patient after the procedure. This should be considered not only for LUV but also for all the other techniques. Habits such as unhealthy (improper) diet, immobility, chronic alcohol consumption, and constipation increase arterial flow of the hemorrhoidal cushions and should be avoided after all procedures.²⁶ Unhealthy habit may be the possible reason of recurrence in two of our patients who regularly consumed alcohol after the procedure. In our series, three patients with recurrence were treated successfully by other surgical techniques. Therefore, another advantage of LUV is that all the other alternative procedures can be performed later, if necessary.

Another interesting outcome of our study is that the four patients who had a prior surgery were asymptomatic at a median follow-up of 19 months. However, this result needs to be supported with comparative studies.

Rubber-band ligation may seem to provide the same postoperative results as LUV and may also be more easily performed than LUV.²⁷ However, LUV is much cheaper than rubber-band ligation because the procedure only requires surgical sutures. Furthermore, in our study, 10 patients who underwent rubber-band ligation previously were asymptomatic at a median follow-up of 22 months. However, this result also needs to be supported with comparative studies.

Data in the literature concerning results of the DGHAL procedure report a success rate of 78–92% in Grade II and Grade III HD patients.^{3–6,10,12} The success rate in this study

was 80% for a median follow-up period of 21 months. Bronstein et al² reported a success rate of 87.5%. Based on the study results, it can be concluded that LUV is not inferior to DGHAL with regard to effectiveness and early complications in the treatment of Grade II and Grade III HD.

In conclusion, LUV is a safe alternative technique with few postoperative complications that can be easily performed for the surgical treatment of symptomatic Grade II and Grade III HD. Nevertheless, comparative studies with other surgical techniques and longer follow-up are required to evaluate the effectiveness of this procedure.

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