

Surgical outcomes of modified Ferguson hemorrhoidectomy for grade IV hemorrhoidal disease

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Cite this article as: Emral AC, Çetinkaya G, Gülen M, Ege B. Surgical outcomes of modified Ferguson hemorrhoidectomy for grade IV hemorrhoidal disease. *Anatolian Curr Med J.* 2025;7(5):652-656.

Received: 07.07.2025

Accepted: 03.09.2025

Published: 15.09.2025

ABSTRACT

Aims: Grade IV internal hemorrhoidal disease represents an advanced stage of hemorrhoidal pathology, often necessitating surgical intervention. Ferguson hemorrhoidectomy, a closed excisional technique, is frequently employed for its reported advantages in postoperative recovery and complication profiles. This study aims to evaluate the effectiveness, postoperative outcomes, and complication rates of modified Ferguson hemorrhoidectomy in patients with grade IV internal hemorrhoidal disease.

Methods: In this retrospective analysis, 229 patients with grade IV internal hemorrhoidal disease who underwent modified Ferguson hemorrhoidectomy between March 2021 and December 2024 were included. Demographic data, postoperative complications, postoperative pain, recurrence rates, and time to return to daily activities were recorded. Postoperative follow-up was conducted up to a mean duration of 16.8 months.

Results: Among 229 patients (mean age 43.7±10.7 years; 58% male), 81% underwent three-quadrant hemorrhoidectomy. Postoperative complications included urinary retention (3.9%), urinary tract infection (0.9%), minor bleeding (1.3%), mild anal stenosis (0.9%), and minor perianal infection (5.2%). The median postoperative VAS pain scores were 4 (range: 2–7) on day 1 and 2 (range: 1–5) on day 7. No significant differences were observed in preoperative and postoperative Cleveland Clinic Incontinence Scores ($p>0.05$). Median time to return to normal daily activities was 12 days (range 5–19).

Conclusion: Modified Ferguson hemorrhoidectomy provides an effective and safe surgical option for grade IV internal hemorrhoidal disease, with low complication and recurrence rates and a favorable recovery profile. These results support its use as a reliable treatment approach in advanced hemorrhoidal disease.

Keywords: Ferguson hemorrhoidectomy, hemorrhoidal disease, postoperative complications, proctology, bleeding

INTRODUCTION

Hemorrhoidal disease (HD) is the most frequently encountered benign anorectal condition in proctologic practice. It is among the leading causes of lower gastrointestinal bleeding and typically presents clinically as painless rectal bleeding. In addition to bleeding, commonly observed symptoms include perianal swelling, prolapse, fecal soiling, pruritus ani, and anal discomfort.¹⁻³

Various medical and surgical treatment options have been described for HD. Medical treatments include lifestyle modifications, dietary recommendations, and the use of topical or systemic medications. Surgical options for HD comprise Milligan-Morgan hemorrhoidectomy, Ferguson hemorrhoidectomy, LigaSure hemorrhoidectomy (LigaSure™, Valleylab, Covidien), stapled hemorrhoidopexy (PPH), rubber band ligation, laser ablation, Doppler-guided hemorrhoidal artery ligation, sclerotherapy, infrared coagulation, and radiofrequency ablation (RFA).^{4,5} Internal hemorrhoids are

classified according to the Goligher classification, which is based on the presence and severity of prolapse. Among these treatment modalities, surgical excision—particularly hemorrhoidectomy—remains the cornerstone of therapy in complex or advanced cases, particularly in patients with grade III or IV hemorrhoids.^{4,6} Although non-life-threatening complications such as urinary retention, urinary tract infection (UTI), and minor bleeding are the most commonly observed after hemorrhoidectomy, serious and potentially life-threatening complications such as rectal perforation, major bleeding, retroperitoneal and pelvic abscesses, and sepsis may also occur.⁷

The primary aim of this study is to comprehensively evaluate the effectiveness, postoperative outcomes, and complication rates of modified Ferguson hemorrhoidectomy in patients with grade IV internal HD. This study seeks to enhance our

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understanding of the surgical outcomes associated with this advanced form of HD.

METHODS

This study received ethical approval from the Ethics Committee of Atılım University Faculty of Medicine, Medicana International Ankara Hospital (Date: 09.11.2023, Decision No: 32). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki. Between March 2021 and December 2024, a total of 2,534 patients presenting to our proctology clinic with HD were retrospectively evaluated. Among these, 769 patients underwent surgical intervention. Of these, 229 patients who underwent modified Ferguson hemorrhoidectomy for grade IV internal HD were included in the study.

Patients who underwent surgical procedures other than modified Ferguson hemorrhoidectomy; those diagnosed with grade I, II, or III internal HD; patients with uncontrolled diabetes, pregnancy, inflammatory bowel disease, inability to tolerate general anesthesia, a history of pelvic/perianal radiotherapy, bleeding disorders, or previous perianal surgery were excluded from the study.

All patients underwent a preoperative anorectal examination in the proctology unit. For patients over 50 years of age, colonoscopy was additionally performed. Based on the extent of the HD, each patient was treated with modified Ferguson hemorrhoidectomy involving two or three quadrants. All surgeries were performed by Dr. B.E., an experienced proctologist.

All patients were discharged on the first postoperative day. Preoperatively, all patients received intravenous ciprofloxacin 500 mg and metronidazole 500 mg as antibiotic prophylaxis. All patients received standardized postoperative care. Postoperatively, oral antibiotic therapy consisting of ciprofloxacin 500 mg twice daily and metronidazole 500 mg three times daily was prescribed for 5 days, along with micronized flavonoid fraction 1000 mg twice daily for one month. The routine analgesic regimen consisted of oral dextketoprofen 25 mg twice daily and diclofenac sodium SR 100 mg once daily. Intramuscular NSAIDs were not routinely prescribed; however, they were administered in cases where oral analgesics were insufficient. In addition, all patients were advised to take warm sitz baths twice daily, use stool softeners, and follow a high-fiber diet with adequate hydration.

Patients were invited for routine follow-up visits on postoperative day 1, at week 1, week 2, month 1, month 6, and year 1. Following the first postoperative year, patients were advised to attend annual proctology follow-up visits. Patients were advised to return for evaluation in case of any ongoing symptoms. Demographic characteristics, postoperative complications, postoperative pain assessed by the Visual Analog Scale (VAS) on postoperative days 1 and 7, time to return to normal daily activities, and recurrence rates were recorded using standardized, prospectively completed forms.

Surgical Procedure

All patients underwent surgery under general anesthesia combined with local infiltration of bupivacaine. With the patient in the prone jackknife position, an elliptical incision was made over the diseased hemorrhoidal tissue. Dissection was performed in the submucosal plane, carefully preserving the internal sphincter muscle, while intervening skin bridges were left intact to avoid circumferential scarring. Hemorrhoidal tissue was excised up to the anorectal junction using electrocautery, taking care to preserve intervening skin bridges.

The pedicle was ligated with a continuous 3/0 polyglactin suture, which was also used to close the rectal mucosa. Hemostasis was achieved by a combination of electrocautery, suture ligation, and the placement of an Absorbable Anal Sponge (8×3 cm; SPONGOSTAN™, Ethicon) in the anal canal at the end of the procedure. No sutures were placed in the anoderm, a deliberate modification intended to reduce postoperative pain, avoid ischemia, and minimize the risk of anal stenosis. This modification in the technique represents the key difference in the procedure. Postoperative dressing consisted solely of the anal sponge. The surgical procedure is illustrated in **Figure**.

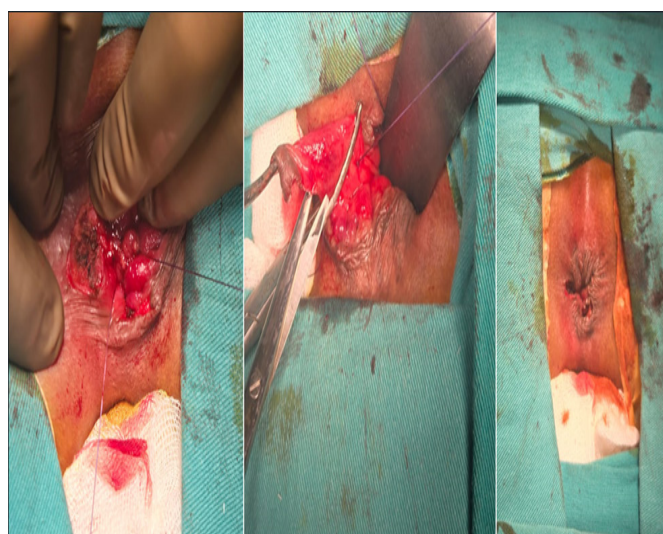


Figure. Intraoperative view of a modified Ferguson hemorrhoidectomy for grade IV hemorrhoids, performed without suturing the anoderm

Statistical Analysis

Data analysis was performed using SPSS version 27 (IBM Corp., USA). Normality of continuous variables was assessed using the Skewness and Kurtosis values. Variables with normal distribution were expressed as mean±SD, whereas non-normally distributed variables were summarized as median (IQR). Categorical data were presented as counts and percentages with 95% confidence intervals (CIs). Comparisons between preoperative and postoperative Cleveland Clinic Incontinence Scores (CCIS), which were not normally distributed due to skewness, were performed using the Wilcoxon signed-rank test. A p-value<0.05 was considered statistically significant.

RESULTS

A total of 229 patients, including 133 males and 96 females, were included in the study. The demographic characteristics of the patients and details of the quadrant-based hemorrhoidectomy are presented in **Table 1**.

Characteristic	n (%) or mean±SD
Age (years)	43.7±10.7
Sex	
Female	96 (42)
Male	133 (58)
Hemorrhoidectomy (quadrants)	
Two quadrants	44 (19)
Three quadrants	185 (81)

SD: Standard deviation

All patients were discharged on postoperative day 1. During postoperative follow-up, complications included urinary retention in 9 patients (3.9%) and UTI in 2 patients (0.9%). Among those with urinary retention, 2 were female and 7 were male, with a mean age of 65.2 years. Both patients who developed UTIs were female, aged 64 and 74 years, respectively.

Postoperative bleeding was observed in 3 patients (1.3%). One of these was a 56-year-old male without a known anticoagulant history but with a recent history of using an unspecified herbal medication with anticoagulant properties. He was evaluated under general anesthesia; minor oozing was observed and bleeding was controlled surgically. The remaining two patients were managed conservatively with one day of observation and showed no further bleeding.

Anal stenosis, classified as mild according to Milsom and Mazier criteria, developed in 2 patients (0.9%). Both were male, aged 46 and 50 years, and were successfully treated with anal dilatation and internal sphincterotomy. None of the patients experienced postoperative deterioration in continence. The median CCIS values were 0 (IQR 0–0) both preoperatively and postoperatively, with no statistically significant difference (Wilcoxon signed-rank test, $p>0.05$).

Minor perianal infection was observed in 12 patients (5.2%) and was controlled with simple wound care. No major perianal infections or cases of Fournier's gangrene were detected. The median time to return to normal daily activities was 12 days (IQR 7–12).

The median postoperative VAS pain score was 4 (IQR 4–4) on day 1 and 2 (IQR 1–2) on day 7. Standard analgesia with oral NSAIDs was sufficient in the majority of patients, while only seven patients (3.0%) required additional intramuscular diclofenac injections for breakthrough pain.

No recurrence was observed in patients who underwent three-quadrant hemorrhoidectomy. Among the patients who underwent two-quadrant hemorrhoidectomy, recurrence of HD from the non-operated quadrant was observed in 5 patients (2.1%) within 1 to 2 years postoperatively. These patients were treated with rubber band ligation.

The mean follow-up period was 16.8±7.9 months. Postoperative outcomes are summarized in **Table 2**.

Outcome	Value (n=229)
Urinary retention	9 (3.9%, 95% CI: 2.1–7.3)
Urinary tract infection	2 (0.9%, 95% CI: 0.2–3.1)
Postoperative bleeding	3 (1.3%, 95% CI: 0.4–3.8)
Anal stenosis (Milsom and Mazier)	
Mild	2 (0.9%, 95% CI: 0.2–3.1)
Moderate	0
Severe	0
Perianal infection	
Minor	12 (5.2%, 95% CI: 3.0–8.9)
Major/Fournier's gangrene	0
Cleveland Clinic Incontinence Score	Preop: 0 (IQR 0–0), Postop: 0 (IQR 0–0), $p > 0.05$ (Wilcoxon)
Postoperative pain (VAS)	Day 1: 4 (IQR 4–4), day 7: 2 (IQR 1–2)
Return to normal life, days	12 (IQR 7–12)
Recurrence	5 (2.1%, 95% CI: 0.9–4.9)
Follow-up, months	16.8±7.9

CI: Confidence interval, IQR: Interquartile range, VAS: Visual Analog Scale

DISCUSSION

Excisional surgical methods remain the most effective treatment option for advanced-stage HD, particularly grade 4, in terms of recurrence prevention. Among excisional hemorrhoidectomy techniques, the Ferguson (closed) hemorrhoidectomy has been shown to result in less postoperative pain, faster recovery, and lower rates of postoperative bleeding compared to the Milligan-Morgan (open) technique.^{3,8} In our surgical practice, we routinely prefer the modified Ferguson hemorrhoidectomy technique.

Postoperative urinary retention has been reported in rates as high as 13%, with male gender and advanced age identified as significant risk factors. In this study, urinary retention was more frequent among older male patients; however, the incidence was lower than that reported in the literature. We believe this lower incidence is because all our surgeries were performed under general anesthesia. This is important since spinal anesthesia has been shown to increase the risk of postoperative urinary retention.^{9,10} Bleday et al.¹¹ reported a UTI rate of 3.3% in their study. In contrast, the incidence of UTI in our cohort was markedly lower. We attribute this difference primarily to the use of general anesthesia, as previously noted, which may have contributed to a reduced incidence of postoperative urinary retention and, consequently, a lower risk of UTI. In addition, patients who received general anesthesia were mobilized earlier compared to those who would have received spinal anesthesia, and they were not affected by side effects such as spinal anesthesia-related postoperative headaches.

Postoperative bleeding following Ferguson hemorrhoidectomy has been described in the literature at rates up to 3%. It has been reported that males are more prone to postoperative bleeding, and that LigaSure hemorrhoidectomy carries a higher bleeding risk compared to Ferguson hemorrhoidectomy. Consistent with the literature, our postoperative bleeding rate was low. The use of continuous sutures in both the Ferguson and modified Ferguson hemorrhoidectomy techniques

contributes to the low incidence of postoperative bleeding. Moreover, Kaidar-Person et al.¹² have demonstrated that surgical experience plays a critical role in reducing bleeding complications.^{3,12-14}

The time to return to normal activities in this study was comparable to that reported in the literature. Although fecal incontinence rates up to 6% and anal stenosis rates up to 3.8% have been reported after hemorrhoidectomy, this study found no significant difference between preoperative and postoperative CCIS, and only 0.9% of patients developed mild anal stenosis. We believe this low complication rate is due to our surgical expertise and specialization in proctology.^{3,13,15,16}

Postoperative pain is the most significant complaint among patients following hemorrhoidectomy. Although pain after Ferguson (closed) hemorrhoidectomy is less than after Milligan-Morgan (open) hemorrhoidectomy, studies have shown that pain following Ligasure hemorrhoidectomy is even lower.^{17,18} In their study, Khanna et al.¹⁸ reported a mean VAS score of 5.2 on postoperative day 1 following Ferguson hemorrhoidectomy. In this study, although postoperative VAS scores were moderately low, it should be noted that all patients had advanced grade 4 disease, necessitating extensive resections.

Our modification can be regarded as an anoderm-sparing variation of the Ferguson hemorrhoidectomy. Unlike the classical Ferguson technique, in which the rectal mucosa, anoderm, and perianal skin are closed continuously, our method deliberately avoids anoderm suturing. This approach is conceptually similar to previously described anoderm-sparing techniques, with the rationale of reducing postoperative pain and the risk of anal stenosis by minimizing ischemia and tension in the anoderm. Although our findings showed relatively low pain scores, these observations should be interpreted with caution due to the retrospective, single-arm design of the study. Prospective randomized studies are needed to confirm whether this modification provides a true advantage over other closed or anoderm-sparing techniques.

Recurrence rates after Ferguson hemorrhoidectomy have been reported around 3%. In this study, no recurrence was observed in patients undergoing three-quadrant hemorrhoidectomy. However, among patients who underwent two-quadrant hemorrhoidectomy, HD developed in untreated quadrants during follow-up. We consider these cases as new disease developments rather than true recurrences.^{12,13}

Limitations

The most significant limitation of this study is its retrospective design and the lack of a control/comparison group. In addition, routine 5-day antibiotic prophylaxis was employed as part of our institutional practice, which does not reflect current international guidelines recommending single-dose preoperative prophylaxis. This discrepancy should be considered when interpreting our results.

CONCLUSION

The modified Ferguson hemorrhoidectomy method offers an effective treatment for grade 4 internal HD, characterized

by low complication rates and high treatment success. It is believed that postoperative pain is reduced in this method, particularly due to the absence of sutures placed in the anoderm. These results indicate that this method is a safe and reliable option for managing this advanced stage of the disease.

ETHICAL DECLARATIONS

Ethics Committee Approval

The study was initiated with the approval of the Atılım University Faculty of Medicine-affiliated Medicana International Ankara Hospital Ethics Committee (Date: 09.11.2023, Decision No: 32).

Informed Consent

Because the study was designed retrospectively, no written informed consent form was obtained from patients.

Referee Evaluation Process

Externally peer-reviewed.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Financial Disclosure

The authors declared that this study has received no financial support.

Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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