Efficacy of Stapled Haemorrhoidopexy *vs*. Ferguson Haemorrhoidectomy in the Treatment of Haemorrhoidal Disease: A Prospective, Randomised, Single-Blind Comparison

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ABSTRACT

Objective: To evaluate the effectiveness of stapled (sutured) haemorrhoidopexy (SH) in the treatment of haemorrhoidal disease (HD) symptoms, and to compare it with the Ferguson haemorrhoidectomy (FH) technique.

Study Design: Randomised, single-blind, experimental study.

Place and Duration of the Study: Department of General Surgery, Faculty of Medicine, Harran University, Sanliurfa, Turkiye, from April 2024 to February 2025.

Methodology: Patients over 18 years of age who were diagnosed with haemorrhoidal disease, accepted surgical treatment, agreed to participate in the study, and did not meet any of the exclusion criteria were included in the study. Postoperative symptom management efficacy was assessed using the haemorrhoidal disease symptom score (HDSS). For data obtained from repeated measurements, the Mann-Whitney U test was performed to evaluate comparisons among groups at multiple time points.

Results: A total of 42 patients who completed the six-month follow-up period were included in the study, with 18 patients in the FH group and 24 patients in the SH group. Of the total patients, 29 were male (69.0%), and 13 were female (31%). The median age was 39 (IQR:23) years. Both groups showed significant differences in the HDSS when comparing preoperative scores with postoperative scores at months 1, 3, and 6 ($p < 0.001$ for each comparison). However, no statistically significant difference in the HDSS was observed between the groups at any time point (0.573, <0.123, <0.679, <0.393).

Conclusion: SH was equally effective as FH in controlling symptoms associated with HD in the postoperative period and may be recommended as a minimally invasive treatment option for patients.

Key Words: *Ferguson haemorrhoidectomy, Haemorrhoidal disease symptom score, Sutured haemorrhoidopexy*.

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INTRODUCTION

Haemorrhoidal disease (HD) is the most common proctological condition, with prevalence rates in adults reaching up to 40%.[1] Initial treatment approaches include lifestyle modifications, dietary changes, and laxative use, which serve as the first-line approach for all stages of HD.[2] In early-stage HD, particularly stages I–II, when these basic treatment modalities are insufficient, outpatient procedures such as rubber band ligation and sclerotherapy may be employed to control symptoms.[2,3] In contrast, surgical interventions are generally required for stage III–IV HD or when outpatient treatments fail to achieve adequate results.

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Haemorrhoidectomy remains the gold standard and most commonly performed surgical treatment for HD.[4] Among these methods, Milligan–Morgan (MM) haemorrhoidectomy and Ferguson haemorrhoidectomy (FH) are widely recognised and practised procedures.[5] These techniques effectively remove both internal and external haemorrhoidal components and are relatively easy to learn and perform.[6] Haemorrhoidectomy remains the primary surgical option for advanced and/or complicated haemorrhoids, due to its low recurrence rates and strong symptom control. However, post-operative pain caused by tissue excision, along with complications resulting from the removal of haemorrhoidal tissue, represents its major drawbacks.[7-9] Reports in the literature indicate that the incidence of moderate-to-severe pain following conventional haemorrhoidectomy can reach up to 65%.[10]

Due to these drawbacks, new tissue-preserving surgical techniques have been developed.[11,12] Stapled (sutured) haemorrhoidopexy (SH) is one such method, designed to ligate haemorrhoidal arteries using sutures, with or without Doppler guidance, reducing blood flow to the haemorrhoidal tissue.[13] To address the

discomfort caused by prolapsed tissue, the ligation suture is typically followed by a mucosal pexy suture, which acts as a permanent suspension mechanism. Compared to haemorrhoidectomy, this procedure results in less postoperative pain.[14]

This study aimed to prospectively evaluate the effectiveness of SH in the treatment of HD symptoms and to compare its efficacy with that of FH, a fundamental surgical procedure for HD. Although SH has been investigated in a limited number of studies, the available literature remains insufficient regarding its long-term outcomes and comparative effectiveness. Therefore, evaluating this innovative surgical approach[15] in the present study is of particular clinical significance, as it may provide valuable evidence for optimising the surgical management of symptomatic HD.

METHODOLOGY

The study was designed as a prospective single-blind randomised clinical trial. The sample consisted of consecutive patients who underwent surgery at the Department of General Surgery, Faculty of Medicine, Harran University, Sanliurfa, Turkiye, from April 2024 to February 2025. Detailed informed consent was obtained from the study patients. Ethical approval was obtained from the Local Ethics Committee of the university. Fifty patients who met the inclusion criteria were randomly distributed with the help of a computer programme, 25 patients in the FH group and 25 patients in the SH group. However, eight of these patients were excluded from the study because they did not attend the 6-month follow-up. The study was a single-blind design in which the investigators were aware of the surgical procedures used in the different trial groups, but the participants were unaware of them.

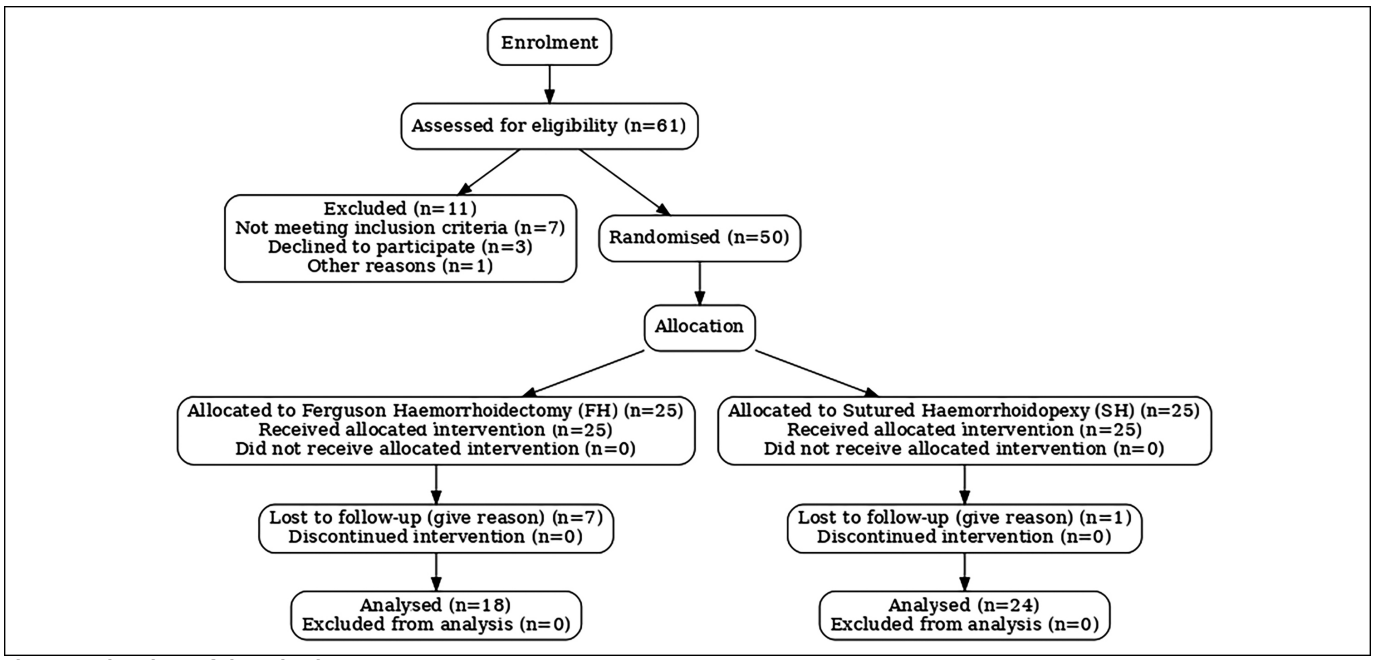

Figure 1: Flowchart of the selection process.

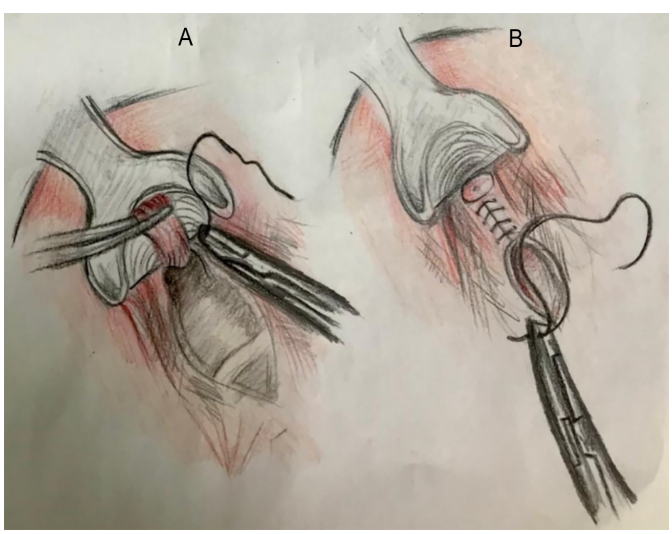

Figure 2: (A) Ligation of the resected haemorrhoidal pile. (B) Distal suturing with the same suture.

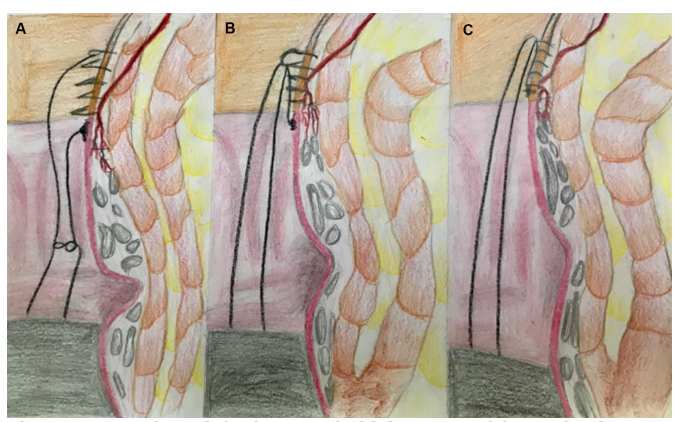

Figure 3: Suturing of the haemorrhoidal artery, with proximal extension of sutures (A, B) followed by knot placement (C).

The surgeries were performed by the same surgeon experienced in the field of proctology. After surgery, patients in both groups were given the same diet and the same wound

care. For the comparison, the haemorrhoidal disease symptom score (HDSS), a scoring system first defined by Nystrom *et al*. to provide a numerical assessment of HD symptom severity, was used.[16] A total of 42 patients who completed the six-month follow-up period were included in the study, with 18 patients in the FH group and 24 patients in the SH group. The flow diagram of the study is shown in Figure 1.

Patients over 18 years of age who were diagnosed with haemorrhoidal disease, accepted surgical treatment, agreed to participate, and did not meet any of the exclusion criteria were included in the study. Exclusion criteria were patients younger than 18 years; those with a history of anorectal surgery, pelvic radiotherapy, inflammatory bowel disease, chronic anal diseases, external HD, or grade III–IV obstetric trauma; patients with incarcerated HD; pregnant women; those who either refused participation or failed to attend regular follow-ups.

The patient data were recorded and evaluated, including age, gender, presence of comorbidities, chronic medication use, duration of preoperative medical treatment, disease stage, number of haemorrhoidal piles, and HDSS scores (preoperatively and at 1, 3, and 6 months postoperatively).

For both surgical procedures, patients received preoperative antibiotic prophylaxis and a single rectal enema for bowel preparation. All patients were operated on under spinal anaesthesia in the lithotomy position. A disposable half-moon anoscope was used for visualising the anal canal.

In the FH technique, the patient was operated under spinal anaesthesia in the lithotomy position. Anal examination was conducted using a disposable half-moon anoscope. Haemorrhoidal piles identified for intervention were isolated using clamps. Dissection was performed proximally at the anoderm boundary of the pile with scissors and electrocautery, and continued until intact mucosal tissue above the dentate line was reached.

The pedicle of the dissected haemorrhoid was clamped and resected above the clamp. The pedicle was then ligated with 5/8 circle 2-0 polyglactin sutures beneath the clamp. Using the same suture, the disrupted mucosal and skin tissues were continuously sutured distally, starting from the pedicle area (Figure 2). For each patient, a minimum of one and a maximum of three piles were excised. The procedure was concluded after achieving haemostasis, and a resorbable haemostatic agent was placed at the haemorrhoidectomy site.

In the SH technique, the patient was operated under spinal anaesthesia in the lithotomy position. Anal examination was conducted using a disposable half-moon anoscope. Haemorrhoidal piles identified for intervention were isolated using clamps. The targeted pile was gently pulled slightly outward from the anus under controlled conditions. The resulting mucosal tenting was sutured just proximal to the dentate line, where intact mucosa begins, using 5/8 circle 2-0 polyglactin sutures that included both mucosa and submucosa. The suture was then tied. Subsequently, additional sutures were passed through mucosa and submucosa, progressing proximally for 4–5 loops at 5-mm intervals. The two ends of the suture were tied together with sufficient tension to form a mucosal fold (Figure 3). This procedure was repeated for all piles deemed necessary. The procedure was concluded after achieving haemostasis, and a resorbable haemostatic agent was placed at the haemorrhoidopexy site.

In the HDSS scoring system, defined in 2010, patients were asked to respond to five questions regarding their experiences over the past three months.[16] Each question was scored from 0 (minimum) to 4 (maximum), yielding a total score ranging from 0 to 20. A score of 0 indicated never, 1 indicated less than once a month, 2 indicated less than once a week, 3 indicated one to six days a week, and 4 indicated every day or always. Higher scores indicate greater severity of HD symptoms. The questions were as follows: Patients were asked to report the frequency of their haemorrhoidal symptoms, including pain, itching, or discomfort in the anal area, bleeding during defecation, soiling of underwear, and swelling or prolapse of haemorrhoids.

Statistical analyses were performed using the R software (version 4.4.2; R Foundation for Statistical Computing, Vienna, Austria). The distributive characteristics of continuous variables were assessed using the Shapiro–Wilk test. Normally distributed data were reported as mean ± standard deviation, whereas non-normally distributed data were reported as median [IQR]. Categorical variables were presented as frequencies and percentages.

For data obtained from the repeated measurements, the Mann-Whitney U test was performed to evaluate the comparisons among groups at multiple time points. The Friedman test was employed to assess changes over time within the same group. For significant results, the Durbin–Conover post-hoc test was applied for pairwise comparisons. Power analysis was not included in the study because the patient numbers determined for each group at the beginning of the study were not maintained. A p-value of ≤0.05 was considered statistically significant in all analyses.

RESULTS

When surgical techniques were compared, the frequency of comorbidities was significantly lower in the FG group (5.6%) compared to that in the HG group (37.5%; $p = 0.026$), as shown in Table I. No significant differences were found between the groups in terms of age, gender, chronic medication use, duration of haemorrhoidal symptoms, history of preoperative medical treatment, duration of preoperative medical treatment, disease stage, or the number of piles treated ($p > 0.05$ for all).

Table I: Comparison of the demographic and clinical characteristics according to the surgical technique in patients undergoing haemorrhoidectomy.

Variables	Overall (n = 42)	FH Group (n = 18)	SH Group (n = 24)	p-values
Age (years)	39.0 [23]	35.5 [20]	40.5 [24.5]	0.508**
Gender				
Male	29 (69.0%)	14 (77.8%)	15 (62.5%)	0.470*
Female	13 (31.0%)	4 (22.2%)	9 (37.5%)	
Comorbidity, yes ‡	10 (23.8%)	1 (5.6%)	9 (37.5%)	**0.026***
Chronic medication use, yes ‡	10 (23.8%)	2 (11.1%)	8 (33.3%)	0.147*
Duration of haemorrhoid complaints (month) §	48.0 [76]	36.0 [96]	65.0 [74]	0.769**
Preoperative treatment history, yes ‡	23 (54.8%)	9 (50.0%)	14 (58.3%)	0.823*
Duration of preoperative treatment (months) §	6.0 [12]	3.0 [6]	6.0 [12]	0.281**
Disease stage ‡				
II	4 (9.5%)	0 (0.0)	4 (16.7%)	0.065*
III	35 (83.3%)	18 (100.0%)	17 (70.8%)	
IV	3 (7.1%)	0 (0.0)	3 (12.5%)	
Pile count ‡				
2	3 (7.1%)	2 (11.1%)	1 (4.2%)	0.331*
3	33 (78.6%)	15 (83.3%)	18 (75.0%)	
4	6 (14.3%)	1 (5.6%)	5 (20.8%)	
Number of piles intervened ‡				
2	9 (21.4%)	5 (27.8%)	4 (16.7%)	0.462*
3	33 (78.6%)	13 (72.2%)	20 (83.3%)	

*‡n (%), §Median [min–max] **Mann-Whitney U test. *Pearson's Chi-square or Fisher's Freeman Halton test. Bold p-value indicates statistical significance (p ≤0.05).*

Table II: Pairwise comparisons of the symptom scores between time points.

Symptom scores		p-values*		
		Overall	FH Group	SH Group
Preoperative	Postoperative 1st month	**<0.001**	**<0.001**	**<0.001**
Preoperative	Postoperative 3rd month	**<0.001**	**<0.001**	**<0.001**
Preoperative	Postoperative 6th month	**<0.001**	**<0.001**	**<0.001**
Postoperative 1st month	Postoperative 3rd month	**<0.001**	**<0.001**	**<0.001**
Postoperative 1st month	Postoperative 6th month	**<0.001**	**<0.001**	**<0.001**
Postoperative 3rd month	Postoperative 6th month	0.815	0.441	0.381

**Durbin–Conover test. Bold p-values indicate statistical significance (p ≤0.05).*

Table III: Comparison of preoperative and postoperative symptom scores over time according to surgical technique in patients undergoing haemorrhoidectomy.

Symptom scores	Overall (n = 42)	FH Group (n = 18)	SH Group (n = 24)	p-values
Preoperative score §	12.0 [4,0 – 19,0]	14.0 [4,0 – 18,0]	12.0 [6.0 – 1.0]	0.573
Postoperative 1st month score §	6.0 [0.0 – 20.0]	4.0 [0.0 – 20.0]	7.0 [3.0 – 10.0]	<0.123
Postoperative 3rd month score §	3.5 [0.0 – 12.0]	3.0 [0.0 – 12.0]	4.0 [0.0 – 10.0]	<0.679
Postoperative 6th month score §	2.0 [0.0 – 16.0]	2.0 [0.0 – 16.0]	3.5 [0.0 – 13.0]	<0.393
p-values**	**<0.001**	**<0.001**	**<0.001**	

*§Median [min-max]. *Mann-Whitney U test. **Friedman test. Bold p-values indicate statistical significance (p ≤0.05).*

According to the results of repeated measures analysis, the change in symptom scores of patients who underwent SH is shown in Table II.

Symptom scores of FG and HG groups did not show a statistically significant difference between the groups preoperatively or at 1, 3, and 6 months postoperatively (Table III).

DISCUSSION

In the present study, the postoperative efficacy of the FH and SH methods in the surgical treatment of HD was compared in detail based on improvements in symptom scores. The Ferguson technique, which has been considered the gold standard in the surgical management of HD for many years, is an excisional surgical method.[17] In contrast, SH techniques offer a minimally invasive approach and have been particularly effective in reducing perianal pain.[13,14,18] Although SH techniques exhibit some differences among surgeons who perform them, they can be regarded as different sub-versions of the same treatment method, as they are based on the same basic objectives.

When examining the results of the present study focusing on the impact of surgical techniques on postoperative HDSS, SH was found to provide similar efficacy to FH in symptom control at the postoperative 1st, 3rd, and 6th month follow-ups, with no significant differences between the two techniques. A review of the literature, however, reveals varying data on the recurrence rates of these techniques. For example, in a multicentre study by Giuliani *et al.*, data from 1,681 patients

were retrospectively analysed, comparing conventional transanal haemorrhoidectomy with SH in terms of post-operative complications and recurrence rates. Patients who underwent excisional haemorrhoidectomy had a significantly higher risk of postoperative complications. Regarding recurrence, after 24 months of follow-up, significantly higher recurrence rates were identified in the SH group that underwent.[19] In contrast, a study by Trenti *et al*., comparing patients with stage III–IV HD, reported similar recurrence rates for both surgical techniques.[20] However, their study had some limitations. The study was conducted in a single centre and included 73 patients. In the study design, the mean follow-up duration was stated as 1.1 years for the SH group and 2.9 years for the haemorrhoidectomy group. Similarly, in a recent single-centre retrospective observational study by Ihle *et al*., 88 patients with stage II–IV HD were compared, and after one year of follow-up, both techniques were reported to have similar recurrence rates.[9] The discrepancies in the literature may be due to methodological differences between studies, such as the stage of the treated HD, distinct patient population characteristics, follow-up durations, and variations in the application details of surgical techniques. This underscores the importance of methodological standards in future multicentre studies.

One of the most striking findings of the present study is the influence of time on symptom scores. Analysis of the trends in symptom score improvements revealed a turning point after the 3rd postoperative month for both surgical methods. At this time point, the rate of symptom improvement slowed, and some patients began to experience symptom recurrence. Fareed *et al.* also discussed this turning point in their study on symptom control following haemorrhoidectomy and suggested that it may be associated with psychosocial factors during the recovery process.[21] These findings highlight the importance of intensifying postoperative follow-up protocols during the first three months after surgery.

In the comparison of surgical techniques for HD treatment, another important point frequently emphasised in the literature is patient satisfaction and quality of life.[22] In the present study, the absence of statistical differences in HDSS during postoperative follow-up between the two surgical techniques suggested that both groups achieved similar outcomes in terms of quality of life. However, whether a 6-month follow-up period is sufficient to draw such conclusions remains open to question. Postoperative pain, a significant problem, can impair quality of life, particularly in the early postoperative period.[23] Aytac *et al*. reported that SH offers advantages in short-term patient satisfaction, particularly due to its efficacy in pain control, while long-term quality of life outcomes were similar to those of the Ferguson technique.[24] Similarly, Ihle *et al*. reported that the SH technique is associated with significantly lower postoperative pain scores compared with haemorrhoidectomy.[9] In addition, as a minimally invasive technique, SH does not hinder potential future haemorrhoidectomy procedures and reduces the risk of serious complications such as anal stenosis, which can be considered other advantages.[25] These findings highlight the necessity of carefully evaluating patient expectations with clinical goals in the selection of surgical techniques. Although SH may be considered a viable option focusing on short-term patient comfort, its long-term outcomes must be closely monitored.

There are certain limitations to the present study. First, the limited patient cohort reduced the statistical power and restricted the generalisability of the findings. A power analysis could not be performed because patient loss during follow-up was higher than anticipated. Second, it was the single-centre design. Multicentre studies, including data from different populations, ethnic groups, and geographic regions, could enhance the generalisability and applicability of the results to larger populations. Moreover, collaboration with researchers from diverse disciplines may provide various perspectives and methodological approaches, enriching the depth of the study and reducing potential biases. Finally, the short follow-up period limited the ability to obtain more comprehensive and reliable results. However, the prospective, single-blind, randomised design of the study and use of advanced statistical analysis methods were strengths, increasing generalisability of the findings. Therefore, the results obtained in the present study should be supported by multicentre studies involving larger populations with longer follow-up periods.

CONCLUSION

SH was found to be as effective as FH in controlling HD symptoms. Because SH techniques are performed at the anal mucosa level, they are associated with lower post-operative pain, which represents a significant advantage for early postoperative patient comfort. Therefore, surgeons should adopt an individualised treatment approach that considers patient characteristics, expectations, and the long-term effects of the surgical techniques.

ETHICAL APPROVAL:
Ethical approval was obtained from the local Ethics Committee of the Harran University Hospital, Turkiye (Protocol ID: 24.04.40; Dated: 15 April 2024). This study was conducted in accordance with the Declaration of Helsinki.

PATIENTS' CONSENT:
Informed consent was taken from all participants included in this study.

COMPETING INTEREST:
The authors declared no conflict of interest.

AUTHORS' CONTRIBUTION:
MSB: Data entry, literature search, editing, statistical analysis,

postoperative follow-up evaluation, critical revision of the article, and supervision.
HY: Conceptualisation, study design, data collection, patient selection, statistical analysis, interpretation of results, drafting, and critical revision of the article.
Both authors approved the final version of the manuscript to be published.

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