IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 23, Issue 10 Ser. 9 (October. 2024), PP 48-55
www.iosrjournals.org

Surgical Treatment Of Haemorrhoids: Stapled Haemorrhoidopexy Versus Conventional Excisional Haemorrhoidectomy - A Clinical Outcome Analysis

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Abstract:
Background: *Hemorrhoids are a common anorectal condition that often requires surgical intervention for third-degree cases when conservative treatments fail. Although both stapled haemorrhoidopexy and conventional excisional hemorrhoidectomy are widely used, uncertainty remains about which technique is superior. This study compares the short- and long-term outcomes of these procedures, focusing on recovery time, pain, and complications to clarify the optimal surgical approach.*
Materials and Methods: *An open-label randomized controlled trial was conducted at Bangabandhu Sheikh Mujib Medical University (BSMMU) over 12 months. Eighty-two patients with third-degree hemorrhoids were randomly assigned to undergo either stapled haemorrhoidopexy or conventional excisional hemorrhoidectomy. Primary outcomes were operating time, postoperative pain, and recovery period, while secondary outcomes included symptom improvement and complications. Data analysis was performed using SPSS, with statistical significance set at $p < 0.05$.*
Results: *Group A had a significantly shorter operating time (16.5 vs. 25 minutes, $p = 0.001$) and less postoperative pain, with 42.9% reporting severe pain at 4 hours post-surgery compared to 95.2% in Group B ($p = 0.001$). By day 15, 95.2% of Group A experienced mild pain, while 64.3% of Group B still reported moderate pain ($p = 0.001$). Group A also had a faster recovery, with a median pain-free defecation time of 7 days versus 18.5 days for Group B ($p = 0.001$). Urinary retention was more common in Group B (50% vs. 19%, $p = 0.003$), while recurrence of mucosal prolapse was lower in Group A (21.4% at 6 months, $p < 0.01$).*
Conclusion: *Stapled haemorrhoidopexy provides faster recovery and less pain but has a lower recurrence of mucosal prolapse compared to conventional hemorrhoidectomy. Surgical decisions should balance short-term benefits with long-term risks.*
Keywords: *stapled haemorrhoidopexy, excisional hemorrhoidectomy, postoperative pain, recurrence, recovery*

Date of Submission: 12-10-2024 Date of Acceptance: 22-10-2024

I. Introduction

Hemorrhoids are a common anorectal condition affecting millions worldwide [1], characterized by the abnormal distension and displacement of anal cushions, leading to symptoms such as bleeding, prolapse, pain, and discomfort [2]. Hemorrhoids are typically classified into four grades based on severity, with third-degree hemorrhoids requiring manual reduction of prolapsed tissue [3,4]. Globally, hemorrhoids impact approximately 4-5% of the population, but prevalence varies by region, diet, and age, with up to 50% of adults over 50 experiencing symptomatic hemorrhoids at some point in their lives [3,5] . The incidence tends to be higher in developed countries, where low-fiber diets and sedentary lifestyles contribute to increased cases [6].

The burden of hemorrhoidal disease extends beyond individual discomfort, with significant economic and healthcare costs. Hemorrhoid-related medical care, including over-the-counter treatments, physician consultations, diagnostic procedures, and surgical interventions, imposes a substantial financial strain. In the United States alone, the cost of treating hemorrhoids exceeds $500 million annually, reflecting the impact on healthcare systems (4). Surgical interventions, including stapled haemorrhoidopexy and conventional excisional haemorrhoidectomy, contribute significantly to this expenditure due to hospital admissions, follow-up care, and extended recovery times.

For severe cases, particularly third- and fourth-degree hemorrhoids, surgical intervention is often necessary when conservative treatments fail [7]. Two widely used techniques are stapled haemorrhoidopexy and conventional excisional haemorrhoidectomy[8]. Stapled haemorrhoidopexy, introduced in the 1990s, is a minimally invasive procedure that uses a circular stapling device to reposition prolapsed hemorrhoidal tissue and

restore normal anatomy [9]. It has gained popularity due to its association with reduced postoperative pain, shorter hospital stays, and quicker recovery times compared to conventional excisional hemorrhoidectomy, where hemorrhoidal tissue is surgically removed[10].

Despite these advantages, both techniques have limitations. Stapled haemorrhoidopexy has been linked to little recurrence rates and complications such as fecal incontinence [11]. In contrast, conventional excisional haemorrhoidectomy, while effective in long-term symptom resolution, is associated with significant postoperative pain and prolonged recovery periods [12]. These differing outcomes have fueled ongoing debates about the optimal surgical approach.

While numerous studies have compared stapled haemorrhoidopexy and conventional excisional haemorrhoidectomy, the evidence remains inconclusive[8,13]. Many studies focus on isolated outcomes, such as postoperative pain or recurrence rates, but do not provide a comprehensive evaluation of clinical factors, including operating time, hospital stay, complication rates, and overall symptom management. This gap in the literature creates a need for more holistic research to guide clinical decisions. The primary aim of this study is to compare the clinical outcomes of stapled haemorrhoidopexy versus conventional excisional haemorrhoidectomy in the surgical management of third-degree hemorrhoids.

II. Material And Methods

Study Design and Randomization

This study was conducted as an open-label, parallel-group randomized controlled trial (RCT) at Bangabandhu Sheikh Mujib Medical University (BSMMU) in Dhaka over a 12-month period, from May 2017 to April 2018. The aim was to compare the outcomes of two surgical procedures for hemorrhoid treatment: stapled hemorrhoidopexy (SH) and conventional excisional hemorrhoidectomy (CEH). Participants were randomly allocated (1:1) to either the experimental group (Group A), which underwent stapled hemorrhoidopexy, or the control group (Group B), which underwent conventional excisional hemorrhoidectomy. The trial adhered to ethical guidelines and received approval from the institutional review board.

Study Population

The study population consisted of patients admitted for hemorrhoid surgery at BSMMU who met the inclusion criteria. Eligible participants were male and female patients aged 18 to 50 years, all of whom had symptomatic 3rd-degree hemorrhoids located at the 3, 7, and 11 o'clock positions, presenting with complaints such as bleeding, pain, irritation, or prolapse.

Patients were excluded from the study if they had acute hemorrhoidal thrombosis, a history of previous hemorrhoidectomy, or other concurrent anal pathologies, such as fistula or fissure. Additionally, individuals with other colorectal diseases (e.g., rectal cancer, Crohn's disease, or ulcerative colitis), immunocompromised conditions, bleeding disorders, or advanced coronary artery disease (NYHA Class III-IV) were not included. Patients with tumors, infections, or severe hypertension (systolic BP > 160 mmHg) were also excluded from participation.

Interventions

Group A (Stapled Haemorrhoidopexy)

Stapled haemorrhoidopexy is performed under general or regional anesthesia, with the patient positioned in either the prone jack-knife or lithotomy position. The procedure utilizes a specialized kit that includes a 34 mm stapling gun, an anal dilator, a purse-string suture speculum, and a suture threader. The anal dilator is inserted and secured to the perianal skin, followed by the placement of a purse-string suture 4–5 cm above the dentate line in the submucosa using the speculum. The stapler is then inserted with its anvil extended, and the purse-string suture is tied over the shaft of the anvil. The suture tails are retrieved using a crochet hook, and the stapler is tightened, drawing the prolapsed mucosa into its casing. After firing the stapler, compression is maintained for 20–30 seconds to ensure hemostasis. The stapler and dilator are then removed, leaving a staple line approximately 2 cm above the internal hemorrhoids

Group B (Conventional Excisional Hemorrhoidectomy)

Excisional hemorrhoidectomy procedure, under regional anesthesia, the patient is placed in a lithotomy position, and the surgical site is prepared aseptically. The anal canal is gently dilated with two fingers, and artery forceps are applied to the perianal skin to expose the internal hemorrhoids. Hemorrhoids are dissected by traction and division, starting at the 3 o'clock position. Care is taken to avoid sphincter injury during dissection. Once the pedicle is exposed, it is ligated with 1/0 catgut and cut, leaving sufficient tissue. Bleeding is controlled by ligation or cauterization. This process is repeated for all hemorrhoidal bundles.

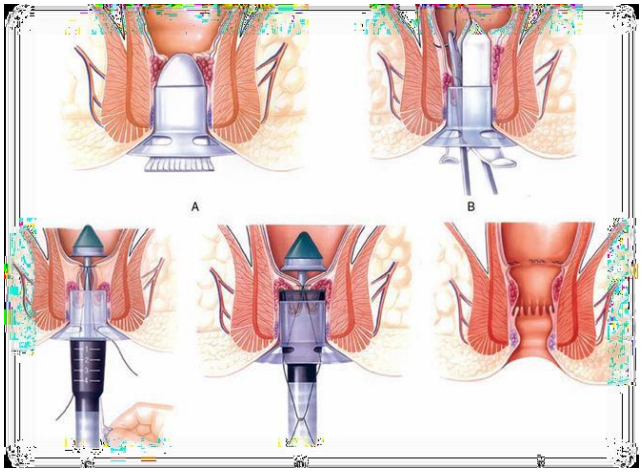

Figure 1: Stapled hemorrhoidectomy procedure: (A) Insert and secure anal dilator to perianal skin. (B) Place purse-string suture 4–5 cm above dentate line using specialized anoscope. (C) Pull suture through stapler's lateral holes. (D) Close and fire stapler. (E) Place staple line about 2 cm above internal hemorrhoids.

Sample Size Calculation

The sample size was calculated using the formula for comparing means of continuous outcomes, with a significance level of 5% and a power of 80%. The standard deviation (σ) was assumed to be 1.33, and the mean difference (δ) was set at 0.565. Based on these parameters, a total of 82 patients were required, with 41 in each group, to account for a potential 10% dropout rate. The formula used for the calculation was:

$$n = \frac{2\sigma^2 \left(Z_{\frac{\alpha}{2}} + Z_{\beta}\right)^2}{\delta^2}$$

Study Outcomes

The primary outcomes measured in this study included operating time, postoperative pain, and recovery period. The operating time was defined as the total duration of the surgical procedure, recorded in minutes. Postoperative pain levels were assessed at 4 hours, 24 hours, and 15 days after surgery using a standardized pain scale to evaluate patient discomfort. The length of the hospital stay was measured in days, reflecting the time patients remained under postoperative care. Recovery time was gauged by how long it took for patients to resume pain-free defecation and return to their normal work activities.

The secondary outcomes focused on symptom improvement and complications. Symptom improvement was measured by reductions in common hemorrhoid-related symptoms such as bleeding, irritation, and prolapse. Complications were monitored for perioperative issues, including primary, reactionary, and secondary hemorrhage, urinary retention, anal stricture, recurrence of hemorrhoids, and postoperative infections, providing a comprehensive view of the safety and efficacy of the two surgical procedures.

Research Instruments and Variables

A structured data collection sheet, along with the Visual Analogue Scale (VAS), was utilized to gather patient information and track clinical outcomes throughout the study. Demographic data collected included the age and gender of the participants.

The study recorded various clinical outcomes, including procedure time, postoperative pain assessed with VAS, total hospital stay, time to return to normal activities, postoperative complications, and recurrence of hemorrhoids over time.

Visual Analogue Scale (VAS): The Visual Analogue Scale (VAS) was used to measure postoperative pain levels. This scale ranged from 0 to 10, with 0 representing no pain and 10 indicating the worst possible pain. Pain levels were categorized as follows: 0 signified no pain; 1-2 represented mild pain; 3-4 indicated moderate pain 1 that interfered with tasks; and 5-6 referred to moderate pain 2 that affected concentration. Severe pain, rated at 7-8, was defined as pain that interfered with basic needs, while the worst pain, scored at 9-10, required bed rest for management. This detailed pain assessment facilitated the monitoring of patient discomfort during the postoperative period.

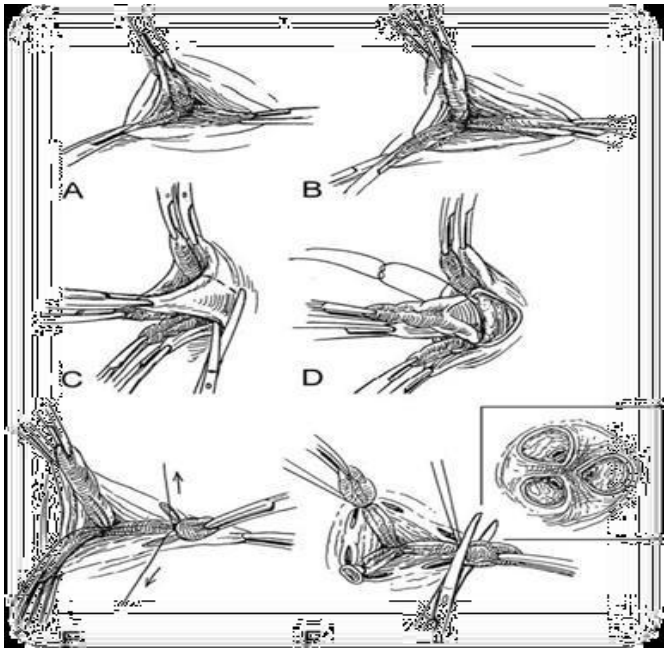

Figure 2: (A) External hemorrhoids are retracted. (B) Internal and external hemorrhoids are pulled outward. (C) Hemorrhoids and external skin are excised. (D) Suture is placed through the internal hemorrhoid and vascular bundle. (E) Ligature is tied. (F) Tissue below the ligature is removed.

Postoperative Care and Follow-up

All patients were started on oral feeding 4 hours post-surgery. Pain management included oral analgesics, and warm sitz baths were recommended if necessary. Patients were instructed to maintain a liquid or semisolid diet for the first 24 hours postoperatively and were prescribed bulk-forming agents for 6-8 weeks.

Antibiotic prophylaxis was administered perioperatively. Patients were monitored postoperatively for pain, bleeding, urinary retention, sepsis, and other complications. Follow-up visits were scheduled at 2 weeks, 1 month, 3 months, and 6 months to assess symptom resolution and recurrence of hemorrhoids.

Statistical Analysis

Data analysis was conducted using SPSS version 21. Qualitative data were analyzed using the Chi-square test or Fisher's exact test, while quantitative data were tested for normality using the Shapiro-Wilk test to determine the normality of the distribution. Parametric tests (e.g., t-test) were applied for normally distributed data, and non-parametric tests (e.g., Mann-Whitney U) were used for non-normally distributed data. A p-value of <0.05 was considered statistically significant. Results were presented in tables and figures where appropriate.

Ethical Considerations

The study protocol was approved by the BSMMU Ethics Committee. All participants were informed of the study's purpose, procedures, and their right to withdraw at any time without compromising their standard of care. Informed written consent was obtained from each participant. Data confidentiality was strictly maintained, and all collected data were anonymized. The study complied with the principles outlined in the Declaration of Helsinki.

III. Result

Age and Gender Distribution

A total of 82 patients were included in the study, with 41 patients in Group A (stapled hemorrhoidopexy) and 41 patients in Group B (conventional excisional hemorrhoidectomy). The age distribution between the two groups was comparable, with a median age of 35.5 years in both groups ($p = 0.655$). The age range for both groups was 20 to 50 years. Group A comprised 64.3% males and 35.7% females, while Group B comprised 59.5% males and 40.5% females, with no significant difference in gender distribution ($p = 0.653$) (Table 1).

Table (1): Distribution of Study Subjects by Age and Gender in group (n=100)

Demographic Characteristics	Group A, n (%)	Group B, n (%)	p-value
Age (years)			
Less than 20	2 (4.8)	2 (4.8)	
21 – 30	14 (33.3)	10 (23.8)	
31 – 40	10 (23.8)	13 (31.0)	
41 – 50	16 (38.1)	17 (40.4)	
Median Age (Min-Max)	**35.50 (20 – 50)**	**35.50 (20 – 50)**	**0.655**
Gender			
Male	27 (64.3)	25 (59.5)	0.653
Female	15 (35.7)	17 (40.5)	

Group A denotes Stapled Haemorrhoidopexy and Group B denotes Conventional Excisional Hemorrhoidectomy
**Chi-square and Mann-Whitney U test was performed to assess the level of significance*

Primary Outcomes

Operating Duration

The median operating time was significantly shorter in Group A (16.5 minutes) compared to Group B (25 minutes) (p = 0.001) (Table 2).

Table (2): Operating Duration in group

Operating Duration	Group A	Group B	p-value
Median Operating duration in Minutes (Min-Max)	16.5 (10.0- 25.0)	25.0 (15.0– 30.0)	0.001

Group A denotes Stapled Haemorrhoidopexy and Group B denotes Conventional Excisional Hemorrhoidectomy
** Mann-Whitney U test was performed to assess the level of significance*

Postoperative Pain

Pain intensity was assessed at different intervals postoperatively. At 4 hours post-surgery, severe pain was reported by 42.9% of patients in Group A and 95.2% in Group B, indicating a significantly lower incidence of severe pain in Group A (p = 0.001). At 24 hours post-surgery, none of the patients in Group A reported severe pain, compared to 52.4% in Group B (p = 0.001). By day 15, 95.2% of patients in Group A experienced only mild pain, while 64.3% of patients in Group B still reported moderate pain (p = 0.001) (Table 3).

Recovery Period

Group A demonstrated a significantly faster recovery, with a median pain-free defecation period of 7 days compared to 18.5 days in Group B (p = 0.001). Return to work also occurred significantly earlier in Group A, with a median of 7 days compared to 22.5 days in Group B (p = 0.001). Additionally, the median postoperative hospital stay was slightly shorter in Group A (2 days) compared to Group B (p = 0.016) (Table 4).

Table (3): Post-Operative Pain by group

Post-operative pain	Group A, n (%)	Group B, n (%)	p-value
Pain at 4 hours			
Moderate 2	24 (57.1)	2 (4.8)	0.001*
Severe	18 (42.9)	40 (95.2)	
Pain at 24 hours			
Moderate 1	26 (61.9)	2 (4.8)	0.001*
Moderate 2	16 (38.1)	17 (40.5)	
Severe	0 (0.0)	22 (52.4)	
Worst	0 (0.0)	1 (2.4)	
Pain at 15 days			
Mild	40 (95.2)	14 (33.3)	0.001*
Moderate 1	2 (4.8)	27 (64.3)	
Moderate 2	0 (0.0)	1 (2.4)	

Group A denotes Stapled Haemorrhoidopexy and Group B denotes Conventional Excisional Hemorrhoidectomy
**Chi-square and Mann-Whitney U test was performed to assess the level of significance*

Secondary Outcomes

Postoperative Complications or Severe Adverse Event

In terms of immediate postoperative complications, urinary retention was significantly more common in Group B (50%) compared to Group A (19%) (p = 0.003). Incontinence of stool was reported in 14.3% of Group A and 4.8% of Group B; however, the difference was not statistically significant (p = 0.137) (Table V).

Table (4): Recovery Period Distribution by group

Recovery Period	Group A Median (Min-Max)	Group B Median (Min-Max)	p-value
Pain free defecation (days)	7.0 (6.0-21.0)	18.5 (10.0-30.0)	0.001
Return to work (days)	7.0 (2.0-15.0)	22.5 (2.0-35.0)	0.001
Post-operative stay (days)	2.0 (1.0-12.0)	2.0 (2.0-4.0)	0.016

Group A denotes Stapled Haemorrhoidopexy and Group B denotes Conventional Excisional Hemorrhoidectomy
** Mann-Whitney U test was performed to assess the level of significance*

In contrast, regarding complications during the follow-up period, anorectal stricture was observed in 4.8% of patients in Group A and 7.2% in Group B at 1 month ($p = 0.645$). Rectal discharge at one month was significantly more prevalent in Group B (100%) compared to Group A (19%) ($p < 0.001$) (Table 5).

Table (5): Post-Operative Complications by group

Post-Operative Complications	Group A, n (%)	Group B, n (%)	p-value
Immediate post-operative complication			
Urinary retention	8 (19.0)	21 (50.0)	0.003*
Incontinence of stool	6 (14.3)	2 (4.8)	0.137*
Complication during follow up			
Anorectal stricture (at 1 month)	2 (4.8)	3 (7.2)	0.645
Incontinence of stool (at 15 days)	1 (2.4)	0 (0.0)	0.314
Rectal discharge (at one month)	8 (19.0)	42 (100.0)	0.000

Group A denotes Stapled Haemorrhoidopexy and Group B denotes Conventional Excisional Hemorrhoidectomy
**Chi-square and Mann-Whitney U test was performed to assess the level of significance*

Hemorrhage

For hemorrhage, primary hemorrhage occurred in 7.1% of patients in Group A and 2.4% in Group B ($p = 0.616$). Reactionary hemorrhage was observed in 7.1% of Group A and 4.8% of Group B, with no significant difference ($p = 1.000$). Secondary hemorrhage occurred in 7.1% of patients in Group A and none in Group B ($p = 0.241$) (Table 6)

Recurrence and Residual Mucosal Prolapse

Mucosal prolapse without bleeding was significantly more common in Group A at 15 days (16.7%), 1 month (16.7%), and at 3 and 6 months (21.4%) postoperatively, while no cases were observed in Group B at any time point ($p < 0.01$ for all comparisons). Mucosal prolapse with bleeding occurred in 7.2% of patients in Group A at 6 months, although the difference between the two groups was not statistically significant ($p = 0.078$) (Table 7).

Table (6): Hemorrhage in group

Hemorrhage	Group A, n (%)	Group B, n (%)	p-value
Primary hemorrhage	3 (7.1)	1 (2.4)	0.616
Reactionary hemorrhage	3 (7.1)	2 (4.8)	1.000
Secondary hemorrhage	3 (7.1)	0 (0.0)	0.241

Group A denotes Stapled Haemorrhoidopexy and Group B denotes Conventional Excisional Hemorrhoidectomy
**Chi-square and Mann-Whitney U test was performed to assess the level of significance*

IV. Discussion

The findings of this study highlight significant differences between stapled haemorrhoidopexy (Group A) and conventional excisional haemorrhoidectomy (Group B) in managing hemorrhoids. Notably, Group A demonstrated a clear advantage in operative time, postoperative pain, recovery period, and postoperative complications—critical considerations for both patients and clinicians when selecting an appropriate surgical intervention.

The median operative time was significantly shorter in Group A (16.5 minutes) compared to Group B (25 minutes). This finding aligns with previous studies that have reported reduced operative time as a key benefit of stapled haemorrhoidopexy, largely due to the less invasive nature of the procedure [8,14]. A shorter operative time may reduce perioperative risks and enhance overall patient satisfaction.

Table (7): Recurrence of Disease or Residual Bulk during follow up by group

Recurrence of Disease	Group A, n (%)	Group B, n (%)	p-value
Mucosal prolapse without bleeding			
At 15 days	7 (16.7)	0 (0.0)	0.006
At 1 month	7 (16.7)	0 (0.0)	0.006
At 3 months	9 (21.4)	0 (0.0)	0.001

Recurrence of Disease	Group A, n (%)	Group B, n (%)	**p-value**
At 6 months	9 (21.4)	0 (0.0)	0.001
Mucosal prolapse with bleeding			
At 3 months	1 (2.4)	0 (0.0)	0.314
At 6 months	3 (7.2)	0 (0.0)	0.078

Group A denotes Stapled Haemorrhoidopexy and Group B denotes Conventional Excisional Hemorrhoidectomy
**Chi-square and Mann-Whitney U test was performed to assess the level of significance*

Pain assessment revealed that patients in Group A experienced significantly less postoperative pain compared to those in Group B. At 4 hours post-surgery, severe pain was reported by 42.9% of patients in Group A, compared to 95.2% in Group B. This trend persisted at 24 hours and 15 days post-surgery, with Group A showing a marked reduction in pain levels. These findings are consistent with literature suggesting that stapled haemorrhoidopexy is associated with reduced postoperative pain due to its avoidance of external wounds and nerve-rich areas [2,15]. Effective pain control is crucial for facilitating quicker recovery, minimizing the need for analgesics, and improving the overall patient experience.

Group A demonstrated significantly faster recovery, with a median pain-free defecation time of 7 days compared to 18.5 days in Group B. Similarly, the return to work was quicker in Group A (7 days) than in Group B (22.5 days). The shorter recovery period observed in stapled haemorrhoidopexy aligns with other studies that highlight the procedure's ability to expedite healing and enable patients to resume normal activities earlier [16,17]. This reduced recovery time is particularly relevant in terms of economic impact, as it may decrease the indirect costs associated with prolonged work absences.

While urinary retention was more common in Group B (50%) compared to Group A (19%), stool incontinence was more frequently observed in Group A (14.3%) than in Group B (4.8%). Although the difference in stool incontinence was not statistically significant, it raises important considerations for postoperative management. Complications such as anorectal stricture and rectal discharge were also more prevalent in Group B. These findings align with prior research that identifies stapled haemorrhoidopexy as being associated with fewer immediate postoperative complications, although it may carry a risk of recurrence [18].

Regarding the hemorrhage, no significant difference was observed in the incidence of hemorrhage between the two groups. The rates of primary, reactionary, and secondary hemorrhage were comparable, suggesting that both procedures carry similar risks of bleeding-related complications. This finding aligns with previous studies that have shown no major difference in hemorrhage rates between the two techniques [19].

In terms of recurrence and residual mucosal prolapse, Group A exhibited a marked occurrence of mucosal prolapse without bleeding throughout the follow-up period. At 15 days and 1 month postoperatively, 16.7% of patients in Group A experienced this condition, which increased to 21.4% at both 3 months and 6 months. In contrast, Group B reported no cases of mucosal prolapse without bleeding at any of these time points ($p < 0.01$ for all comparisons). This stark difference suggests a potential impact of the surgical technique employed or inherent patient characteristics that could influence postoperative healing and complications.

When examining mucosal prolapse with bleeding, Group A reported a 7.2% incidence at 6 months, while only 2.4% of patients experienced this complication at 3 months. However, the statistical analysis did not reveal a significant difference ($p > 0.05$) between the two groups for mucosal prolapse with bleeding. This lack of statistical significance indicates that although bleeding cases were observed in Group A, they might not be directly attributable to the surgical intervention or technique used compared to Group B, which experienced no such occurrences. Prior studies have reported an increased risk of recurrence with stapled hemorrhoidopexy, raising questions about the long-term efficacy of the procedure despite its short-term benefits [20]. However, this lower recurrence rate should be weighed against the advantages of reduced pain and quicker recovery. Further investigation may be required to understand the underlying causes of these outcomes.

V. Conclusion

Stapled haemorrhoidopexy offers significant short-term benefits, including reduced postoperative pain, quicker recovery, and shorter hospital stays compared to conventional excisional hemorrhoidectomy. However, these advantages come with a minimal risk of short-term recurrence of hemorrhoids. The choice between these procedures should consider individual patient priorities, balancing immediate relief against the potential for future recurrence. This emphasizes the importance of personalized care in surgical treatment decisions.

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