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A Study on the Incidence and Predictors of Complications after Open Haemorrhoidectomy

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ABSTRACT

Background: Open haemorrhoidectomy remains the standard surgical treatment for high-grade haemorrhoids. Despite its efficacy, the procedure is associated with a range of postoperative complications, and understanding their incidence and predictors is essential for improving patient care. **Objective:** To determine the incidence and predictors of complications following open haemorrhoidectomy. **Methods:** This cross-sectional study was conducted at Aga Khan Hospital, Gilgit from November 2024 to April 2025. A total of 225 patients undergoing open haemorrhoidectomy were included through non-probability consecutive sampling. Demographic, clinical, and intraoperative data were collected, including age, BMI, haemorrhoid grade, comorbidities, duration of surgery, and bleeding volume. Postoperative complications such as pain, bleeding, urinary retention, wound infection, delayed healing, anal stenosis, and recurrence were recorded. Data were analyzed using SPSS version 26, with chi-square tests and multivariate logistic regression applied. **Results:** Postoperative complications occurred in 37.7% of patients. The most common complications were prolonged pain (24.4%), urinary retention (12.4%), and secondary bleeding (9.3%). Significant predictors of complications included age over 50 years (OR 2.6, $p = 0.001$), BMI ≥ 30 kg/m^2 (OR 2.4, $p = 0.004$), diabetes mellitus (OR 3.1, $p < 0.001$), smoking (OR 2.2, $p = 0.008$), intraoperative bleeding over 50 ml (OR 2.5, $p = 0.005$), and operative duration over 45 minutes (OR 2.1, $p = 0.01$). **Conclusion:** It is concluded that open haemorrhoidectomy is associated with a substantial risk of complications, particularly in older, obese, diabetic, and smoking patients, as well as those undergoing longer or more complex surgeries. Preoperative risk assessment and individualized management strategies are recommended to minimize postoperative morbidity.

INTRODUCTION

Haemorrhoidal disease is a common anorectal disorder affecting millions globally, with an estimated prevalence ranging between 4% and 35% in adults, depending on diagnostic criteria and population demographics [1][2]. It represents a major cause of outpatient visits and surgical interventions in general surgery and colorectal practice. Clinically, haemorrhoids are characterized by symptomatic enlargement and distal displacement of the normal anal cushions, presenting with rectal bleeding, prolapse, discomfort, itching, and mucus discharge [3]. Risk factors include prolonged straining, chronic constipation, pregnancy, sedentary lifestyle, and low-fiber diets [4]. According to the Goligher classification system, haemorrhoids are graded from I to IV based on their degree of prolapse [5]. While Grades I and II haemorrhoids are often managed conservatively using pharmacological agents, dietary adjustments, and office-based procedures such as rubber band ligation, sclerotherapy, or infrared coagulation, Grades III and IV typically necessitate surgical intervention for definitive management [6]. Open haemorrhoidectomy—most commonly the Milligan-Morgan procedure—is recognized as the traditional gold standard surgical treatment, especially in low-resource settings where stapled and closed techniques may be less accessible due to cost or expertise limitations [7][8]. Despite its widespread use, open haemorrhoidectomy is associated with a notable incidence of postoperative complications, which can affect both short-term recovery and long-term functional outcomes. Literature reports complication rates ranging from 15% to 50% depending on patient selection, surgical technique, perioperative protocols, and follow-up duration [9][10]. The most frequently reported complications include postoperative pain, secondary bleeding, urinary retention, wound infection, delayed wound healing, anal stenosis, incontinence, and recurrence of haemorrhoidal symptoms [11]. Postoperative pain, in particular, is reported in

almost all cases in varying degrees, with some studies noting severe pain lasting beyond the expected 7–10 days post-surgery in up to 20–30% of patients [12].

Postoperative bleeding is another clinically significant complication, occurring in 2% to 6% of cases according to previous research, occasionally necessitating reoperation or transfusion [13]. Urinary retention is noted in 5% to 25% of patients, linked both to regional anesthesia and to postoperative pain inhibiting voluntary micturition reflexes [14]. Wound infection rates following open haemorrhoidectomy have been reported between 2% and 10%, especially in patients with poor perianal hygiene or comorbidities such as diabetes mellitus [15]. Anal stenosis, while relatively rare (1%–5%), represents a serious late complication that may require further surgical intervention [16]. Recurrence of haemorrhoidal symptoms post-haemorrhoidectomy has been reported in approximately 2% to 8% of cases over long-term follow-up, reinforcing the need for careful patient selection and technique optimization [17]. Several patient-related and procedure-related predictors for postoperative complications have been identified across different studies. Advanced age, male gender, higher body mass index (BMI), and comorbid conditions such as diabetes mellitus, hypertension, and cardiovascular diseases have all been associated with increased postoperative risks [18][19]. Procedural factors including operative time, intraoperative blood loss, use of cautery versus scalpel techniques, and type of anesthesia (spinal versus general) have also been shown to influence complication rates [20]. For instance, previous research has highlighted that longer operative times and higher grades of haemorrhoids increase the likelihood of bleeding and wound-related complications [21]. Furthermore, variations in perioperative protocols such as antibiotic prophylaxis, analgesia regimens, and postoperative care pathways may impact outcomes, which explains some of the variability in reported complication rates across different centers and countries [22]. Importantly, while new surgical options like stapled haemorrhoidopexy and laser haemorrhoidoplasty have emerged, open haemorrhoidectomy continues to be the procedure of choice in many tertiary care and public hospital settings, especially where resource constraints exist [23].

Objective

To determine the incidence and predictors of complications following open haemorrhoidectomy.

METHODOLOGY

This was a cross-sectional study conducted at Aga Khan Hospital Gilgit from November 2024 to April 2025, including 225 patients who underwent open haemorrhoidectomy, selected through non-probability consecutive sampling.

Inclusion Criteria

- Patients aged 18–75 years undergoing open haemorrhoidectomy for grade III and IV haemorrhoids.
- Both males and females.
- Patients who provided informed consent.

Exclusion Criteria

- Patients with bleeding disorders or on anticoagulant therapy.
- Patients with inflammatory bowel disease.
- Patients with previous anorectal surgery.
- Patients undergoing stapled or closed haemorrhoidectomy.
- Immunocompromised patients (e.g., HIV/AIDS, long-term steroid therapy).

Data Collection

After obtaining ethical approval from the institutional review board and informed consent from all participants, data were collected from 225 patients who underwent open haemorrhoidectomy. Demographic details such as age, gender, BMI, comorbidities (such as diabetes mellitus and hypertension), smoking status, and haemorrhoid grade were recorded preoperatively using a structured proforma. Operative details such as duration of surgery, amount of intraoperative bleeding, and anaesthesia type were documented. Postoperative follow-up was conducted for a minimum of four weeks to assess for complications. Recorded complications included postoperative bleeding, urinary retention, anal stenosis, wound infection, delayed wound healing, persistent pain beyond two weeks, and recurrence.

Each complication was defined as follows:

- **Postoperative bleeding:** Any bleeding requiring medical or surgical intervention.
- **Urinary retention:** Inability to pass urine requiring catheterization post-surgery.
- **Anal stenosis:** Clinically significant narrowing confirmed on examination.
- **Wound infection:** Presence of purulent discharge or erythema requiring antibiotic treatment.
- **Delayed wound healing:** Wound not healed by 4 weeks postoperatively.
- **Persistent pain:** Pain requiring analgesia beyond two weeks post-surgery.
- **Recurrence:** Return of haemorrhoidal symptoms within 6 months.

Statistical Analysis

The data were analyzed using SPSS version 26.0. Descriptive statistics were applied to summarize continuous variables such as age, BMI, and operative time, reported as mean ± standard deviation. Categorical variables such as gender, haemorrhoid grade, and postoperative complications were expressed as frequencies and percentages. Chi-square tests were performed to examine associations between categorical variables including age group, gender, haemorrhoid grade, comorbid conditions, and the incidence of complications. Multivariate logistic regression analysis was conducted to identify significant predictors for postoperative complications, considering a p-value of <0.05 as statistically significant.

RESULTS

Among the 225 patients undergoing open haemorrhoidectomy, the average age was 44.6 ± 12.8 years. Patients who developed complications were

generally older, with an average age of 48.1 ± 13.2 years, compared to 42.3 ± 11.7 years in those without complications. Males represented 61% of all patients, and complication rates were higher among men (68%) compared to women (56%). The overall BMI was 27.5 ± 4.1 kg/m^2, with patients experiencing complications having a higher average BMI of 28.6 ± 4.5 kg/m^2 compared to 26.9 ± 3.8 kg/m^2 in those without complications. Diabetes was present in 33% of all patients but was significantly more common in the complication group (49%) versus the non-complication group (23%). Hypertension and smoking were also more prevalent in patients with complications, at 46% and 41% respectively, compared to 33% and 21% in patients without complications.

Table 1

Demographic and Clinical Characteristics of Participants

Characteristic	Total (n = 225)	Patients with Complications (n = 85)	Patients Without Complications (n = 140)
Age (years)	44.6 ± 12.8	48.1 ± 13.2	42.3 ± 11.7
Gender (Male)	61% (137/225)	68% (58/85)	56% (79/140)
BMI (kg/m^2)	27.5 ± 4.1	28.6 ± 4.5	26.9 ± 3.8
Diabetes Mellitus	33% (74/225)	49% (42/85)	23% (32/140)
Hypertension	38% (85/225)	46% (39/85)	33% (46/140)
Smoking Status (Yes)	29% (65/225)	41% (35/85)	21% (30/140)
Haemorrhoid Grade III	58% (130/225)	53% (45/85)	61% (85/140)
Haemorrhoid Grade IV	42% (95/225)	47% (40/85)	39% (55/140)

The average duration of surgery for all patients was 42.8 ± 12.5 minutes. For those who developed complications, the average operative time was longer, measured at 48.5 ± 13.4 minutes, compared to 39.5 ± 11.1 minutes in those without complications. Spinal anesthesia was used in 72% of the total cases, slightly more frequent in patients with complications (76%) than in those without (70%). Intraoperative bleeding greater than 50 ml was reported in 19% of all patients, affecting 29% of those with complications versus only 13% without. The use of cautery was noted in 64% of procedures overall, with higher utilization in complicated cases (71%) compared to uncomplicated ones (60%).

Table 2

Intraoperative Variables

Variable	Total (n = 225)	Patients with Complications (n = 85)	Patients Without Complications (n = 140)
Duration of Surgery (min)	42.8 ± 12.5	48.5 ± 13.4	39.5 ± 11.1
Anaesthesia Type: Spinal	72% (162/225)	76% (65/85)	70% (97/140)
Intraoperative Bleeding > 50 ml	19% (43/225)	29% (25/85)	13% (18/140)
Use of Cautery	64% (144/225)	71% (60/85)	60% (84/140)

Postoperative complications occurred in 37.7% of the total sample. Persistent postoperative pain lasting more than 7 days was the most common complication, affecting 24.4% of patients (55 out of 225). Secondary bleeding was reported in 9.3% of cases, while urinary retention occurred in 12.4%. Wound infections affected 7.5% of patients, and delayed wound healing was seen in 6.6%. Anal stenosis developed in 2.6% of the cohort, while haemorrhoidal recurrence occurred in 4.9%. These findings confirm that postoperative pain, urinary retention, and bleeding are the most frequent complications following open haemorrhoidectomy.

Table 3

Postoperative Complications Profile

Complication	Frequency (n)	Percentage (%)
Postoperative Pain > 7 days	55	24.4%
Secondary Bleeding	21	9.3%
Urinary Retention	28	12.4%
Wound Infection	17	7.5%
Delayed Wound Healing	15	6.6%
Anal Stenosis	6	2.6%
Recurrence	11	4.9%
Any Complication	85	37.7%

Patients older than 50 years had a significantly higher complication rate, representing 45% of the complication group versus 22% in the non-complication group ($p = 0.001$). Male gender was associated with complications in 68% of affected patients compared to 56% without complications ($p = 0.04$). Obesity (BMI ≥ 30 kg/m^2) was present in 31% of those with complications, versus just 14% in those without ($p = 0.003$). Diabetes mellitus was a strong predictor, present in 49% of patients with complications compared to 23% without ($p < 0.001$). Hypertension and smoking were also statistically significant, with complication rates of 46% vs. 33% for hypertension ($p = 0.03$) and 41% vs. 21% for smoking ($p = 0.002$).

Table 4

Risk Factors Associated with Postoperative Complications

Risk Factor	Patients with Complications (n = 85)	Patients Without Complications (n = 140)	p-value
Age > 50 years	45% (38/85)	22% (31/140)	0.001
Male Gender	68% (58/85)	56% (79/140)	0.04
BMI ≥ 30 kg/m^2	31% (26/85)	14% (20/140)	0.003
Diabetes Mellitus	49% (42/85)	23% (32/140)	<0.001
Hypertension	46% (39/85)	33% (46/140)	0.03
Smoking	41% (35/85)	21% (30/140)	0.002

Hospital stays longer than five days were recorded in 39% of patients with complications, compared to only 15% of those without complications ($p < 0.001$). Readmissions within 30 days post-surgery occurred in 12% of the complication group and only 4% of the non-complication group ($p = 0.02$). Patients experiencing complications also had delayed return to normal activities: 44% took more than two weeks to return to work compared to just 18% in the uncomplicated group ($p < 0.001$). This indicates that complications following open haemorrhoidectomy substantially affect both hospitalization and recovery duration.

Table 5

Comparison of Hospital Stay and Recovery Outcomes

Outcome	Patients with Complications (n = 85)	Patients Without Complications (n = 140)	p-value
Hospital Stay > 5 days	39% (33/85)	15% (21/140)	<0.001
Readmission within 30 days	12% (10/85)	4% (6/140)	0.02
Return to Work > 2 weeks	44% (37/85)	18% (25/140)	<0.001

DISCUSSION

This study evaluated the incidence and predictors of complications following open haemorrhoidectomy in a cohort of 225 patients. Our findings indicate that postoperative complications occurred in 37.7% of the study population, with postoperative pain, urinary retention, and secondary bleeding being the most frequently reported adverse outcomes. This aligns with previous research, where complication rates following open haemorrhoidectomy ranged from 30% to 50%, underscoring that while the procedure remains effective, it carries notable postoperative morbidity [24]. In our study, postoperative pain persisting beyond seven days was the most common complication, affecting 24.4% of patients. This is consistent with previous research, where pain incidence ranged between 20% and 35% after open haemorrhoidectomy, emphasizing pain as a predictable outcome due to the nature of tissue excision and wound healing. Urinary retention was observed in 12.4% of patients in this study, comparable to previous research reporting 10% to 25% incidence rates [25]. This reinforces the role of postoperative pain and spinal anesthesia in inhibiting bladder function.

Secondary bleeding was noted in 9.3% of our patients, falling within the 5–15% range reported by previous research. Wound infections (7.5%), delayed wound healing (6.6%), and anal stenosis (2.6%) were also observed, with similar frequencies noted in previous research [26]. For instance, previous research documented wound infection rates between 5% and 10% and anal stenosis in 1% to 5% of cases, suggesting consistent complication profiles across different populations and healthcare settings. Age over 50 years was identified as a significant predictor of complications, with patients in this age group showing 2.6 times higher odds of developing postoperative issues. This observation is supported by previous research, which also found increased age to be associated with slower wound healing, higher infection risk, and prolonged recovery times due to reduced physiological reserve. Similarly, diabetes mellitus emerged as a strong independent predictor in our study, increasing the risk of complications by 3.1 times. This is in line with previous research that highlighted poor glycemic control as a contributor to impaired wound healing and higher infection rates post-haemorrhoidectomy [27]. Obesity (BMI ≥ 30 kg/m^2) was another significant factor, with a 2.4-fold increase in complication risk. This finding is consistent with previous research linking obesity to increased surgical difficulty, longer operative times, and delayed recovery in anorectal procedures. Smoking also demonstrated a notable impact, increasing the odds of complications by 2.2 times, which mirrors previous research identifying smoking as a modifiable risk factor that negatively affects wound healing and tissue oxygenation [28].

From a surgical perspective, intraoperative bleeding greater than 50 ml and operative times exceeding 45 minutes were both associated with higher complication rates. These findings agree with previous research that described prolonged operative duration and excessive bleeding as markers for more complex cases or technical difficulties, both of which contribute to increased postoperative risks [29]. The study also highlighted that patients experiencing complications had significantly longer hospital stays and delayed return to work. Specifically, 39% of patients with complications stayed more than five days in the hospital compared to only 15% of those without complications. This is comparable to previous research showing that postoperative morbidity significantly extends hospitalization and recovery time, impacting both patient quality of life and healthcare resource utilization [30]. Overall, our results reinforce existing evidence from previous research while providing localized data specific to the study population. The consistent pattern observed between our findings and those reported globally underscores the importance of identifying high-risk patients preoperatively. Proactive strategies such as optimizing glycemic control, weight management, and smoking cessation, along with careful surgical planning, may help mitigate complication risks associated with open haemorrhoidectomy.

CONCLUSION

It is concluded that complications following open haemorrhoidectomy are frequent, affecting approximately 37.7% of patients in this study. The most common postoperative issues observed were prolonged pain, urinary retention, secondary bleeding, wound infection, delayed wound healing, anal stenosis, and recurrence. Significant predictors of complications included age over 50 years, male gender, obesity (BMI ≥ 30 kg/m^2), diabetes mellitus, smoking, prolonged operative time, and intraoperative bleeding exceeding 50 ml. These findings are consistent with patterns reported in previous research and highlight the need for targeted preoperative assessment and postoperative care strategies to reduce morbidity. Tailoring patient management—particularly focusing on modifiable risk factors such as glycemic control and smoking cessation—can contribute to better surgical outcomes and reduced healthcare burden. Further multicenter studies with larger sample sizes and diverse populations are recommended to validate these findings.

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