# The Effect of Different Surgical Techniques of Haemorrhoidectomy on the Occurrence of Postoperative Hypertrophic Anal Papillae

Jie Xu, Yongzhi Lv, Weiping Chang and Huan Jia

*Department of Gastroenterology and Colorectal Surgery, The First Affiliated Hospital of Xi'an Medical University, Xi'an, Shaanxi, China*

## ABSTRACT

**Objective:** To explore the differences in the occurrence of postoperative hypertrophic anal papillae (HAP) using different surgical techniques (Ferguson haemorrhoidectomy or Milligan-Morgan haemorrhoidectomy), and whether the haemorrhoidectomy technique is an independent risk factor of postoperative HAP.

**Study Design:** A descriptive study.

**Place and Duration of the Study:** The First Affiliated Hospital of Xi'an Medical University, Xi'an, Shaanxi, China, from October 2018 to 2023.

**Methodology:** Data were collected retrospectively from the electronic inpatient and outpatient records of patients with haemorrhoidectomy who were grouped according to the specific haemorrhoidectomy technique, and the difference in the incidence rate of postoperative HAP between the two groups was compared by $\chi^2$ test. In addition, the correlation between other observation indicators and postoperative HAP was tested. Relevant indicators were included in binary logistic regression analysis to determine whether the haemorrhoidectomy technique was an independent risk factor for postoperative HAP.

**Results:** This study collected 815 cases with 494 Milligan-Morgan surgery and 321 Ferguson surgery. Twenty-six (8.1%) cases with Ferguson surgery and 13.16% cases with Miligan-Morgan surgery (n = 65) had postoperative HAP. The difference between the two groups is statistically significant (p = 0.025). After multivariate regression analysis, it was found that the haemorrhoidectomy technique was an independent risk factor of postoperative HAP (p = 0.004).

**Conclusion:** The frequency of postoperative HAP varies significantly between Milligan-Morgan haemorrhoidectomy and Ferguson haemorrhoidectomy, and the haemorrhoidectomy technique can independently affect the occurrence of postoperative HAP. In order to get a lower occurrence of postoperative HAP, it was recommended for front-line colorectal doctors to consider the Ferguson haemorrhoidectomy.

**Key Words:** *Ferguson haemorrhoidectomy*, *Milligan-Morgan haemorrhoidectomy*, *Mixed haemorrhoids*, *Hypertrophic anal papillae*, *Independent risk factor*.

**How to cite this article:** Xu J, Lv Y, Chang W, Jia H. The Effect of Different Surgical Techniques of Haemorrhoidectomy on the Occurrence of Postoperative Hypertrophic Anal Papillae. *J Coll Physicians Surg Pak* 2025; **35(03)**:287-291.

## INTRODUCTION

Haemorrhoids is a common anorectal disease. The incidence rate of Chinese people is 40.27-51.56%,[1] besides the incidence rate reported abroad is even as high as 70%.[2] It can bring apparent troubles to residents' lives and work by causing clinical symptoms such as prolapse, bloody stool, and pain.[3] When reaching staged III-IV according to Goliger classification[4] or achieving unsatisfactory results through conservative treatment, the haemorrhoidectomy should be chosen necessarily.[5]

*Correspondence to: Dr. Jia Huan, Department of Gastroenterology and Colorectal Surgery, The First Affiliated Hospital of Xi'an Medical University, Xi'an, Shaanxi, China*
*E-mail: aerozimmerman@163.com*

*Received: July 08, 2024; Revised: January 25, 2025; Accepted: February 03, 2025*
*DOI: https://doi.org/10.29271/jcpsp.2025.03.287*

Haemorrhoidectomy can be divided into two types i.e., Milligan-Morgan haemorrhoidectomy (open wound) and Ferguson haemorrhoidectomy (closed wound).[6] HAP is one of the complications after haemorrhoidectomy.[7,8] On one hand, its polypoid appearance under anal endoscopy can cause confusion and dissatisfaction; on the other hand, HAP itself can cause discomfort symptoms such as pain and sagging similar to Haemorrhoids,[3] thereby negatively affecting the postoperative experience of patients.

Currently, there is limited research on this complication in China and abroad concerning the impact of haemorrhoidectomy on the incidence of postoperative HAP. The objective of this study was explore whether the haemorrhoidectomy technique is an independent risk factor for the occurrence of postoperative HAP through intergroup $\chi^2$ test and binary logistic regression analysis.

## METHODOLOGY

This data review was approved by the Ethics Committee of the First Affiliated Hospital of Xi'an Medical University. The data were collected retrospectively by querying electronic inpatient and outpatient records of patients who underwent haemorrhoidectomy from October 2018 to 2023, with a six-month outpatient follow-up. The study included patients with haemorrhoidectomy diagnosed as staged III-IV haemorrhoids, aged from 18 to 75 years. Patients with other anorectal surgery performed together, preoperative HAP, surgical contraindications, or human papillomavirus infection were excluded from the study.

The data were collected on patients' general details (age, gender, course of disease, and degree of haemorrhoids), surgical details (haemorrhoidectomy technique and number of haemorrhoid incisions), postoperative recovery data (degree of postoperative constipation, wound exudation, wound bleeding, wound pain, and wound oedema), and the occurrence of postoperative HAP. By querying electronic medical orders and course records, binary and ordered categorical variables in the research data were assigned scores based on related descriptions as shown in Table I.

During the operation, the Milligan-Morgan group opened the surgical wound, while the Ferguson group closed the surgical wound. Regardless of hospitalisation or outpatient follow-up, postoperative wound dressing-change examination should be conducted daily until the wound was completely healed. Besides, it was advised to undergo the anoscope examination monthly within six months after surgery even if the wound was healed. When postoperative HAP was discovered during the outpatient follow-up, the outpatient doctors used high-frequency electric knife equipment (Beijing Maidi Kangwei Medical Equipment Co. Ltd., model CM-350A) in the outpatient treatment room to perform electrocautery resection after local anaesthesia.

The SPSS version 27.0 statistical software was used to analyse the data, and the count data (gender, degree of haemorrhoids, and haemorrhoidectomy technique) were expressed as frequency (percentages) using $\chi^2$ test. Quantitative data (age, course of disease, and number of incisions) were represented by $x \pm s$ using t-test. The ordered categorical data (postoperative constipation, wound exudation, wound bleeding, wound pain, and wound oedema) expressed as frequency (percentage) were subjected to Mann-Whitney U test. Multivariate analysis of the occurrence of postoperative HAP was conducted using binary logistic regression analysis in which the correlational observation indicators confirmed through the above tests were included. The difference is statistically significant with $p < 0.05$.

## RESULTS

From October 2018 to 2023, 815 patients who underwent haemorrhoidectomy were included in the study, including 494 cases with Milligan-Morgan surgery and 321 cases with Ferguson surgery. In terms of the incidence of postoperative HAP, the Milligan-Morgan group had a rate of 13.16% (n = 65), while the Ferguson group had a rate of 8.1% (n = 26). Patients with Ferguson surgery had a lower probability of developing postoperative HAP ($p = 0.025$). Table II shows the detailed differential analysis in the two groups including no statistically significant difference ($p > 0.05$) in general data and a statistically significant difference ($p = 0.025$) in the occurrence of postoperative complications.

**Table I: Assigned scores of categorical variables in the research data.**

| Categorical variables | Scores | | |
|---|---|---|---|
| | 0 | 1 | 2 |
| Gender | Male | Female | - |
| Degree of haemorrhoids | Stage III | Stage IV | - |
| Haemorrhoidectomy technique | Milligan-Morgan | Ferguson | - |
| Postoperative constipation | None | Mild (requiring oral laxatives) | Severe (requiring enema to alleviate) |
| Wound exudation | Slight (less than 1 piece of gauze exudes) | Moderate (increased exudation but less than 2 pieces of gauze) | Massive (exuding more than 3 pieces of gauze) |
| Wound bleeding | Slight (toilet paper stained with blood) | Moderate (dripping blood during defaecation) | Massive (spraying blood during defaecation) |
| Wound pain | Mild (tolerable) | Moderate (requiring oral analgesics) | Severe (requiring intramuscular injection of analgesics) |
| Wound oedema | Mild (less than 1/4 perianal area) | Moderate (1/4 to 1/2 perianal area) | Severe (more than 1/2 perianal area) |

**Table II: Differential analysis of postoperative HAP in two groups.**

| Variables | | Milligan-morgan group (n = 494) | Ferguson group (n = 321) | Verification values | p-value |
|---|---|---|---|---|---|
| General data | | | | | |
| Age (years) | | 44.73 ± 12.37 | 44.17 ± 13.27 | t = 0.611 | 0.542 |
| Gender (n/%) | Male | 253 (51.21) | 178 (55.45) | $\chi^2$ = 1.402 | 0.236 |
| | Female | 241 (48.79) | 143 (44.55) | | |
| Course of disease (months) | | 31.03 ± 18.19 | 30.78 ± 19.69 | t = 0.181 | 0.856 |
| Degree of haemorrhoids (n/%) | Stage III | 276 (55.87) | 166 (51.71) | $\chi^2$ = 1.355 | 0.244 |
| | Stage IV | 218 (44.13) | 155 (48.29) | | |
| Occurrence of postoperative HAP (n/%) | Yes | 65 (13.16) | 26 (8.1) | $\chi^2$ = 5.019 | 0.025* |
| | No | 429 (86.84) | 295 (91.9) | | |

*Note: Compared with the Ferguson group, t/$\chi^2$ tests were used,*p <0.05.*

**Table III: Correlation analysis between other observation indicators and postoperative HAP.**

| Variables | | | Non-occurrences (n = 724) | Occurrences (n = 91) | Verification values | p-value |
|---|---|---|---|---|---|---|
| General data | Age (years) | | 44.73 ± 12.68 | 42.79 ± 13 | t = 1.367 | 0.172 |
| | Gender (n/%) | Male | 379 (52.35) | 52 (57.14) | $\chi^2$ = 0.746 | 0.388 |
| | | Female | 345 (47.65) | 39 (42.86) | | |
| | Course of disease (months) | | 31.14 ± 18.47 | 29.28 ± 21.18 | t = 0.889 | 0.374 |
| | Degree of haemorrhoids (n/%) | Stage III | 408 (56.35) | 34 (37.36) | $\chi^2$ = 11.746 | 0.001* |
| | | Stage IV | 316 (43.65) | 57 (62.64) | | |
| Number of incisions | | | 2.16 ± 0.97 | 2.81 ± 0.98 | t = 6.074 | <0.001* |
| Postoperative recovery data | Postoperative constipation (n/%) | None | 542 (74.86) | 24 (26.37) | Z = -10.076 | <0.001* |
| | | Mild | 156 (21.55) | 44 (48.35) | | |
| | | Severe | 26 (3.59) | 23 (25.27) | | |
| | Wound exudation (n/%) | Slight | 497 (68.65) | 50 (54.95) | Z = -3.06 | 0.007* |
| | | Moderate | 208 (28.73) | 31 (34.07) | | |
| | | Massive | 18 (2.49) | 10 (10.99) | | |
| | Wound bleeding (n/%) | Slight | 425 (58.7) | 40 (43.96) | Z = -2.695 | 0.002* |
| | | Moderate | 268 (37.02) | 45 (49.45) | | |
| | | Massive | 31 (4.28) | 6 (6.59) | | |
| | Wound pain (n/%) | Mild | 406 (56.08) | 44 (48.35) | Z = -1.62 | 0.105* |
| | | Moderate | 290 (40.06) | 40 (43.96) | | |
| | | Severe | 28 (3.87) | 7 (7.69) | | |
| | Wound edema (n/%) | Mild | 274 (37.85) | 34 (37.36) | Z = -0.016 | 0.987 |
| | | Moderate | 406 (56.08) | 52 (57.14) | | |
| | | Severe | 44 (6.08) | 5 (5.49) | | |

*Note: Compared with the occurrence group, t/$\chi^2$/Mann-Whitney U tests were used,*p <0.05.*

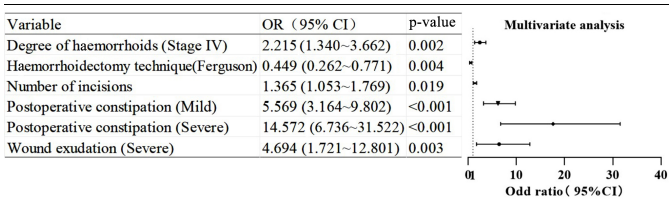


**Figure 1: Multivariate analysis results for the occurrence of postoperative HAP.**

Table III indicates that degree of haemorrhoids, number of incisions, postoperative constipation, wound exudation, and wound bleeding were also correlated with the occurrence of postoperative HAP by correlation analysis between other observation indicators and postoperative HAP.

Figure 1 shows that besides the degree of haemorrhoids (stage IV), number of incisions, postoperative constipation (mild and severe), and wound exudation (severe), the haemorrhoidectomy Ferguson technique was also identified as an independent risk factor for postoperative HAP. However, the Ferguson surgery could reduce the incidence of postoperative HAP.

The table on the left, in Figure 1, lists the statistically significant variables obtained through binary logistic regression analysis with postoperative HAP as the predictor variable. The forest plot on the right visually displays odd ratio (95% CI) of these variables correspondingly (OR = odd ratio, CI = confidence interval).

## DISCUSSION

HAP, also known as fibroepithelial polyps of the anus,[8] is typically characterised as reactive proliferation of squamous epithelium accompanied by interstitial fibrous tissue proliferation and vascular dilation and congestion in pathological examination. This reflects that HAP is a tissue-adaptive change which occurs in response to stimuli such as inflammation and anal skin laceration.[9] Under the proctoscopy, it typically appears as a white fibrous polypoid anal structure with a slender base at the pectinate line.[10] Although it is generally considered to be related to chronic anal fissures,[11] it is very common to find HAP in daily diagnosis and treatment of anorectal diseases. Even if there is no anal fissure, a considerable number of people also have HAP. The incidence of HAP was found to be 8.65% among 70,430 individuals undergoing electronic rectoromanoscope examinations from 2013 to 2015.[12] The latest physical examination of 3,250 healthy people in 2023 found that the incidence rate of HAP was 15.3%.[13] When the HAP increases to a certain extent, it cannot be considered as an absolutely benign disease. Some domestic studies have mentioned the rare occurrence of malignant transformation of HAP.[14,15] Boluk *et al*. believed that although it is benign in nature, excision is necessary when it causes pain, gradually increases in volume, or is suspected to be infectious or malignant, as well as when treating secondary changes in other perianal diseases.[16]

The surgical wound left by any haemorrhoidectomy surgery is subjected to mechanical damage and high temperature burns of a high-frequency electric knife during the operation, as well as the traction damage of postoperative defaecation and destruction of faecal micro-organisms during the postoperative recovery. These mechanical, physical, and biological factors cause wound inflammation reactions, including oedema, exudation, and pain.[17] The inflammatory response during the wound recovery may induce adaptive reactions in the anal papillae near the incision, leading to proliferation and hypertrophy.[18]

Regarding the clinical comparative study of two types of haemorrhoidectomy, Yuan *et al*. found that the Ferguson surgery has the least postoperative pain after 24 hours compared to other surgical approaches including the Milligan-Morgan surgery.[19] Bhatti *et al*. conducted a meta-analysis and found that although the Ferguson surgery has a longer surgical time, it has advantages in accelerating wound healing and reducing postoperative pain and bleeding.[20] However, there is currently no comparative study between the two surgical techniques in the incidence of postoperative HAP. In a study on risk factors for HAP after Milligan-Morgan surgery,[21] it was found that the degree of haemorrhoids, postoperative constipation, postoperative rectal bleeding, and postoperative infection were independent risk factors for postoperative HAP. However, both techniques are used in clinical practice and both have the possibility of inducing postoperative HAP.

In this study, it was found that the incidence of HAP after Ferguson surgery (8.1%) was lower compared to that after Milligan-Morgan surgery (13.16%). Moreover, by eliminating possible collinear factors, the haemorrhoidectomy technique was found to be one of the independent factors of postoperative HAP in multivariate regression analysis. The closed wound of Ferguson surgery is more stable which can better cope with the expansion and pulling force of postoperative defaecation. Additionally, the neater wound will be easier to heal by aligning the skin tissues on both sides, thus inducing a milder degree of adaptive hyperplasia reaction in the anal papillae compared with the opened wound of Milligan-Morgan surgery. Due to the fact that this study was conducted in a single region and centre, the research conclusions have certain limitations, and later further researches in multiple regions and centres are needed to cover the deficiency.

## CONCLUSION

The haemorrhoidectomy technique has a significant impact on the occurrence of postoperative HAP as an independent risk factor, and the Ferguson surgery is worth recommending with lower incidence for front-line colorectal doctors.

**FUNDING:**
This study has obtained funding support from the First Affiliated Hospital of Xi'an Medical University (Fund number: XYYFY-2023-03).

**ETHICAL APPROVAL:**
The study has been approved by the Ethics Committee of the First Affiliated Hospital of Xi'an Medical University (Approval No: XYYFY2023LSKY-028-01).

**PATIENTS' CONSENT:**
Since the study involved retrospective data analysis and posed no risk to patients, the requirement for patient informed consent was waived according to the decision of the Ethics Committee.

**COMPETING INTEREST:**
The authors declared no conflict of interest.

**AUTHORS' CONTRIBUTION:**
JX: Conception, design, data collection, statistical analysis, interpretation of results, and manuscript writing.
YL: Designing, data collection, manuscript review, and patients' follow-up.
WC: Data collection and patients' follow-up.
HJ: Data collection, interpretation, and revising the manuscript critically for important intellectual content.
All authors approved the final version of the manuscript to be published.

## REFERENCES

1. The coloproctology society of Chinese association of integrative medicine. Chinese clinical practice guidelines of haemorrhoids (2020). *J Colorect Anal Surg* 2020, **26(05)**:519-33. (In Chinese). doi: 10.19668/j.cnki.issn1674-0491.2020.05.001.
2. Herold A. Differential diagnosis of hemorrhoidal disease. *Hautarzt* 2020, **71(4)**:269-74. doi: 10.1007/s00105-020-04553-y.
3. Idrees JJ, Clapp M, Brady JT, Stein SL, Reynolds HL, Steinhagen E. Evaluating the accuracy of haemorrhoids: Comparison among specialties and symptoms. *Dis Colon Rectum* 2019; **62(7)**:867-71. doi: 10.1097/DCR.0000000000001315.
4. Dekker L, Geurts IJMH, Grossi U, Gallo G, Veldkamp R. Is the goligher classification a valid tool in clinical practice and research for hemorrhoidal disease? *Tech Coloproctol* 2022; **26(5)**:387-92. doi: 10.1007/s10151-022-02591-3.
5. Hawkins AT, Davis BR, Bhama AR, Fang SH, Dawes AJ, Feingold DL, *et al*. The American society of colon and rectal surgeons clinical practice guidelines for the management of haemorrhoids. *Dis Colon Rectum* 2024, **67(5)**:614-23. doi: 10.1097/DCR.0000000000003276.
6. Lohsiriwat V. Treatment of haemorrhoids: A coloproctologist's view. *World J Gastroenterol* 2015; **21(31)**:9245-52. doi: 10.3748/wjg.v21.i31.9245.
7. Jain P, Dhakaita S, Vishnoi S. Complications of stapled haemorrhoidectomy. Surgical review: *Int J Surg Trauma Orthoped* 2020; **6(1)**:45-9. doi: 10.17511/ijoso.2020.i01.08.
8. Park K, Abbas P, Langenburg S, Poulik J, Hanan A, Shehata BM. Giant anal fibroepithelial polyp in a healthy teenage boy: A case report and literature review. *Fetal Pediatr Pathol* 2022; **41(3)**:493-8. doi: 10.1080/15513815.2020.1843575.
9. Bettington M, Brown I. Polyps and polypoid lesions of the anus. *Diagnost Histopathol* 2014; **20(1)**:38-45. doi: 10.1016/j.mpdhp.2013.12.001.
10. Albuquerque A, Etienney I. Identification and reporting of anal pathology during routine colonoscopies. *J Coloproctol* 2023; **43(2)**:152-8. doi: 10.1055/s-0043-1769921.
11. Aasole AG, Bomble SN, Govande PC, Phad RN, Gupta KC. Chronic anal fissure an observational study. *Int J Med Rev Case Rep* 2022; **6(1)**:39-43. doi: 10.5455/IJMRCR.chronic-anal-fissure-760.

12. Li XJ, Tian YJ, Luo Y. Analysis in 70430 cases by electronic rectum and sigmoid endoscope from 2013 to 2015. *Anhui Med Univer* 2018; **53(10)**:1562-6. doi: 10.19405/j.cnki.issn 1000-1492.2018.10.016.
13. Hunang C. Investigation of anorectal diseases and surgical intervention strategy in healthy population. *Surg Res Tech* 2023; **12(1)**:53-5. doi: 10.3969/j.issn.2095-378X.2023 01.014.
14. Wang PX, Jiang Q, Adu IK, Ai MH, Wang WZ, Yang F, *et al*. Hypertrophic anal papillotomy by transparent cap-assisted endoscopic hot snare resection. *Yangtze Med* 2022; **6(4)**: 121-30. doi: 10.4236/ym.2022.64012.
15. Li Y, Zhang H, Cong Q, Li M, Bi H, Zhao Y, *et al*. Chinese expert consensus on diagnosis and treatment of anal intraepithelial neoplasia. *Gynecol Obstet Clin Med* 2024; **4**:e000013. doi: 10.1136/gocm-2024-000013.
16. Boluk SE, Boluk S, Genc MS, Ozcan B, Karadag M, Kesici U. Clinical importance of evaluating the results of excused perianal lesions. *Open Access Maced J Med Sci* 2024; **12(2)**:1-6. doi: 10.3889/oamjms.2024.11874.
17. Yang F, Bai X, Dai X, Li Y. The biological processes during wound healing. *Regen Med* 2021; **16(4)**:373-90. doi: 10. 2217/rme-2020-0066.
18. Wang S, Wang M. Clinical analysis of 38 cases of hypertrophied anal papillae after mixed hemorrhoid surgery. *World Lat Med Inform* 2015; **15(92)**:137. doi: 10.3969/j.issn. 1671-3141.2015.92.108.
19. Yuan XG, Wu J, Yin HM, Ma CM, Cheng SJ. Comparison of the efficacy and safety of different surgical procedures for patients with haemorrhoids: A network meta-analysis. *Tech Coloproctol* 2023; **27(10)**:799-811. doi: 10.1007/s10151-023-02855-6.
20. Bhatti MI, Sajid MS, Baig MK. Milligan-morgan (open) *versus* ferguson haemorrhoidectomy (closed): A systematic review and meta-analysis of published randomized, controlled trials. *World J Surg* 2016; **40(6)**:1509-19. doi: 10.1007/s00268-016-3419-z.
21. Fengmin Z. Risk factors of hypertrophic anal papillae after Milligan-morgan haemorrhoidectomy for mixed Haemorrhoids. *J Colorectal Anal Surg* 2016; **22(6)**. Available from: https://d.wanfangdata.com.cn/.