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ORIGINAL ARTICLE

A comparative study of Minimally Invasive Procedure for Hemorrhoids (MIPH) with Open Hemorrhoidectomy (Milligan-Morgan Hemorrhoidectomy)

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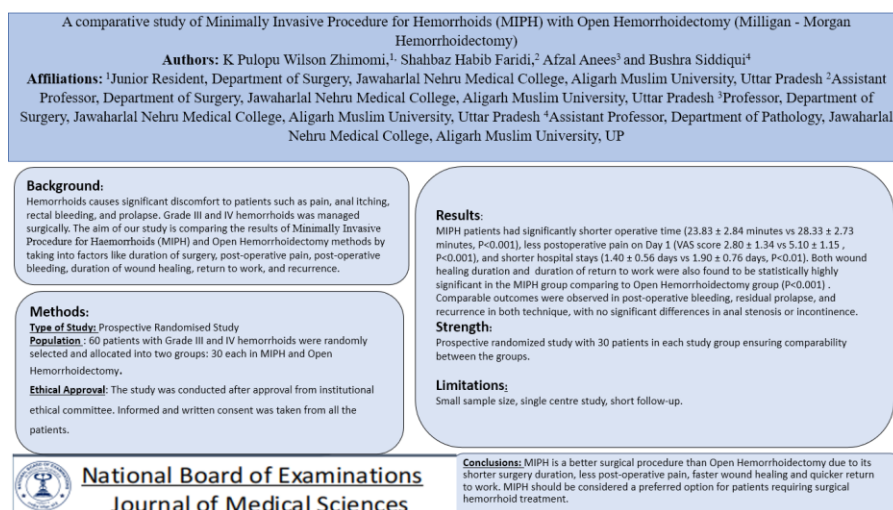
Abstract

Background: Hemorrhoidal disease, characterized by the enlargement and displacement of anal cushions, presents significant discomfort including pain, bleeding, and prolapse. The surgical treatment for advanced hemorrhoids (Grade III-IV) traditionally involved Open hemorrhoidectomy (Milligan-Morgan Hemorrhoidectomy), which is effective but associated with considerable postoperative pain and prolonged recovery. Minimally Invasive Procedure for Hemorrhoids (MIPH), introduced by Dr. Antonio Longo, offers a less painful alternative with faster recovery. This study compares the outcomes of MIPH and Open Hemorrhoidectomy by assessing duration of surgery, post operative pain, post operative bleeding, hospital stay, wound healing, return to work, and recurrence of hemorrhoids. **Methods:** This prospective study, conducted from August 2022 to July 2024, randomized 60 patients with Grade III and IV hemorrhoids into two groups: 30 undergoing MIPH and 30 undergoing Open Hemorrhoidectomy. Outcomes were evaluated using standardized tools and statistical analysis with a P-value <0.05 considered significant. **Results:** MIPH patients had significantly shorter operative times (23.83 ± 2.84 minutes vs 28.33 ± 2.73 minutes, $P < 0.001$), less postoperative pain on Day 1 (VAS score 2.80 ± 1.34 vs 5.10 ± 1.15 , $P < 0.001$), and shorter hospital stays (1.40 ± 0.56 days vs 1.90 ± 0.76 days, $P < 0.01$). Wound healing time was significantly faster in the MIPH group (6.40 ± 1.61 days vs 21.47 ± 4.48 days, $P < 0.001$). Return to work was also quicker for MIPH patients (7.83 ± 2.48 days vs 17.70 ± 7.27 days, $P < 0.001$). Both procedures had comparable rates of post-operative bleeding, recurrence, and residual prolapse, with no significant differences in anal stenosis or incontinence. **Conclusions:** MIPH is a superior alternative to Open Hemorrhoidectomy, offering reduced pain, shorter operative time, faster recovery, quicker return to work and similar safety outcomes. MIPH should be considered a preferred option for patients requiring surgical hemorrhoid treatment.

Keywords: Hemorrhoids, Minimally invasive procedure for Hemorrhoids (MIPH); Open hemorrhoidectomy (Milligan – Morgan hemorrhoidectomy), Longo’s stapled hemorrhoidopexy

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Graphical Abstract



Introduction

Hemorrhoids are a very common anorectal condition defined as the symptomatic enlargement and distal displacement of the normal anal cushions. Haemorrhoids are known as one of the most prevalent and oldest diseases [1]. Haemorrhoids mainly occur because of chronic constipation. Haemorrhoids can also happen secondarily because of pregnancy, carcinoma of rectum, tumours of uterine origin, problem during micturition because of presence of enlarged prostate or strictures, and portal hypertension [2].

Hemorrhoids are categorized into external, internal, and mixed types. Internal hemorrhoids occur above the dentate line and are covered by mucous membranes, while external hemorrhoids are located below the dentate line and are covered by skin. Internal hemorrhoids are further classified into four grades based on their degree of prolapse, following Goligher's classification. This classification system is essential in guiding treatment decisions. The third classification type evaluate haemorrhoids on the basis of their anatomical position, where 3, 7 and 11 o'clock are referred as

primary haemorrhoids, whereas the areas between them are secondary [3,4]. Hemorrhoids show different presentations clinically like pain, bleeding, itching, mucus discharge, and something projecting out of the rectum. The patient generally reports the dripping of blood in the toilet, mainly bright red in colour [5]. Conservative treatment, including lifestyle and dietary modifications, is typically recommended for Grade I and early Grade II hemorrhoids. Medications such as laxatives, stool softeners, calcium dobesilate, and oral flavonoids are commonly prescribed to alleviate symptoms [6]. When conservative treatment is insufficient, or in cases of more advanced hemorrhoids (Grades 3-4), surgical interventions become necessary. The most commonly performed surgical treatment is hemorrhoidectomy, with the Milligan-Morgan open hemorrhoidectomy, being the traditional technique. However, this procedure is associated with significant postoperative pain, longer recovery periods, and increased postoperative complications. Other surgical options include Ferguson's closed hemorrhoidectomy and newer, minimally invasive procedures like Stapled

Hemorrhoidopexy, also known as Minimally Invasive Procedure for Hemorrhoids (MIPH) [7,8,9]. Stapled hemorrhoidopexy offers a minimally invasive alternative to traditional methods, with reduced pain and faster recovery [9]. Stapled hemorrhoidopexy, introduced by Dr. Antonio Longo in 1998, has become a popular alternative for managing prolapsing Grade III and IV hemorrhoids. By avoiding surgical intervention below the dentate line, this technique significantly reduces postoperative pain and shortens recovery time. Stapled hemorrhoidopexy is associated with fewer complications, a lower recurrence rate, and a faster return to normal activities compared to traditional hemorrhoidectomy [10,11]. This study aims to compare the outcomes of the Minimally Invasive Procedure for Hemorrhoids (MIPH) with Open Hemorrhoidectomy (Milligan-Morgan Hemorrhoidectomy).

Material and Methods

Type of Study

Prospective Randomised Study

Inclusion criteria

Grade 3 hemorrhoids

Grade 4 hemorrhoids

Exclusion criteria

Grade 1 & grade 2 hemorrhoids

Thrombosed & strangulated haemorrhoids

Prior hemorrhoidectomy

Intercurrent anal pathology (example: fistula in ano, anal fissure)

Patient's refusal

Patients' information

The study was conducted at Department of Surgery, Jawaharlal Nehru

Medical College, Aligarh Muslim University, Uttar Pradesh, India, between August 2022 and July 2024 over a 24 months period. Ethical approval was obtained from the Institutional Ethical Committee before the commencement of the study, and informed and written consent was taken from all patients prior to surgery. The study aimed to assess the outcomes of two surgical techniques for hemorrhoids: Milligan-Morgan Open Hemorrhoidectomy and Minimally Invasive Procedure for Hemorrhoids (MIPH). This prospective study included 60 patients who were randomly assigned into two groups using the envelope method, with 30 patients in each group.

Prior to surgery, each patient underwent a thorough clinical evaluation, including history-taking, physical examination, and proctoscopy. Blood investigations were conducted to assess fitness for spinal anesthesia. Rectal enema was administered the night before the surgery. Both the surgical techniques were performed with the patient in the lithotomy position under spinal anesthesia. Following surgery, patients were monitored in the ward and given intravenous fluids. Oral feeds were introduced postoperatively, and pain was assessed using the Visual Analogue Scale (VAS) at day 0 and day 1 post operatively. The patients were evaluated for complications such as post-operative bleeding and infection. If no complications were observed, patients were discharged within 1-2 days. In the event of complications, the hospital stay was extended, and appropriate treatment was administered. Follow-up visits were scheduled after one week, and additional follow-up was done through outpatient visits or phone calls. Patients were

instructed to report any complications immediately.

The study's key outcomes include operative time, postoperative pain, post operative bleeding, duration of hospital stay, duration of wound healing and return to work. Operative time was recorded from the start of the anal canal inspection to the completion of the procedure, including packing the anal canal with gauze.

Statistical analysis

Data were collected in Microsoft Excel and analyzed using SPSS software (Version 25.0). Categorical variables were presented as numbers and percentages, while continuous variables were reported as means and standard deviations. The chi-square test was used to compare categorical data, and an unpaired t-test was applied for continuous variables. A p-value

<0.05 was considered statistically significant.

Results

The study compared MIPH and Open Hemorrhoidectomy procedures, showing that MIPH had a higher percentage of Grade 3 hemorrhoids (83.3%) compared to Open Hemorrhoidectomy (66.7%), while Grade 4 hemorrhoids were more prevalent in the Open Hemorrhoidectomy group (33.3%) than in the MIPH group (16.7%), with no significant difference in gender distribution ($P>0.05$). However, age distribution was significant ($P<0.01$), with younger patients (<25 years) predominantly undergoing MIPH, while older patients (>50 years) were more likely to have Open Hemorrhoidectomy (33.3%). The overall findings suggest age significantly influenced the choice of procedure (Table 1).

Table 1: Comparison of operative time between the two surgery procedures

S.No.	Procedure	Duration of Surgery (Minute)	t- Value	P- Value
		Mean $\pm$ SD		
1	MIPH	23.83 $\pm$ 2.84	-6.251	P < 0.001
2	Open Hemorrhoidectomy	28.33 $\pm$ 2.73		
3	Total	26.08 $\pm$ 3.58		

Abbreviation: MIPH = Minimally Invasive Procedure for Hemorrhoids

The mean operative time for MIPH was 23.83 $\pm$ 2.84 minutes, while for Open Hemorrhoidectomy, it was 28.33 $\pm$ 2.73 minutes. A t-value of -6.251 and a P-value

of $P<0.001$ demonstrate a statistically highly significant difference, indicating that MIPH is faster (Table 2).

Table 2. Comparison of post – operative pain in Day 0 and Day 1 in different surgery procedures using VAS (Visual Analog Scale)

S.No.	Procedure	Day 0 Post Operative Pain (VAS)	Day 1 Post Operative Pain (VAS)
		Mean $\pm$ SD	Mean $\pm$ SD
1	MIPH	4.70 $\pm$ 1.36	2.80 $\pm$ 1.34
2	Open Hemorrhoidectomy	7.00 $\pm$ 1.36	5.10 $\pm$ 1.15
3	Total	5.85 $\pm$ 1.78	3.95 $\pm$ 1.70

4	t- Value	-6.519	-7.092
5	P- Value	P < 0.001	P < 0.001

(Abbreviation: MIPH = Minimally Invasive Procedure for Hemorrhoids, VAS = Visual Analog Scale)

On the day of surgery (Day 0), MIPH patients experienced a mean pain score of 4.70 ± 1.36 , significantly lower than Open Hemorrhoidectomy at 7.00 ± 1.36 , indicated by a t-value of -6.519 and P-value < 0.001. On Day 1, MIPH pain

averaged 2.80 ± 1.34 , compared to 5.10 ± 1.15 for Open Hemorrhoidectomy, with a t-value of -7.092 and P-value < 0.001, reinforcing the less painful nature of MIPH (Table 3).

Table 3. Comparison of post operative bleeding in different surgery procedures

S.No	Post Operative Bleeding	Procedure						Ch ² - Value	P- Value
		MIPH		Open Hemorrhoidectomy		Total			
		No. of Cases	(%)	No. of Cases	(%)	No. of Cases	(%)		
1	Present	3	10.0%	4	13.3 %	7	11.7 %	0.162	P > 0.05
2	Absent	27	90.0%	26	86.7 %	53	88.3 %		
3	Total	30	100.0 %	30	100.0 %	60	100.0 %		

(Abbreviation: MIPH = Minimally Invasive Procedure for Hemorrhoids)

Table 3 shows 10.0% of MIPH patients and 13.3% of Open Hemorrhoidectomy patients experienced post-operative bleeding, with a Chi-square value of 0.162 and a P-value > 0.05. This

indicates no significant difference in the incidence of bleeding between the two procedures, suggesting that both carry similar risks for post-operative bleeding (Table 4).

Table 4. Comparison of duration of Hospital stay (days) in two study groups

S.No.	Procedure	Duarton of Hospital Stay (Days)	t- Value	P- Value
		Mean $\pm$ SD		
1	MIPH	1.40 ± 0.56	-2.898	P < 0.01
2	Open Hemorrhoidectomy	1.90 ± 0.76		
3	Total	1.65 ± 0.71		

(Abbreviation: MIPH = Minimally Invasive Procedure for Hemorrhoids)

Table 4 indicates that the average hospital stay for MIPH patients is 1.40 ± 0.56 days, shorter than the 1.90 ± 0.76 days for Open Hemorrhoidectomy patients. A t-value of -2.898 and a P-value

< 0.01 demonstrate a significant difference, suggesting that MIPH results in a shorter hospital stay compared to Open Hemorrhoidectomy (Table 5).

Table 5. Comparison of duration of wound healing (Days) in two study groups

S.No.	Procedure	Duration of Wound Healing (Days)	t- Value	P- Value
		Mean $\pm$ SD		
1	MIPH	6.40 $\pm$ 1.61	-17.342	P < 0.001
2	Open Hemorrhoidectomy	21.47 $\pm$ 4.48		
3	Total	13.93 $\pm$ 8.30		

(Abbreviation: MIPH = Minimally Invasive Procedure for Hemorrhoids)

The comparison of wound healing duration between MIPH and Open Hemorrhoidectomy shows MIPH patients had a mean healing time of 6.40 $\pm$ 1.61 days, while Open Hemorrhoidectomy patients averaged 21.47 $\pm$ 4.48 days. The t-

value of -17.342 and P-value of P<0.001 indicate a highly significant difference, confirming that wounds from MIPH heal much faster than those from Open Hemorrhoidectomy (Table 6).

Table 6. Comparison of duration of Return to Work (Days) in two study groups

S.No.	Procedure	Duration of Return to Work (Days)	t- Value	P- Value
		Mean $\pm$ SD		
1	MIPH	7.83 $\pm$ 2.48	-7.037	P < 0.001
2	Open Hemorrhoidectomy	17.70 $\pm$ 7.27		
3	Total	12.77 $\pm$ 7.33		

(Abbreviation: MIPH = Minimally Invasive Procedure for Hemorrhoids)

Table 6 compares the time taken to return to work post-surgery. MIPH patients returned to work in an average of 7.83 $\pm$ 2.48 days, while Open Hemorrhoidectomy patients took 17.70 $\pm$ 7.27 days. The t-value of -7.037 and P-value of P<0.001 indicate a highly significant difference, showing that MIPH patients resume normal activities much earlier than those who undergo Open Hemorrhoidectomy.

Discussion

Stapled hemorrhoidopexy, also known as minimally invasive procedure for hemorrhoids (MIPH), introduced by Dr. Antonio Longo, has become a popular alternative for managing prolapsing Grade III and IV hemorrhoids due to the technique's fewer complications, lower recurrence rate, and a faster return to

normal activities as compared to traditional hemorrhoidectomy.

This present study aligns with those of Gupta S et al. (2019) and Symeonidis D et al. (2022), showing a higher prevalence of Grade 3 hemorrhoids in MIPH patients (83.3%) compared to Open Hemorrhoidectomy (66.7%), likely due to MIPH's less invasive nature, while Grade 4 hemorrhoids were seen more in Open Hemorrhoidectomy (33.3%) than MIPH (16.7%) [2,12]. The mean duration of surgery was significantly shorter for MIPH (23.83 $\pm$ 2.84 minutes) compared to Open Hemorrhoidectomy (28.33 $\pm$ 2.73 minutes) (P<0.001). Studies by Symeonidis D et al. (2022) and Singh DK et al. (2023), reported similar finding for both procedures, highlighting MIPH's faster operative time and potential benefits for reducing anesthesia-related risks

[12,13]. MIPH patients reported significantly less post-operative pain than Open Hemorrhoidectomy patients in this study. On Day 0, the mean pain score using VAS (Visual Analog Scale) for MIPH was 4.70 ± 1.36 , compared to 7.00 ± 1.36 for Open Hemorrhoidectomy ($P < 0.001$), supported by Gupta S et al. (2019) and Symeonidis D et al. (2022) [2,15]. On Day 1, MIPH patients had a mean score of 2.80 ± 1.34 versus 5.10 ± 1.15 for Open Hemorrhoidectomy ($P < 0.001$), supported by Gupta S et al. (2019) and Singh DK et al. (2023) [2,13].

This study shows no significant difference in post-operative bleeding between MIPH (10.0%) and Open Hemorrhoidectomy (13.3%), with a Chi-square value of 0.162 and P-value > 0.05 , indicating similar risks. Comparable bleeding rates between the two procedures was reported by Singh DK et al. (2023) and Sharma B et al. (2018), suggesting that MIPH may have a slightly lower, though not statistically significant, bleeding risk [13,14]. Our findings show that MIPH patients had a significantly shorter hospital stay (1.40 ± 0.56 days) compared to Open Hemorrhoidectomy patients (1.90 ± 0.76 days), with a t-value of -2.898 and P-value < 0.01 . This aligns with studies by Gupta S et al. (2019) reporting shorter hospital stays for MIPH. The reduced stay could lower healthcare costs and minimize the risk of hospital-acquired infections [2]. MIPH patients had significantly faster wound healing (6.40 ± 1.61 days) compared to Open Hemorrhoidectomy patients (21.47 ± 4.48 days), with a t-value of -17.342 and $P < 0.001$. This corresponds with Gupta S et al. (2019) and Singh DK et al. (2023), all reporting faster healing times for MIPH. The quicker healing in MIPH may be due to anal

mucosa preservation and improved tissue approximation from staples [2,13]. MIPH patients returned to work significantly sooner (7.83 ± 2.48 days) compared to Open Hemorrhoidectomy patients (17.70 ± 7.27 days), with $P < 0.001$, supported by Gupta et al. (2019) and Singh et al. (2023) [2,13]. There was no incidence of incontinence and anal or rectal stenosis at 3 months post-operatively for both MIPH and Open Hemorrhoidectomy, consistent with Singh DK et al. (2023) and Sharma et al. [13,14]. Regarding recurrence, MIPH had 0% recurrence, while Open Hemorrhoidectomy had 3.3%, with no significant difference ($P = 0.313$). Similar trends were reported by Gupta S et al. (2019), suggesting MIPH may have a lower recurrence rate due to precise suture placement [2].

Conclusion

The study highlights several advantages of the Minimally Invasive Procedure for Hemorrhoids (MIPH) over the traditional Open Hemorrhoidectomy (Milligan-Morgan Hemorrhoidectomy). MIPH was associated with a shorter operative time, less post-operative pain, quicker wound healing, shorter hospital stays, and a faster return to work, making it a highly favourable option for patients. Importantly, both procedures yielded comparable results in terms of post-operative complications, including bleeding, residual prolapse, incontinence, recurrence, and anal or rectal stenosis.

MIPH, therefore, emerges as a superior alternative to Open Hemorrhoidectomy, especially for treating grade III and IV hemorrhoids. Its minimally invasive nature leads to significantly improved patient recovery and a more favourable post-operative

experience. Notably, the absence of serious complications, such as incontinence and anal stenosis, further supports the use of MIPH as a preferred surgical option. These findings suggest that MIPH should be considered the procedure of choice for patients requiring surgical intervention for hemorrhoids. Overall, MIPH offers a less invasive approach with better outcomes, enhancing patient's quality of care and recovery.

Ethical Approval

The study was conducted after approval from institutional ethical committee.

Conflicts of interest

The authors declare that they do not have conflict of interest.

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