Section: General Surgery

Original Research Article

A PROSPECTIVE COMPARATIVE STUDY OF STAPLER HEMORRHOIDOPEXY VERSUS OPEN HEMORRHOIDECTOMY OF SHORT-TERM RESULTS IN RIMS RANCHI

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Abstract

Background: Hemorrhoids are a common and debilitating condition requiring surgical intervention in severe cases. Stapler hemorrhoidopexy and open hemorrhoidectomy are two prevalent surgical techniques for treating hemorrhoids. This study aims to compare the postoperative outcomes, specifically pain, complications, and recovery time, associated with these procedures. **Materials and Methods:** A prospective analysis was conducted on 70 patients with third and fourth-degree hemorrhoids who underwent either stapler hemorrhoidopexy (35 patients) or open hemorrhoidectomy (35 patients). Postoperative pain was measured using a visual analog scale (VAS) at 6 hours, 12 hours, 24hours and on follow-up post-surgery. Complications were recorded, and recovery time was assessed by the duration needed to return to normal activities. **Result:** Results indicated that patients who underwent stapler hemorrhoidopexy experienced significantly less postoperative pain at all measured intervals ($p < 0.05$) compared to those who underwent open hemorrhoidectomy. Furthermore, the stapler hemorrhoidopexy group had a lower incidence of complications and a shorter recovery time. **Conclusion:** In conclusion, Although the initial costs of stapler hemorrhoidopexy are higher, the procedure offers superior short-term outcomes with fewer postoperative complications. However, the long-term efficacy and recurrence rates of this method require further investigation. This study suggests that stapler hemorrhoidopexy is advantageous for immediate postoperative recovery, though the open hemorrhoidectomy remains a viable alternative, especially in resource-constrained settings. Future research should focus on the long-term outcomes and comprehensive cost-benefit analyses of these surgical techniques.

INTRODUCTION

Hemorrhoids (Greek: haima = blood, rhoos = flowing; synonym: piles, Latin: pila = a ball) are cushions of submucosal vascular tissue (blood vessels - arterioles, venules, and arteriolar-venular communications; smooth muscle and elastic connective tissue) located in the anal canal.[1] Hemorrhoids are classified into internal and external hemorrhoids based on their location with respect to the dentate line. Internal hemorrhoids are symptomatic anal cushions typically found at the 3, 7, and 11 o'clock positions (when the patient is in the lithotomy position). External hemorrhoids are related to venous channels of the inferior hemorrhoidal plexus deep in the skin surrounding the anal verge. They are usually recognized only because of a complication, most typically a painful solitary acute thrombosis.[1] External hemorrhoids are located distal to the dentate line and are lined by squamous epithelium. Combined internal and external hemorrhoids (interno-external) arise both above and below the dentate line and have characteristics of

both internal and external hemorrhoids.[2,3] Internal hemorrhoids reside above the dentate line and are covered by transitional and columnar epithelium.[4] Internal hemorrhoids are further divided into four degrees based on the degree of prolapse, although this may not always reflect the intensity of a patient's symptoms.[5,6]

1. First-degree internal hemorrhoids cause painless bleeding with defecation.
2. Second-degree hemorrhoids protrude through the anal canal during defecation but spontaneously reduce.
3. Third-degree internal hemorrhoids protrude and bleed with defecation, but they need to be reduced manually.
4. Fourth-degree internal hemorrhoids are fixed below the dentate line and cannot be manually reduced.

The most common symptom patients present with is rectal bleeding, and itching is another common symptom.[7] Treatment of hemorrhoids depends on the degree of hemorrhoids. First and second-degree hemorrhoids can be managed conservatively with dietary fiber, stool softeners, plenty of fluid intake, and avoiding straining. Injection sclerotherapy and banding can also be done for first and second-degree hemorrhoids. For third and fourth degree and symptomatic hemorrhoids, a surgical approach is used.[8]

Indications for surgery include a) Third and fourth-degree hemorrhoids b) Second-degree hemorrhoids not cured by non-operative treatment c) Fibrosed hemorrhoids d) Interno-external hemorrhoids with well-defined external hemorrhoids other indications for surgery include hemorrhoidal bleeding sufficient to cause anemia.[9]

Operative Hemorrhoidectomy Modalities:

a) Open Technique (Milligan-Morgan Operation): Named after the surgeon and more common in the UK. In this operation, hemorrhoids are excised, and the skin and anal mucosa are left open to heal by secondary intention. b) Closed Submucosal Hemorrhoidectomy (Parks or Ferguson Hemorrhoidectomy): Involves resection of hemorrhoidal tissue and closure of the wound with absorbable sutures; more popular in the USA.

Stapler Hemorrhoidectomy is an inpatient procedure in developing countries. In 1998, Antonio Longo described the Longo technique or stapler hemorrhoidopexy. The aim is symptom relief. The technique of stapler hemorrhoidopexy (Longo), which utilizes a purpose-designed stapling gun (PPH, Ethicon Inc.), excises a strip of mucosa and submucosa (together with the vessels traveling within them) circumferentially, well above the dentate line. This reduces blood flow to the hemorrhoidal plexus and lifts the hemorrhoidal mass to its anatomical position, resolving the prolapse. Activation of the stapling gun also simultaneously repairs the cut mucosa and submucosa by stapling the edges together.[10]

This procedure is quick to perform, and controlled trials suggest that it is less painful and less traumatic than conventional hemorrhoidectomy. In the short term, it is equally efficacious. However, evidence is emerging that the Longo technique is associated with higher recurrence rates compared to conventional hemorrhoidectomy and is associated with more additional surgeries. After counselling, the patient may choose to accept a higher recurrence rate to take advantage of the short-term benefits.[11,12]

Postoperative Complications: Early complications include pain, urinary retention (especially in men), and reactionary hemorrhage. Late complications include secondary hemorrhage, anal stricture, anal fissure, submucosal abscess, and incontinence.

Stapler hemorrhoidopexy is still in the evolutionary stage and is a costly operative modality compared to open hemorrhoidectomy for the treatment of third and fourth-degree hemorrhoids. That is why open hemorrhoidectomy is chosen over stapler hemorrhoidopexy in states like Jharkhand. The comparison between these two modalities of treatment has not been studied in the tertiary center of Jharkhand.

The main objective of the study is to compare stapler hemorrhoidopexy and open hemorrhoidectomy as management approaches in terms of: a) Operative time and intraoperative blood loss b) Recovery time c) Duration of hospital stay d) Postoperative pain and complications (bleeding per rectum, infection, anal incontinence, and recurrence of symptoms).[13]

MATERIALS AND METHODS

This study was conducted in the Department of General Surgery, Rajendra Institute of Medical Sciences (R.I.M.S.), Ranchi, Jharkhand, India, over a period of one year from May 2023 to May 2024. It was a prospective comparative study between open hemorrhoidectomy (Milligan-Morgan) and stapler hemorrhoidopexy for the management of grade 3 and grade 4 hemorrhoids. The study was approved by the institutional ethics committee, RIMS, Ranchi (IEC no.: 74/IEC/RIMS;23/03/2023), and written informed consent taken from all patients participating in the study.

Inclusion criteria were patients with age between 18 and 70 years presented with grade 3 or grade 4 hemorrhoids. Exclusion criteria included acute hemorrhoidal episodes with thrombosis, prior hemorrhoidectomy, intercurrent anal pathology (e.g., fistula in ano, anal fissure, abscess), anal stenosis, secondary hemorrhoids, and ASA Grade ≥ IV patients.

A total of 70 patients were included in the study and randomly divided into two groups: 35 patients underwent open hemorrhoidectomy, and 35 patients underwent stapler hemorrhoidopexy.

Data were collected using a questionnaire proforma. Patients were clinically examined, and routine lab-investigations were conducted preoperatively. All patients were operated under spinal anaesthesia in the

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lithotomy position. Duration of surgery was observed from the time of anaesthesia induction till the final hemostasis and also intra-operative blood loss was estimated by using Gauze Visual Analogue (3 ml in the 10 × 10 cm gauze, and four patterns i.e., 25% (3ml), 50%(6ml), 75%(9ml), and 100% (12ml) saturation were selected for the visual guide). The duration of the hospital stay was calculated from the day of surgery. Time to return to normal work, postoperative pain, first stool passed, and postoperative complications were evaluated. Postoperative management consisted of standard nursing care and analgesia.

Postoperative pain was assessed using a Visual Analog Scale (VAS) where a score of 0 represents no pain and a score of 10 represents the worst pain ever. Patients were discharged when postoperative pain control and home circumstances permitted. The patients were reviewed at 1 week, 3 weeks, and 6 weeks postoperatively to assess any postoperative complications.

Descriptive statistical analysis was performed using SPSS software version 26. The study data were analysed using descriptive statistics (mean, standard deviation, frequency). Comparison between the two groups was performed using the Student's T-test for continuous variables, whereas the Pearson's Chi-square test and Fisher's exact test were used for group comparisons of categorical variables. For all statistical evaluations, an alpha level of 5% has been taken, i.e. if any p value < 0.05, then considered as significant.

RESULTS

The results of the comparative study involving 70 patients, divided equally into two groups i.e., 35 in Stapled Hemorrhoidectomy and 35 in Open Hemorrhoidectomy.

In the Open Hemorrhoidectomy group, 11 out of 35 patients (31.43%) were in the age group of 51-60 years, followed by 10 patients (28.57%) in the 41-50 years age group. In the Stapler Hemorrhoidopexy group, 8 out of 35 patients (22.86%) were in the age group of 31-40 years, and 7 patients (20%) were in both the 41-50and 61-70-years age groups. In stapler hemorrhoidopexy group, 77.14% (27) were males and 22.86% (8) were females. In open hemorrhoidectomy group 65.71% (23) were males and 34.29% (12) were females. [Table 1]

In the study, 45.71% (16) of patients in the Open Hemorrhoidectomy group had Grade 3 hemorrhoids, compared to 68.57% (24) in the Stapler Hemorrhoidopexy group. Conversely, 54.29% (19) of patients in the Open Hemorrhoidectomy group had Grade 4 hemorrhoids, compared to 31.43% (11) in the Stapler Hemorrhoidopexy group.

Among the patients with Grade 3 hemorrhoids, 40% (40) presented with bleeding per rectum, and 40% (16) experienced pain during defecation. In the Grade 4 hemorrhoids group, 30% (30) of patients presented with bleeding per rectum, and 30% (9) experienced pain during defecation.

The mean duration of presentation was 2.8 years with a standard deviation of 1.70 for the Grade 3 hemorrhoids group, and 3.17 years with a standard deviation of 1.80 for the Grade 4 hemorrhoids group. As shown in [Table 2 and Figure 1], the mean intraoperative time in the Open Hemorrhoidectomy group was 36.51 minutes, with 42.86% (15) of patients undergoing surgery within 41-50 minutes. In the Stapler Hemorrhoidopexy group, the mean intraoperative time was 28.71 minutes, with a range of 15-40 minutes, and 42.86% (15) of patients undergoing surgery within 21-30 minutes. The p-value was <0.001, indicating a statistically significant difference. If there were three tissues then it had taken much time for excision in open procedure than for single tissue and SH group time taken was independent of number of hemorrhoids.

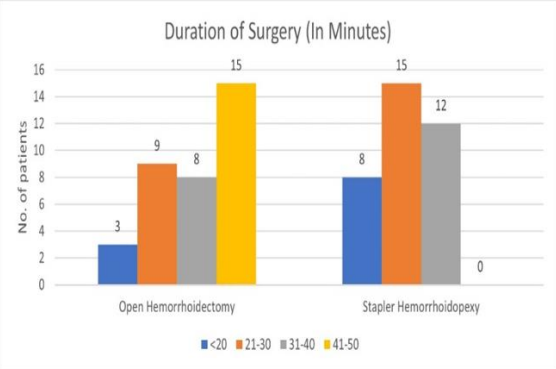

Figure 1: Comparison of intra-operative time in both OH and SH groups

OH = Open Haemorrhoidectomy
SH = Stapler Haemorrhoidopexy

As depicted in [Table 3], the mean blood loss in the Open Hemorrhoidectomy group was 38.80 ± 8.48 ml which was significantly higher compared to the Stapler Hemorrhoidopexy group i.e. 6.54 ± 2.89 ml. In the Open Hemorrhoidectomy group, 40% (14) of patients experienced blood loss between 41-50 ml, whereas in the Stapler Hemorrhoidopexy group, 91.43% (32) of patients had minimal blood loss, ranging from 1-10 ml.

Post Operative Complication: In this study, several complications were assessed following Open Hemorrhoidectomy and Stapler Hemorrhoidopexy, focusing on pain, bleeding, urinary retention, incontinence, and recovery metrics. The primary complications included pain at various intervals post-surgery, per rectal bleeding, urinary retention, and incontinence. Additionally, the study evaluated the time to first stool passage, length of hospital stay, and return to normal activities, providing a comprehensive view of the post-operative recovery experience for each surgical method.

As shown in [Table 4 and Figure 2], pain levels were assessed using the Visual Analog Scale (VAS).

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Patients who underwent Open Hemorrhoidectomy reported mean pain scores of 6.37, 5.6, and 3.11 at 6, 12, and 24 hours post-surgery, respectively. In contrast, patients undergoing Stapler Hemorrhoidopexy experienced significantly lower mean pain scores of 3.06, 1.7, and 0.6 at the same time intervals. These scores, consistently below 3 in Stapler hemorrhoidopexy, which were approximately half the pain severity reported by the Open Hemorrhoidectomy group.

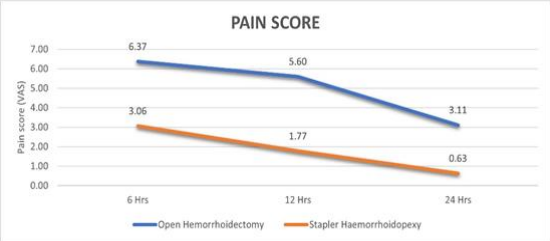

Figure 2: Mean pain (VAS) score at 6 Hours, 12 Hours and 24 Hours

[Table 5] shows the detailed pain scores variation at different postoperative intervals: 6 Hours: In the Open Hemorrhoidectomy group, 51.43% (18) of patients reported severe pain, while 25.71% (09) experienced intense pain. In contrast, 68.57% (24) of patients in the Stapler Hemorrhoidopexy group reported only mild pain.

12 Hours: The Open Hemorrhoidectomy group had 48.57% (17) of patients with severe pain and 31.43% (11) with moderate pain. Conversely, 71.43% (25) of patients in the Stapler Hemorrhoidopexy group experienced mild pain. 24 Hours: In the Open Hemorrhoidectomy group, 54.29% (19) of patients reported mild pain, and 37.14%(13) had moderate pain. In the Stapler Hemorrhoidopexy group, 51.4% (18) of patients had mild pain, and 48.57% (17) reported no pain.

In the Open Hemorrhoidectomy group, 51.43% (18) of patients experienced bleeding per rectum. In contrast, 82.86% (29) of patients in the Stapler Hemorrhoidopexy group did not report bleeding per rectum. The difference between the two groups was statistically significant, with a p-value of 0.003. In both the groups, a similar proportion of patients did not experience any urinary retention postoperatively. Specifically, 85.71% (30) of patients in the Open Hemorrhoidectomy group and 94.29% (33) in the Stapler Hemorrhoidopexy group did not report urinary retention. This indicates that urinary retention was a relatively uncommon complication in both surgical procedures, with no significant difference between the two groups. Also, the data shows that in the Open Hemorrhoidectomy group, only 1 patient (2.86%) had experience incontinence, compared to Stapler Hemorrhoidopexy group where none of them experienced incontinence. Overall, 98.57% (69) of patients across both groups did not report incontinence with flatus and stool. The p-value of 0.314 indicates no significance. Thus, both surgical procedures demonstrated similar outcomes regarding postoperative incontinence, with very few patients affected. [Table 6]

Following [Table 7], illustrate the time to first stool passage after surgery. In the Open Hemorrhoidectomy group, the mean time for passing the first stool was 13 hours, with 28.57% (10) of patients having their first bowel movement within 11-12 hours post-surgery. In contrast, the Stapler Hemorrhoidopexy group had a mean time of 8.80 hours, with 51.43% (18) patients passing their first stool within 6-8 hours. The earlier stool passage observed in the Stapler Hemorrhoidopexy group was statistically significant, with a p-value of <0.001.

[Table 8 and Figure 3] show that 40% (14) and 34.29% (12) of patients in the Open Hemorrhoidectomy group were discharged on day 2 and 3, respectively. In contrast, 48.57% (17) and 37.14% (13) of patients in the Stapler Hemorrhoidopexy group were discharged on days 1 and 2. The Stapler Hemorrhoidopexy group experienced a significantly shorter hospital stay, with a p-value of 0.039.

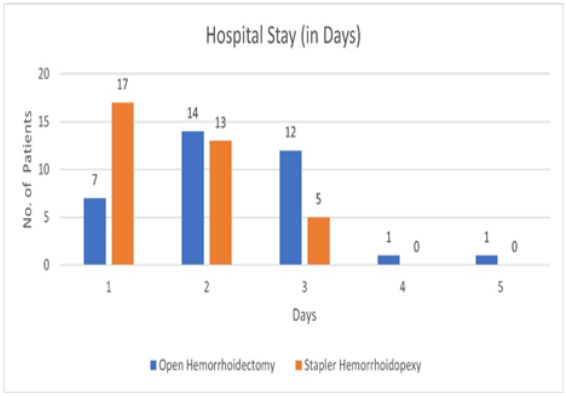

Figure 3: Comparison of hospital stay

65.7% (23) of patients in the Open Hemorrhoidectomy group took 15-20 days to return to normal work, whereas 80% (28) of patients in the Stapler Hemorrhoidopexy group returned to normal work within 8-14 days [Table 9]. A significantly earlier return to normal work was observed in the Stapler Hemorrhoidopexy group.

In open hemorrhoidectomy group, 31.4% (11) patients had pain, 14.2% (05) had pus discharge per rectally and 17.14% (06) had bleeding per rectally mainly due to slippage of ligature for which again patients underwent surgery to secure bleeder and sometimes bleeding was so profuse that patients had to underwent at least one- or two-unit of blood transfusion. Whereas in stapler group complications were lesser as compared to opened hemorrhoidectomy, and mainly complained of pain and with significant p value 0.004. Other complications were also minimal in the Stapler Hemorrhoidopexy, with nearly no issues reported. In contrast, the Open Hemorrhoidectomy group experienced mild rectal discharge in 8.5% (03), pain in 5.7% (02), constipation in 5.7% (02), and incontinence with stool in 5.7% (02) patients and it

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also reveals that no complications were observed in either surgical procedure by the 6th week. [Table 10] During the 1st week, 62.86% (22) of patients in the Open Hemorrhoidectomy group experienced complications, compared to only 25.71% (09) in the Stapler Hemorrhoidopexy group. By the 3rd and 6th weeks, the Stapler Hemorrhoidopexy group reported no complications, while 22.86% (08) of patients in the Open Hemorrhoidectomy group continued to experience complication in the 3rd week [Table 11].

Table 1: Comparison of gender distribution of patients studied.

		Operation		Total
		Open Hemorrhoidectomy	Stapler haemorrhoidopexy	
Gender	Female	12 (34.29%)	8 (22.86%)	20 (28.57%)
	Male	23 (65.71%)	27 (77.14%)	50 (71.43%)
Total		35 (100%)	35 (100%)	70 (100%)

Samples are matched with the p=0.290.
Pearson's Chi square test of significance applied.

Table 2: Comparison of Intra-Operative timing in Open hemorrhoidectomy and Stapler hemorrhoidopexy

		Operation (%)		Total (%)	p Value
		Open Hemorrhoidectomy	Stapler haemorrhoidopexy		
Duration of surgery (in minutes)	<20	3 (8.57%)	8 (22.86%)	11 (15.71%)	<0.001*#
	21-30	9 (25.71%)	15 (42.86%)	24 (34.29%)	
	31-40	8 (22.86%)	12 (34.29%)	20 (28.57%)	
	41-50	15 (42.86%)	0 (0%)	15 (21.43%)	
Mean ± SD		36.51 ± 9.16	28.71 ± 7.25		<0.001*t
Total		35(100%)	35(100%)	70(100%)	

Sampled are matched with p value <0.001.
*Statistically significant p-value. #-Fisher's exact test of significance. t-Unpaired t test of significance.
SD= Standard deviation.

Table 3: Comparison of intra-op blood loss in both OH and SH groups

		OPERATION (%)		Total (%)	p Value
		Open Hemorrhoidectomy	Stapler haemorrhoidopexy		
Blood loss (in ml)	1-10	0(0%)	32 (91.43%)	32 (45.71%)	<0.001*#
	11-20	3 (8.57%)	3 (8.57%)	6 (8.57%)	
	21-30	4 (11.43%)	0 (0%)	4 (5.71%)	
	31-40	13 (37.14%)	0 (0%)	13 (18.57%)	
	41-50	14 (40%)	0 (0%)	14 (20%)	
	51-60	1 (2.86%)	0 (0%)	1 (1.43%)	
Total		35 (100%)	35 (100%)	70 (100%)	
Mean ± SD		38.80 ± 8.48	6.54 ± 2.89		<0.001*t

Samples are matched with p<0.001.
* Statistically significant p-value. #-Fisher's exact test of significance. t-Unpaired t test of significance.
OH = Open Hemorrhoidectomy
SH = Stapler Haemorrhoidopexy SD = Standard Deviation
p-value of <0.05 is considered significant.

Table 4: Comparison of mean of pain score at various intervals in both the groups

	Operation		
	Open Hemorrhoidectomy	Stapler haemorrhoidopexy	
	Mean ± Std. Deviation	Mean ± Std. Deviation	p- value
6 Hours pain score	6.37 ± 1.48	3.06 ± 1.28	<0.001*t
12 Hours pain score	5.60 ± 1.80	1.77 ± 1.33	<0.001*t
24 Hours pain score	3.11 ± 1.39	0.63 ± 0.69	<0.001*t

Samples are matched with p-value<0.001.
* Statistically significant p-value. t- Unpaired t test of significance. p-value<0.05 is considered significant.

Table 5: Comparison of post-operative pain with VAS scale at 6 hours, 12 hours and 24 hours in both groups

Pain According to VAS	Operation (%)						p-Value
	Open Hemorrhoidectomy			Stapler Hemorrhoidopexy			
	6 hrs	12 hrs	24 hrs	6 hrs	12 hrs	24hrs	
No Pain (0)	0 (0%)	1 (2.86%)	2 (5.71%)	0 (0%)	6 (17.14%)	17 (48.57%)	<0.001*#
Mild Pain (1-3)	2 (5.71%)	3 (8.57%)	19 (54.29%)	24 (68.57%)	25 (71.14%)	18 (51.43%)	
Moderate Pain (4-6)	6 (17.14%)	11 (31.43%)	13 (37.14%)	10 (28.57%)	4 (11.43%)	0 (0%)	
Severe Pain (7-9)	18 (51.43%)	17 (48.57%)	1 (2.86%)	1 (2.86%)	0 (0%)	0 (0%)	
Intense Pain (10)	9 (25.71%)	3 (8.57%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	

Samples are matched with p-value <0.001.
* Statistically significant p-value.

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#-Fisher's exact test of significance. VAS = Visual Analog Scale.

Table 6: Comparison of post-op complications in both the OH and SH operative modalities

		Operation (%)		Total	p-value
		Open hemorrhoidectomy	Stapler hemorrhoidopexy		
Bleeding per rectal	Absent	17(48.57%)	29(82.86%)	70	0.003*#
	Present	18(51.43%)	6(17.14%)		
Urinary retention	Absent	30(85.71%)	33(94.29%)	70	0.232#
	Present	5(14.29%)	2(5.71%)		
Incontinence	Absent	34(97.14%)	35(100%)	70	0.314#
	Present	1(2.86%)	0(0%)		

p-value <0.05 considered as significant.
*Statistically significant p-value.
-Fisher's exact test of significance.

Table 7: Comparison of 1st stool passed between OH and SH groups.

		OPERATION (%)		Total (%)	p-Value
		Open Hemorrhoidectomy	Stapler haemorrhoidopexy		
1st Stool passed (in hrs)	6-8	1 (2.86%)	18 (51.43%)	19 (27.14%)	<0.001*#
	9-10	4 (11.43%)	11 (31.43%)	15 (21.43%)	
	11-12	10 (28.57%)	5 (14.29%)	15 (21.43%)	
	13-14	6 (17.14%)	0 (0%)	6 (8.57%)	
	15-16	9 (25.71%)	0 (0%)	9 (12.86%)	
	17-18	4 (11.43%)	1 (2.86%)	5 (7.14%)	
	19-20	1 (2.86%)	0 (0%)	1 (1.43%)	
	Total	35 (100%)	35 (100%)	70 (100%)	
Mean ± SD		13.86 ± 2.99	8.80 ± 2.65		<0.001*t

Samples are matched with p-value<0.001.
*Statistically significant p-value. #-Fisher's exact test of significance. t-Unpaired t test of significance.
SD = Standard Deviation. p-value<0.05 is considered as significant

Table 8: Comparison of hospital stay (in days) in studied samples.

		OPERATION (%)		Total (%)	p-Value
		Open Hemorrhoidectomy	Stapler haemorrhoidopexy		
Hospital stays (days)	1	7 (20%)	17 (48.57%)	24 (34.29%)	0.039*#
	2	14 (40%)	13 (37.14%)	27 (38.57%)	
	3	12 (34.29%)	5 (14.29%)	17 (24.29%)	
	4	1 (2.86%)	0 (0%)	1 (1.43%)	
	5	1 (2.86%)	0 (0%)	1 (1.43%)	
Total		35 (100%)	35 (100%)	70 (100%)	
Mean ± SD		2.29 ± 0.93	1.66± 0.73		0.003*t

Samples are matched with p-value=0.039.
*Statistically significant p-value. #-Fisher's exact test of significance. t-Unpaired t test of significance.
p-value<0.05 is considered significant.

Table 9: Comparison of back to normal activity (in days) in studied population.

		OPERATION(%)		Total (%)	p-Value
		Open Hemorrhoidectomy	Stapler haemorrhoidopexy		
Back to normal work in days	≤ 7	1 (2.86%)	4 (11.43%)	5 (7.14%)	<0.001*#
	8-14	11 (31.43%)	28 (80%)	39 (55.71%)	
	15-20	23 (65.71%)	3 (8.57%)	26 (37.14%)	
Total		35 (100%)	35 (100%)	70 (100%)	
Mean ± SD		16.20 ± 3.43	10.57 ± 2.71	-	<0.001*t

Samples are matched with p-value<0.001. *Statistically significant p-value. #-Fisher's exact test of significance. t-Unpaired t test of significance. SD = Standard deviation

Table 10: Comparison of complications at 1st week, 3rd week and 6th week.

	Operation (%)					
	Open Hemorrhoidectomy			Stapler Hemorrhoidopexy		
	1st week	3rd week	6th week	1st week	3rd week	6th week
Bleeding Per rectally	6(17.14%)	0(0%)	0(0%)	1(2.86%)	0(0%)	0(0%)
Discharge	5(14.29%)	3(8.57%)	0(0%)	0(0%)	0(0%)	0(0%)
Pain	11(31.43%)	2(5.71%)	0(0%)	8(22.86%)	0(0%)	0(0%)
Incontinence	0(0%)	1(2.86%)	0(0%)	0(0%)	0(0%)	0(0%)
Constipation	0(0%)	2(5.71%)	0(0%)	0(0%)	0(0%)	0(0%)
Fistula formation	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
Anal stenosis	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)	0(0%)
None	13(37.14%)	27(77.14%)	35(100%)	26(74.29%)	35(100%)	35(100%)

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p value<0.05 considered as significant. *Statistically significant p-value. #-Fisher's exact test of significance.

Table 11: Complications at 1st, 3rd and 6th week in studied samples.

		OPERATION (%)		p Value	Significance
		Open Hemorrhoidectomy	Stapler hemorrhoidopexy		
Complications 1st week	No	13 (37.14%)	26 (74.29%)	0.002*#	Significant
	Yes	22 (62.86%)	9 (25.71%)		
Complication 3rd week	No	27 (77.14%)	35 (100%)	0.003*#	Significant
	Yes	8 (22.86%)	0 (0%)		
Complications 6th week	No	35 (100%)	35 (100%)	-	-
	Yes	0 (0%)	0 (0%)		

p-value <0.05 has been considered as significant.
*Statistically significant p-value.
#-Fisher's exact test of significance.

Table 12: Comparison of various outcomes between open hemorrhoidectomy and stapler hemorrhoidopexy in our study Vs. other previous studies.

	Sachin Idoor D. et al (2017) (n=100),[13]		Surati K. et al (2022) (n=40),[19]		Gani M. et al(2024), (n=80),[20]		Our Study (n=70)	
	Open	Stapler	Open	Stapler	Open	Stapler	Open	Stapler
Duration of Surgery (in minutes)	44	33	40	34	50	35	36.5	28.71
Intra-operative Blood loss(in ml)	-	-	-	-	80	60.2	38.8	6.54
Post-operative Pain	2.89±0.86	1.78±0.77	5.9	2.4	6.27±0.41	3.12±0.56	6.37	3.06
Duration of hospital Stay (In days)	3.92±0.77	1.94±0.79	2.4	1.5	2.5	1.5	2.29 ± 0.93	1.66 ± 0.73
Return to work (In days)	15.40±2.08	8.42±2.72	20.5	3	-	-	16.2 ± 3.43	10.5 ± 2.7

DISCUSSION

Hemorrhoids are a common anorectal pathology known for their morbidity and complications. Traditionally, Grade 3 and 4 hemorrhoids were treated with conventional procedures such as open Milligan-Morgan hemorrhoidectomy or closed Fergusson hemorrhoidectomy, which were considered the 'gold standard'. However, these conventional surgeries often resulted in severe postoperative pain, prolonged wound healing, affects anal function and complications such as anal stenosis, and overall well-being.[14] Since 1998, Stapler Hemorrhoidopexy has emerged as a better alternative.[15] The Stapler Hemorrhoidopexy, also known as the Longo procedure or circular anopexy, is a safe and feasible technique that requires fewer analgesics and allows for early discharge, thus reducing hospital stays. With rigorous case selection and correct surgical technique, it provides excellent long-term results and high patient satisfaction.[16] During the procedure, the purse-string suture should be placed in the submucosal plane rather than deeper in the muscular-propria layer.

Antonio Longo first presented his results of Stapler Hemorrhoidopexy in 144 patients at the 1998 World Endoscopic Meeting in Rome.[17] Many controlled studies have since demonstrated that Stapler Hemorrhoidopexy is associated with fewer postoperative complications and quicker recovery. Despite high patient satisfaction rates, many of these studies were conducted in highly specialized centers. This study aims to compare the short-term outcomes of Stapler Hemorrhoidopexy with MilliganMorgan (Open) Hemorrhoidectomy, and to determine if the results align with the literature when the procedures are performed at independent centers.

Seventy patients underwent hemorrhoid surgery at Rajendra Institute of Medical Sciences, Ranchi, Jharkhand, who met the inclusion and exclusion criteria, were included in this study. Thirty-five patients underwent the Stapler Hemorrhoidopexy, and thirty-five underwent Milligan-Morgan (Open) Hemorrhoidectomy. In the Open Hemorrhoidectomy group, 31.43% of patients were aged 51-60 years, while in the Stapler Hemorrhoidopexy group, 22.86% were aged 31-40 years. Among the patients, 45.71% in the Open group and 68.57% in the Stapler group had Grade 3 hemorrhoids, while 54.29% in the Open group and 31.43% in the Stapler group had Grade 4 hemorrhoids. Females constituted 24.29% of the Open group and 22.86% of the Stapler group, whereas males were 65.71% in the Open group and 77.14% in the Stapler group. The samples were matched with a p-value of 0.053. The mean duration of presentation was 2.83±1.70 months for Grade 3 hemorrhoids and 3.17±1.80 months for Grade 4 hemorrhoids.

The duration of the surgery was shorter in the Stapler group compared to the Open procedure, regardless of the number of hemorrhoids. In the Open procedure, 42.86% of patients had a surgery duration ranging from 41-50 minutes, with a mean of 36.51±9.16 minutes. For multiple hemorrhoidal tissues, excision and ligation required additional time compared to a single hemorrhoidal tissue. In the Stapler Hemorrhoidopexy group, 42.86% of patients had a surgery duration ranging from 15-40 minutes, with a mean of 28.71±7.25 minutes. The Stapler Hemorrhoidopexy group showed a significantly

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shorter intraoperative time compared to the Open procedure, with a p-value <0.001.

Similar findings have been reported in various studies. Kumar M. et al. (2023) observed a mean operative time of 24 minutes for Stapler and 46 minutes for Open procedures.[17] A comparative study by Salama M. M. et al. (2023) involving 76 patients also reported shorter surgery durations for Stapler Hemorrhoidopexy, with mean times of 20.54 minutes versus 22.18 minutes for the Open procedure.[18]

In our study, the Stapler procedure resulted in minimal blood loss, with 91% of patients having blood loss ranging from 1-10 ml, compared to 40% of Open procedure patients experiencing blood loss in the range of 41-50 ml. The mean blood loss was 6.54 ml for Stapler and 38.80 ml for Open procedures. There was significantly less blood loss in the Stapler procedure with a p-value of 0.00. Blood loss was assessed visually based on the number and size of surgical gauze used.

[Table 12] presents a comparison of various outcomes in our study between open hemorrhoidectomy and stapler hemorrhoidopexy vs. other relevant studies, includes studies conducted by Sachin Idoor D. et al,[13] Surati K. et al,[19] and Gani M. et al.[20]

Nambula Malyadri et al. (2021) reported similar findings, with Stapler procedures showed less blood loss compared to Open procedure with a p-value <0.001.[21]

Postoperative pain was less severe in the Stapler Hemorrhoidopexy group compared to the Open procedure. Pain assessment using the VAS scale at 6, 12, and 24 hours showed a mean score of 6.37 in the Open procedure versus 3.06 in the Stapler group. At 6 hours, 51.43% of patients in the Open procedure reported severe pain, while 68% in the Stapler group reported mild pain. The severity of pain was significantly lower in the Stapler group compared to the Open group, with a p-value <0.001. Similar results were observed at 12 and 24 hours.

Shukla S. et al. (2017) reported significantly lower pain scores in the Stapler group compared to the Open procedure with a p-value <0.05.[22] Cheetham et al. (Lancet, 2000) reported increased pain in the Stapler group due to a low stapled line.[23] However, Salama M. M. et al. (2023) reported significantly less postoperative pain in the Stapler group, with mean scores of 3.8 compared to 4.8 in the Open group.[18]

Postoperative bleeding was more common in the Open Hemorrhoidectomy group, primarily due to reactionary hemorrhage. In our study, 51.43% of patients in the Open group experienced bleeding per rectally, compared to 6% in the Stapler group, which was minor and resolved after a few days. The incidence of rectal bleeding was significantly higher in the Open group with a p-value of 0.003. The bleeding was often due to slippage of ligature, leading to severe anaemia (hypovolemia) and the need for blood transfusions or reoperation.

Nisar P. J. et al. (2004) reported similar findings, with higher rates of postoperative bleeding in conventional procedures compared to Stapler group.[24] Kumar M. et al. (2023) also found more cases of bleeding in the Open procedure.[17]

Urinary retention, a common complication following anorectal surgery, was more prevalent in the Open Hemorrhoidectomy group compared to Stapler Hemorrhoidopexy. In our study, 14.29% of patients in the Open group experienced urinary retention, compared to only 5.7% in the Stapler group, with higher rates observed in males. Zaheer et al. found that adequate analgesics were associated with a lower incidence of urinary retention.[25] Chik B. et al. (2006) reported similar findings, indicating that urinary retention was more common in conventional methods than in Stapler.[26] The exact cause of urinary retention is not well understood but may be related to detrusor muscle dysfunction or pain. Various methods, such as α-adrenergic blockers and sitz baths, have been used to reduce incidence.[26]

Incontinence with stool and flatus was more common in the Open Hemorrhoidectomy group. Our study observed incontinence in Open Hemorrhoidectomy group. Stanojević G. et al. (2023) reported higher rates of anal incontinence with Open Hemorrhoidectomy compared to Stapler.[27] Early stool passage was reported in the Stapler group, with a mean of 8.8 hours (range: 6-8 hours), while in the Open procedure, the mean was 13.86 hours (range: 11-12 hours), due to postoperative pain. This difference was statistically significant with a p-value <0.001.

Due to postoperative pain, urinary retention, or infection (pus discharge), patients in the Open Hemorrhoidectomy group were often discharged later. In contrast, patients who underwent Stapler Hemorrhoidopexy were discharged earlier, with 48.57% being discharged on postoperative day 1, compared to 40% of Open procedure patients discharged on day 2. The Stapler group had a significantly shorter hospital stay with a p-value of 0.039. Khan N. F. et al. (2009) reported a significantly shorter postoperative hospital stay in the Stapler group (3.37±2.2 days) compared to the Open group (2.0±0.81 days), with a p-value of 0.003.[28] Bangaradka N. et al. (2022) also reported a shorter hospital stay in the Stapler(average of 1.1 days) compared to the Open(average of 2.8 days).[29] A meta-analysis and several studies confirmed that Stapler Hemorrhoidopexy results in a shorter postoperative hospital stay due to less postoperative discomfort.[4] This was consistent with Bangaradka N. et al.'s (2022) findings.

The time to return to normal work was quicker in the Stapler group. Our study found that 80% of patients returned to work within 8-14 days, compared to 65.7% in the Open group who returned in 15-20 days. The Stapler group showed significantly quicker recovery and return to normal work with a p-value <0.001. Malyadri N. et al. (2021) reported an early resumption of daily activities in the Stapler compared

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to the Open (p-value <0.001).[21] Kumar M. et al. (2023) also found that the mean return-to-work time was 4±1.2 days for the Stapler vs 14±3.4 days for the Open, with a p-value of 0.001.[17]

Postoperative complications at 1 week, such as bleeding per rectally, pus discharge, and pain, were more common in the Open Hemorrhoidectomy group. In our study, these complications were significantly more frequent in the Open procedure compared to the Stapler Hemorrhoidopexy, with a p-value of 0.004. Rectal bleeding was more common with the Open procedure in the initial days, often due to surgical threads separating from the bowel wall. This bleeding typically resolves on its own, though some patients may require re-admission, blood transfusion, or further surgery. Pus discharge and perianal itching were also observed with the Open procedure, likely due to wounds not being sutured and healed by secondary intention, which is slower and more prone to contamination.

By the 3rd week, postoperative complications were much lesser compared to the first week in both groups. Few manageable complications persisted in the Open group, with no complications reported in the Stapler Hemorrhoidopexy group by the 6th week. Anal stenosis has been reported as a complication of Milligan-Morgan open hemorrhoidectomy, emphasizing the importance of leaving a few millimeters of "bridges" between excised hemorrhoids to prevent anal canal stenosis. The technique is primarily used for the removal of Grade 3 and 4 hemorrhoids at the 3, 7, and 11 o'clock positions, resulting in a "three-leaf" clover appearance post-surgery.

Limitations of the Study:

The study included only 70 participants; a larger sample size might have yielded more statistically significant results.

The study focuses on short-term outcomes; long-term complications would require extended follow-up for comprehensive assessment.

The study did not include a cost analysis.

CONCLUSION

This study demonstrates that stapler hemorrhoidopexy offers significant advantages over open hemorrhoidectomy. Specifically, it is associated with reduced intraoperative blood loss, shorter operative duration, and fewer postoperative complications. Additionally, patients undergoing stapled hemorrhoidopexy experience faster recovery and an earlier return to daily activities. To enhance patient outcomes, it is advisable to incorporate dietary and lifestyle modifications alongside surgical treatment to mitigate recurrence. Future research with larger sample sizes and extended follow-up periods is warranted to validate and expand upon these findings.

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