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Original Research Article

Stapled hemorrhoidopexy versus Milligan-Morgan hemorrhoidectomy for grade III and IV hemorrhoids – a prospective randomized comparative study

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ABSTRACT

Background: Surgical management of grade III and IV hemorrhoids is associated with postoperative pain and delayed recovery. Stapled hemorrhoidopexy offers a tissue-preserving alternative to conventional excisional hemorrhoidectomy. This study compared perioperative and early postoperative outcomes of stapled hemorrhoidopexy and Milligan-Morgan hemorrhoidectomy.

Methods: This prospective randomized comparative study was conducted over two years at a tertiary care centre. One hundred and twenty patients aged 18-80 years with symptomatic grade III or IV hemorrhoids were randomized equally into two groups: open Milligan-Morgan hemorrhoidectomy (n=60) and stapled hemorrhoidopexy (n=60). Operative time, intraoperative blood loss, postoperative pain assessed using the visual analogue scale (VAS), hospital stay, and early postoperative complications were evaluated. A p value <0.05 was considered statistically significant.

Results: Stapled hemorrhoidopexy demonstrated significantly shorter operative time than Milligan-Morgan hemorrhoidectomy (26.41±7.25 versus 37.51±8.16 min; p<0.0001) and lower intraoperative blood loss (10.56±2.89 versus 38.80±8.48 ml; p<0.0001). Postoperative VAS pain scores were significantly lower in the stapled group at 6, 12, 24 and 48 hours and on postoperative day 7 (p<0.0001). Hospital stay was also significantly shorter (1.60±0.73 versus 2.29±0.93 days; p<0.0001). Postoperative bleeding occurred significantly less frequently after stapled hemorrhoidopexy (21.7% versus 53.3%; p=0.0004). Urinary retention was observed in 5.0% versus 15.0%, while anal discharge occurred in 3.3% versus 13.3% of patients in the stapled and open groups, respectively.

Conclusions: Stapled hemorrhoidopexy provides significant short-term advantages over Milligan-Morgan hemorrhoidectomy, with reduced operative time, blood loss, postoperative pain, hospital stay, and early morbidity. It represents an effective option for appropriately selected patients with grade III and IV hemorrhoids; however, longer-term studies are required to determine recurrence, functional outcomes, quality of life, and cost-effectiveness.

Keywords: Hemorrhoids, Stapled hemorrhoidopexy, Milligan-morgan hemorrhoidectomy, Grade III hemorrhoids, Grade IV hemorrhoids; Postoperative pain

INTRODUCTION

Hemorrhoids are among the most common benign anorectal disorders worldwide. They develop when the normal vascular cushions of the anal canal undergo pathological enlargement and distal displacement due to degenerative changes in the supporting connective tissue and vascular structures.[1] Hemorrhoids are broadly classified into internal, external, and mixed types. Internal hemorrhoids arise above the dentate line and are covered by rectal mucosa, whereas external hemorrhoids originate below the dentate line and are covered by anoderm (skin).[2]

The clinical presentation depends on whether the hemorrhoids are internal or external. Internal hemorrhoids are commonly classified according to Goligher's

classification based on the degree of prolapse. Grade I hemorrhoids present with bleeding without prolapse. Grade II hemorrhoids prolapse during defecation but reduce spontaneously. Grade III hemorrhoids prolapse during defecation and require manual reduction, whereas grade IV hemorrhoids remain prolapsed permanently and are irreducible.[3]

Based on their anatomical location, hemorrhoids are also classified as primary and secondary. Primary hemorrhoids typically occur at the 3, 7, and 11 o'clock positions, whereas secondary hemorrhoids arise at other locations within the anal canal.[4-6]

The clinical manifestations of hemorrhoids vary according to their type and severity. Patients may remain asymptomatic, with hemorrhoids detected incidentally during colonoscopy, or they may present with painless bleeding per rectum, prolapse, mucous discharge, faecal soiling, pruritus ani, and occasional pain.[7]

Management depends on the type and grade of hemorrhoids. Grade I and early grade II hemorrhoids are usually managed conservatively with dietary and lifestyle modifications, increased fibre intake, and pharmacological therapy. Selected patients with grade II and grade III hemorrhoids may also be treated with office-based procedures such as injection sclerotherapy, rubber band ligation, or newer modalities including laser coagulation.[4,8] However, surgical intervention remains the treatment of choice for symptomatic grade III and grade IV hemorrhoids.

The commonly performed surgical procedures include Ferguson's closed hemorrhoidectomy, Milligan-Morgan open hemorrhoidectomy, and Longo's stapled hemorrhoidopexy.[8-10] Milligan-Morgan hemorrhoidectomy is the conventional gold-standard procedure and has demonstrated excellent long-term outcomes. However, because it creates an open anorectal wound, it is associated with significant postoperative pain, bleeding, delayed return to normal daily activities, and, in some cases, late complications such as anal stenosis.

Stapled hemorrhoidopexy, introduced by Antonio Longo, is a newer surgical technique designed to reduce postoperative pain and facilitate faster recovery. The procedure involves circumferential resection of a ring of rectal mucosa and submucosa above the haemorrhoidal cushions using a circular stapling device.

This interrupts the arterial blood supply to the haemorrhoidal plexus while simultaneously restoring the prolapsed haemorrhoidal tissue to its normal anatomical position. Although stapled hemorrhoidopexy has been reported to result in less postoperative pain, reduced hospital stays, and earlier return to normal activities, it is associated with higher procedural costs.[12-14]

The present study was undertaken to compare stapled hemorrhoidopexy with conventional Milligan-Morgan hemorrhoidectomy in patients with grade III and grade IV hemorrhoids. The outcomes evaluated included operative time, intraoperative blood loss, postoperative pain, early and late postoperative complications, and time required to resume normal daily activities.

METHODS

This prospective randomized study was conducted at Shri Ram Murti Smarak Institute of Medical Sciences (SRMS-IMS), Bareilly, a tertiary care centre in North India, over a period of two years.

Patients of either sex, aged 18-80 years, who were diagnosed with symptomatic grade III or grade IV hemorrhoids and were fit to undergo surgery under regional anaesthesia were included in the study. Patients with bleeding disorders, inflammatory bowel disease, pregnancy, suspected colorectal malignancy, previous anorectal surgery, chronic liver disease, or associated anorectal conditions such as fissure-in-ano or fistula-in-ano were excluded.

Written informed consent was obtained from all participants prior to enrolment. The study protocol was approved by the institutional ethics committee.

A total of 120 eligible patients were enrolled and randomized into two equal groups (n=60 each) using a computer-generated randomization sequence. Group A (n=60) patients underwent conventional open Milligan-Morgan hemorrhoidectomy, and group B (n=60) patients underwent stapled hemorrhoidopexy.

A detailed clinical history, physical examination, and proctoscopic findings were recorded in a predesigned proforma. The collected data were entered into Microsoft Excel and analysed using statistical package for the social sciences (SPSS) software (version 22.0). Descriptive statistics were used to summarize the data. Continuous variables were compared using the student's t-test, and a p value of <0.05 was considered statistically significant.

Surgical technique

All patients received intravenous broad-spectrum antibiotics at the time of induction of anaesthesia. Mechanical bowel preparation was administered on the evening before surgery. All procedures were performed under spinal anaesthesia with the patient in the lithotomy position. Following routine painting and draping, digital rectal examination and proctoscopy were performed to confirm the clinical findings.

Milligan-Morgan technique (open hemorrhoidectomy)

A Kelly clamp was applied to the haemorrhoidal pedicle. A V-shaped incision was made over the external

component of the haemorrhoid, followed by careful dissection of the haemorrhoidal tissue using scissors and diathermy. The dissection was carried out in the plane superficial to the internal sphincter to avoid sphincter injury. The haemorrhoidal pedicle was ligated with 2-0 polyglactin (vicryl®) using a round-bodied needle and subsequently divided. The resulting wound was left open to heal by secondary intention. The procedure was repeated for the remaining haemorrhoidal pedicles. At the completion of surgery, a gauze pack impregnated with local anaesthetic ointment was placed in the anal canal and removed six hours postoperatively.

Stapled hemorrhoidopexy

Following gentle anal dilatation, the anal dilator and circular anal dilator ring were introduced and secured. A circumferential purse-string suture using 2-0 polypropylene (prolene®) was placed approximately 2 cm proximal to the dentate line, incorporating the rectal mucosa and submucosa. A circular haemorrhoidal stapling device was then introduced, and the purse-string suture was tied securely around the shaft of the stapler. The stapler was closed and maintained in the closed position for approximately 30 seconds before firing. After firing, the stapler was gently withdrawn along with the excised mucosal doughnut. The staple line was carefully inspected for bleeding, and haemostasis was achieved with additional sutures whenever required. Finally, a gauze pack impregnated with local anaesthetic ointment was inserted into the anal canal and removed six hours after surgery.

Postoperative follow-up

Patients were assessed every six hours during the first 48 hours after surgery for postoperative pain, bleeding, urinary retention, anal discharge, and faecal incontinence. They were discharged according to the institutional protocol and advised to return for follow-up on the seventh postoperative day. Patients were instructed to report immediately to the emergency department if they experienced excessive pain, bleeding, fever, or any other postoperative complications before the scheduled follow-up.

RESULTS

A total of 120 patients were included in the study and were randomly allocated into two equal groups using a computer-generated randomization sequence. Group A (n=60) underwent conventional open Milligan-Morgan hemorrhoidectomy, whereas group B (n=60) underwent stapled hemorrhoidopexy.

Demographic characteristics

Both male and female patients were included in the study. Males constituted the majority in both groups, accounting for 38 (63.3%) patients in group A and 36 (60.0%) patients in group B. Females comprised 22 (36.7%) patients in group A and 24 (40.0%) patients in group B.

The age of patients in group A ranged from 22 to 76 years, with a mean age of 50.1±10.3 years. In group B, the age ranged from 23 to 60 years, with a mean age of 49.7±12.3 years. The mean body mass index (BMI) was 27.8±3.2 kg/m² in group A and 28.1±3.7 kg/m² in group B (Table 1).

Table 1: Demographic characteristics.

Variables	Open (n=60)	Stapler (n=60)	P value
Age (years)	50.1±10.3	49.7±12.3	0.84
Gender			
Male	38 (63.3%)	36	0.816
Female	22	24	0.76
BMI (mean±SD)	27.8±3.2	28.1±3.7	0.6

Clinical presentation

Painless bleeding per rectum was the most common presenting complaint and was observed in 56 (93.3%) patients in group A and 54 (90.0%) patients in group B. Bleeding associated with varying degrees of pain during defecation was reported by 5 (8.3%) patients in group A and 6 (10.0%) patients in group B (Table 2).

The sensation of a mass prolapsing through the anus during defecation was reported by 57 (95.0%) patients in group A. Of these, 32 (53.3%) required manual reduction of the prolapsed hemorrhoids, whereas in 28 (46.7%) patients the prolapse remained irreducible. Similarly, in group B, 55 (91.7%) patients reported prolapse during defecation. Manual reduction was required in 36 (60.0%) patients, while the prolapse remained irreducible in 24 (40.0%) patients (Table 2).

Table 2: Clinical presentation.

Variables	Open (n=60), N (%)	Stapler (n=60), N (%)	P value
Bleeding PR	56 (93.3)	54 (90)	0.51
Pain during defecation	05 (8.3)	06 (10)	0.74
Something coming out per rectum	57 (95)	55 (91.6)	0.45
Grade of haemorrhoids			
III	32 (53.33)	36 (60)	0.46
IV	28 (46.67)	24 (40)	0.46

Operative findings

The mean operative time was significantly longer in group A (37.51±8.16 minutes) than in group B (26.41±7.25 minutes) (Table 3).

Table 3: Operative findings.

Variables	Open (n=60)	Stapler (n=60)	P value
Operative time (min)	37.51±8.16	26.41±7.25	<0.0001
Intra-op bleeding (ml)	38.80±8.48	10.56±2.89	<0.0001

The mean intraoperative blood loss was also higher in group A (38.8±8.48 ml, range: 30-150 ml) compared with group B (10.56±2.89 ml, range: 10-30 ml).

Postoperative pain

Postoperative pain was assessed using the VAS. Patients in group A experienced considerably higher pain scores than those in group B throughout the postoperative period.

In group A, the mean VAS score was 6.3±1.5 at 6 hours, 5.4±1.3 at 12 hours, and 4.3±1.29 at 24 hours after surgery. The pain gradually decreased to 3.3±1.27 on postoperative day 2 and 2.2±0.2 on postoperative day 7.

In contrast, patients in group B reported significantly lower pain scores, with mean VAS scores of 2.59±1.3, 1.86±1.3, and 1.2±0.5 at 6, 12, and 24 hours, respectively. The pain further decreased to 1.0±1.3 on postoperative day 2 and 0.5±1.1 on postoperative day 7 (Table 4).

Postoperative complications

Postoperative bleeding, ranging from minimal spotting to frank bleeding per rectum, was observed in 32 (53.3%) patients in group A compared with 13 (21.7%) patients in group B.

Urinary retention developed in 9 (15.0%) patients in group A and 3 (5.0%) patients in group B during the early postoperative period.

Transient faecal incontinence was infrequent in both groups. In group A, flatus incontinence was observed in 3 (5.0%) patients, while 2 (3.3%) patients experienced incontinence to liquid stool. In group B, one (1.7%) patient each developed transient flatus incontinence and liquid stool incontinence. No patient in either group developed incontinence to solid stool (Table 5).

Table 4: Postoperative pain.

Variables		Open (n=60)	Stapler (n=60)	P value
Post operative pain (VAS score)	Post operative day-0 (evening)/6 hours	6.3±1.5	2.59±1.3	<0.0001
	Post operative day-1 (morning)/12 hours	5.40±1.30	1.86±1.3	<0.0001
	Post operative day-1 (evening)/24 hours	4.3±1.29	1.2±0.5	<0.0001
	Post operative day-2	3.3±1.5	1.0±1.3	<0.0001
	Post operative day-7	2.2±1.5	0.5±1.1	<0.0001
Post op hospital stays (days)		2.29±0.93	1.6±0.73	<0.0001

Table 5: Complications.

Complications		Open (n=60), N (%)	Stapler (n=60), N (%)	P value
Bleeding		32 (53.33)	13 (21.66)	0.0004
Urinary retention		09 (15)	03 (5)	0.069
Anal discharge		08 (13.33)	02 (3.33)	0.048
Incontinence	Gas	03 (5)	01(1.66)	0.200
	Liquid	02 (3.33)	01 (1.66)	0.559
	Solid	00	00	0

DISCUSSION

The present study demonstrates that stapled hemorrhoidopexy offers significant short-term advantages over conventional open hemorrhoidectomy in the management of grade III and grade IV hemorrhoids. Patients undergoing stapled hemorrhoidopexy experienced significantly shorter operative time, lower postoperative pain scores, reduced analgesic requirement, shorter hospital stay, and fewer early postoperative complications. These findings support the growing evidence that stapled hemorrhoidopexy is a safe and effective alternative to conventional open hemorrhoidectomy, particularly in selected patients requiring surgical intervention.

A major finding of this study was the significantly shorter operative time associated with stapled hemorrhoidopexy. The mean operative time was 26.41±7.25 minutes compared with 37.51±8.16 minutes for open hemorrhoidectomy. These findings are consistent with those reported by Agarwal N et al, as well as other published studies by Rowsell et al, Mehigan et al, and Ganio et al, all of which demonstrated a reduction in operative duration with the stapled technique.[2,15-17] The shorter operative time may be attributed to the

standardized nature of the stapling procedure, which avoids extensive dissection and haemostasis of the highly vascular anoderm. However, operative time is also influenced by the surgeon's experience and familiarity with stapling devices. Therefore, variations observed across different studies may reflect differences in the learning curve, patient selection, and institutional protocols.

Postoperative pain remains one of the most important determinants of patient satisfaction following haemorrhoid surgery. In the present study, patients who underwent stapled hemorrhoidopexy consistently reported significantly lower VAS scores at 6, 12, 24, and 48 hours, as well as on postoperative day 7. Consequently, these patients required fewer postoperative analgesics than those undergoing open hemorrhoidectomy. Similar observations have been reported by Gani et al, Tjandra et al, Shalaby and Desoky, and the Cochrane systematic review comparing stapled hemorrhoidopexy with conventional excisional hemorrhoidectomy.[18-21,23] The lower pain scores are anatomically plausible because stapled hemorrhoidopexy is performed above the dentate line, where visceral innervation predominates and pain sensation is minimal. In contrast, open hemorrhoidectomy involves excision of anoderm and perianal skin, which are richly supplied with somatic sensory nerves, resulting in greater postoperative discomfort. Nevertheless, a few studies have reported less pronounced differences in pain scores, particularly when modern energy devices and multimodal analgesic protocols are used during open hemorrhoidectomy, suggesting that perioperative pain management strategies may influence postoperative outcomes.

Reduced postoperative pain translated into earlier recovery and shorter hospital stay in the present study. Patients treated with stapled hemorrhoidopexy had a mean hospital stay of 1.60±0.73 days, compared with 2.29±0.93 days following open hemorrhoidectomy. Comparable findings have been reported by Daniel et al, Bangaradka et al, Ortiz et al, and numerous randomized controlled trials.[23-25] Earlier discharge not only improves patient satisfaction but also reduces hospital resource utilization and overall healthcare costs. However, it should be recognized that hospital stay may also be influenced by institutional discharge policies, patient preferences, socioeconomic factors, and local healthcare infrastructure, which may account for differences observed among studies.

With respect to postoperative complications, stapled hemorrhoidopexy demonstrated a favourable early safety profile. Although postoperative bleeding was the most frequently observed complication in both groups, it was generally mild, self-limiting, and did not require blood transfusion, reoperation, or prolonged hospitalization. Similar findings have been reported by Ganio et al, Aggarwal et al, and other prospective comparative studies.[2,15] Urinary retention occurred in both groups and appeared to correlate more closely with postoperative pain, spinal anaesthesia, and perioperative fluid administration than with the surgical technique itself. This observation is consistent with previous reports suggesting that urinary retention is a multifactorial postoperative complication rather than a procedure-specific event.

Transient incontinence to flatus and liquid stools was observed in a small proportion of patients, with a higher incidence following open hemorrhoidectomy. This temporary impairment has been attributed to anal dilatation during instrumentation, postoperative sphincter spasm, tissue oedema, or temporary neuropraxia. Most patients recovered completely during follow-up, indicating that the condition was functional rather than structural. Similar findings have been described by previous investigators, although long-term continence appears to remain comparable between the two procedures.

The findings of the present study are broadly consistent with previous randomized controlled trials and meta-analyses demonstrating superior short-term outcomes following stapled hemorrhoidopexy. However, several systematic reviews, including those by Tjandra et al and Cochrane analyses, have also reported a relatively higher incidence of recurrent haemorrhoidal prolapse and the need for re-intervention following stapled hemorrhoidopexy during long-term follow-up.[19,22] Since the present study primarily evaluated early postoperative outcomes, it was not designed to assess long-term recurrence, durability of symptom relief, or patient-reported quality of life. Consequently, direct comparison with long-term outcome studies should be interpreted with caution.

The strengths of this study include the prospective comparative design, standardized assessment of postoperative pain using the VAS, and evaluation of multiple clinically relevant perioperative outcomes. Nevertheless, several limitations should be acknowledged. First, the sample size was relatively small, limiting the statistical power to detect uncommon complications. Second, the study was conducted at a single tertiary care centre, which may limit the generalizability of the findings. Third, the duration of follow-up was relatively short and therefore did not permit assessment of long-term recurrence, anal function, patient satisfaction, or quality-of-life outcomes. In addition, cost-effectiveness was not evaluated, despite the higher initial cost associated with stapling devices, which remains an important consideration in resource-limited healthcare settings.

Future multicentre randomized controlled trials with larger sample sizes, longer follow-up, and comprehensive assessment of recurrence rates, functional outcomes, patient-reported quality of life, and cost-effectiveness are warranted to better define the long-term role of stapled hemorrhoidopexy in the surgical management of haemorrhoidal disease.

Overall, the findings of the present study indicate that stapled hemorrhoidopexy provides superior short-term postoperative outcomes compared with conventional open hemorrhoidectomy, particularly with respect to operative time, postoperative pain, analgesic requirement, hospital stay, and early postoperative morbidity. While these results support the use of stapled hemorrhoidopexy as an effective surgical option for appropriately selected patients, careful consideration of long-term recurrence and economic factors remains essential when choosing the optimal surgical approach.

Limitations

The present study has several limitations that should be considered while interpreting the findings. The study was conducted at a single tertiary care centre with a relatively modest sample size of 120 patients, which may limit the generalizability of the results and reduce the ability to detect fewer common complications. The follow-up period was limited to the early postoperative phase; therefore, long-term outcomes such as recurrence, anal stenosis, chronic pain, continence status, and patient satisfaction could not be adequately assessed. A formal cost-effectiveness analysis was not performed. Although stapled hemorrhoidopexy demonstrated superior short-term clinical outcomes, the higher cost of the stapling device remains an important consideration, particularly in resource-constrained healthcare settings. Patient-reported quality-of-life measures and long-term functional outcomes were not evaluated, which could have provided a more comprehensive assessment of the overall effectiveness of both surgical procedures.

These limitations highlight the need for larger, multicentre studies with longer follow-up and comprehensive economic and quality-of-life assessments to further validate the findings of the present study.

CONCLUSION

The findings of the present study demonstrate that stapled hemorrhoidopexy is a safe and effective surgical alternative to conventional open hemorrhoidectomy for the treatment of grade III and grade IV hemorrhoids. Compared with open hemorrhoidectomy, stapled hemorrhoidopexy was associated with significantly shorter operative time, reduced postoperative pain, decreased analgesic requirement, shorter hospital stay, and fewer early postoperative complications. These advantages facilitated earlier recovery and a faster return to routine daily activities, thereby improving short-term postoperative outcomes and patient comfort.

Despite these favourable short-term results, the present study was not designed to evaluate long-term outcomes such as recurrence, anal stenosis, persistent continence disturbances, or the need for re-intervention. Therefore, no definitive conclusions can be drawn regarding the long-term efficacy and durability of stapled hemorrhoidopexy. Future multicentre, adequately powered randomized controlled trials with longer follow-up are required to evaluate long-term functional outcomes, recurrence rates, quality of life, and cost-effectiveness. Such evidence will help establish more robust clinical recommendations regarding the optimal surgical management of advanced haemorrhoidal disease.

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