# Stapled hemorrhoidopexy versus Milligan–Morgan technique (open hemorrhoidectomy) in surgical treatment of third-degree and fourth-degree circumferential piles

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**Background**
Hemorrhoidal disease is one of the commonest benign anorectal problems worldwide. Hemorrhoidal disease is usually considered the most troublesome anal diseases. They can slide down, prolapse, dilate, and bleed occasionally.
**Objective**
This is a prospective randomized comparative study that compares between the conventional Milligan–Morgan hemorrhoidectomy and stapling hemorrhoidopexy in the surgical treatment of the third-degree and fourth-degree circumferential piles.
**Results**
Stapled hemorrhoidectomy (SH) had significant decrease in intraoperative blood loss and significant decrease in the recurrence rate with no effect on fecal continence.
**Conclusion**
From this study, we concluded that SH is superior to Milligan–Morgan technique in treatment of third-degree and fourth-degree circumferential piles, as SH had significant decrease in intraoperative blood loss and significant decrease in the recurrence rate with no effect on fecal continence. The complication rate showed a statistically nonsignificant difference with respect to the postoperative complications, such as postoperative bleeding, urinary retention, and anal stenosis.

**Keywords:**
circumferential piles, Milligan–Morgan, stapled hemorrhoidopexy

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## Introduction

Hemorrhoidal disease is one of the commonest benign anorectal problems worldwide. Hemorrhoidal disease is usually considered the most troublesome anal diseases. They can slide down, prolapse, dilate, and bleed occasionally [1].

Millions of people are affected around the world. It is a major medical and socioeconomic problem. The etiology of hemorrhoidal disease includes many factors such as constipation and prolonged straining [2].

The commonest symptom of third-degree hemorrhoidal disease is bright-red blood covering the stool or found on toilet paper after defecation or in the toilet bowl. Other symptoms include sensation of a hard lump around the anus, protrusion, and/or mucous discharge [3].

Frequent rubbing of the anus causes exacerbation of the symptoms with vicious cycle of irritation, itching, and bleeding, which is called pruritus ani. They are liable to thrombosis, causing severe pain [4].

Hemorrhoidal disease is classified into four degrees. The first and second degrees require conservative or semiconservative methods. The third and fourth degrees include severe prolapse and usually require surgical intervention [5].

Milligan–Morgan hemorrhoidectomy (MMH) has been the most popular among the various surgical techniques performed. And the traditional surgical operation was excision according to Milligan–Morgan (MM) technique. Till the 1990s, this operation was considered the gold-standard treatment [6].

Surgical hemorrhoidectomy has been reputed as being a painful procedure for a benign disease, and causes postoperative pain that needs about 2–3 days of hospital stay and a convalescence of at least 1 month [7].

Then, a newer technique, which is the stapled hemorrhoidopexy, was introduced. This is usually reserved for third and fourth degrees [8].

Stapled hemorrhoidopexy is a newer modality that represents a paradigm change in the treatment of hemorrhoids. However, it has been met with both skepticism and interest [9].

Stapled hemorrhoidectomy (SH) has better short-term outcomes, including shorter operating times, less postoperative pain, early return to work, and greater patient satisfaction [10].

## Aim

This is a prospective randomized comparative study that compares between the conventional MMH and stapling hemorrhoidopexy (SHP) in the surgical treatment of the third- and fourth-degree circumferential piles.

## Patients and methods

(1) This is a prospective randomized comparative study that compares between the conventional MMH and SHP in the surgical treatment of the third- and fourth-degree circumferential piles.
(2) Study setting: the study was conducted at the General Surgery Department, Ain Shams University Hospitals.
(3) Study period: from January 2020 to July 2021.

### Inclusion criteria

(1) Patients with third-degree and fourth-degree circumferential piles.
(2) Patients with American Society of Anesthesiologists scores I and II.
(3) Age greater than 18 years.

### Exclusion criteria

(1) Patients with debilitating diseases such as liver cirrhosis and bleeding tendencies.
(2) Patients with previous anal surgeries or recurrent hemorrhoids.
(3) Patients with hemorrhoids accompanied by other anal conditions such as fissure, fistula, or anal stenosis or complicated hemorrhoids.
(4) Patients with impaired anal sphincter function or fecal incontinence.
(5) Virgin female patients.
(6) Patients with inflammatory bowel disease.

(a) Sampling method: patients meeting the criteria mentioned above.
(b) Sample size: The study was conducted on 50 patients. The patients included in the study were divided in a randomized way into two groups. In total, 25 patients underwent MM technique of open hemorrhoidectomy and 25 underwent stapled hemorroidopexy.

Ethical considerations: approval of the Ethical Committee and written informed consent from all the patients were obtained after explanation of the procedure carefully to the patients and the possible complications that may occur. An informed consent was taken from all patients who accepted to participate in the study. Risks, complications, and alternative procedures were explained to the patient. Confidentiality was assured of the personal data and medical information of all patients.

Study tools: all the patients included in the study were candidates for

(1) Clinical assessment:

Full detailed medical and surgical history, history of anal symptoms such as pain, bleeding, discharge, or pruritus ani, inspect for any prolapsed tissue, active bleeding, fissures, or fistulous openings, and PR examination and proctoscope to exclude any masses.

(1) Investigations:

Laboratory: routine preoperative labs (complete blood count, coagulation profile, liver and renal functions, and viral markers).

Colonoscopy: to exclude any underlying pathology such as colorectal malignancy.

### Surgical technique

Preoperatively, patients were kept nil per oral the night before the surgery. One dose of ciprofloxacin and metronidazole was given at the time of anesthesia for surgery. All operations were performed in the lithotomy position (Fig. 4). Patients were reexamined under anesthesia to confirm the grade of hemorrhoids and to rule out associated anal pathologies like anal fissure and fistula in ano or masses. A standardized procedure was followed for performing the surgery in each group.

### Group A: MMH

A V-shaped incision is made using a cutting cautery device in the skin surrounding the base of the

hemorrhoid (Fig. 1). Then, dissection in the submucous space was done by cautery to strip the hemorrhoid from its bed. The dissection was continued in the cranial direction up to the pedicle. Dissection was carried out in the submucosal plain to avoid internal sphincter injury. The pedicle was then double-ligated with a 2/0 vicryl suture (Fig. 2), and the distal part of the hemorrhoid was excised. The same steps were carried out regarding the other hemorrhoids, leaving a skin bridge between them to avoid anal stenosis (Fig. 3). Hemostasis was done by cautery device and gelfoam sponge. The wound was left open, and an external pack of gauze was applied.

**Figure 1**

V-shaped incision made with cutting cautery device.

**Figure 2**

The pedicle is then double-ligated with a 2/0 vicryl suture.

**Group B: SHP**

A gentle per-rectal examination was done followed by gentle anal dilation. The external device (transparent

**Figure 3**

Postoperative.

**Figure 4**

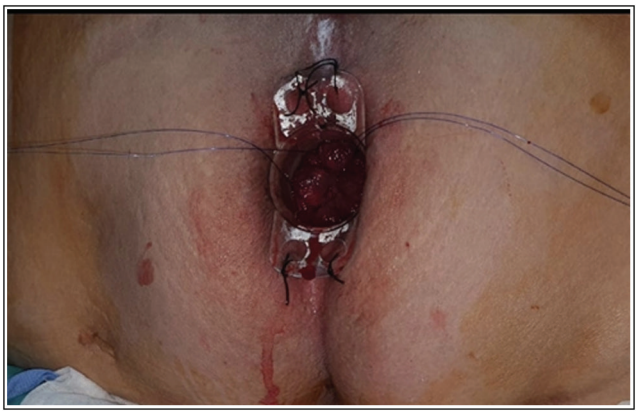
Position and sterilization of the perianal area.

anoscope) of PPH stapler (PROXIMATE PPH Hemorrhoidal Circular Stapler Set; Ethicon US, LLC, United states, New Jersey) was applied and fixed to the cutaneous margin (Fig. 5). This was done to facilitate the reduction of the prolapsed hemorrhoids. The next step was to use a transparent retractor to insert a 2/0 propylene (26-mm half-circle needle) double purse-string suture circumferentially, with submucosal bites of the lower rectum, about 2 cm above the dentate line (at the anorectal junction) (Fig. 6). The anvil (head) was inserted beyond the purse-string suture, and then the purse-string was tied over the stem of the anvil firmly (Fig. 7). The stapler was then closed to incorporate the prolapsing hemorrhoidal tissue in the cup of the stapler by gradually tightening the screw. To promote hemostasis, it is recommended to wait 30 s before firing. After confirmation that adequate tissue was incorporated and that the vaginal wall in female patients was free by PV examination, the stapler was fired and taken out with the doughnut (Fig. 8). To promote hemostasis, it is recommended to wait 20 s after firing before opening the instrument. Hemostasis along the staple line was then ensured, and if required, cautery or a 3–0 vicryl suture were used in case of bleeding. Plication mucopexy of any residual internal components with vicryl 2–0 suture (Figs 9 and 10).

**Figure 5**

The external device (transparent anoscope) of PPH stapler (PROXIMATE PPH Hemorrhoidal Circular Stapler Set, Ethicon US, LLC) is applied and fixed to the cutaneous margin, showing fourth-degree circumferential piles.

**Figure 6**



Double purse-string suture.

### Postoperative management

It consisted of standard nursing care and analgesia. Patients started on a soft oral diet within 4 h postoperatively. Dressing was removed on the morning after surgery and a local external visual examination was done.

Postoperative pain was evaluated using the visual analog scale (VAS 0–10), where 0–1=no pain, 1.1–3=low pain intensity, 3.1–7=pain of medium intensity, 7.1–9=pain of high intensity, and 9.1–10=strong and unbearable pain.

Postoperative incontinence was evaluated according to Wexner score: never, 0; rarely, less than 1/month;

**Figure 7**

The anvil (head) is inserted beyond the purse-string suture.

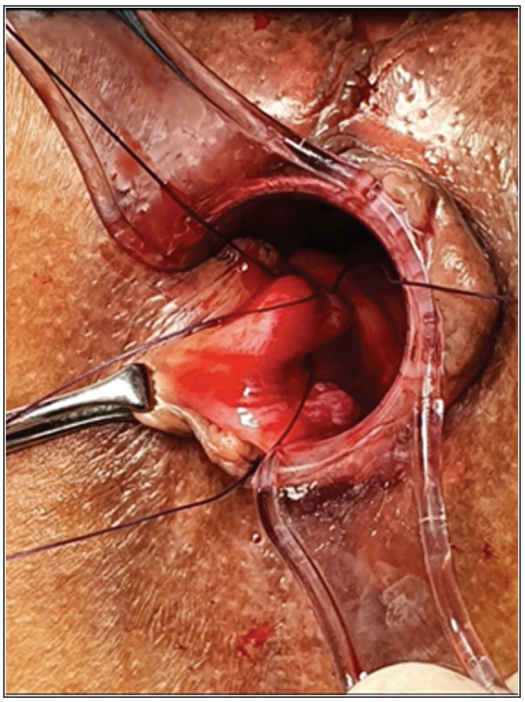
**Figure 8**

Firing of the stapler.

**Figure 9**

The donuts.

**Figure 10**



Plication mucopexy of the residual internal components with vicryl 2–0 suture.

sometimes, less than 1/week, greater than 1/month; usually, less than 1/day, greater than 1/week; always, greater than 1/day, 0, perfect; 20, complete incontinence (Table 1) [11].

**Table 1 Wexner score for fecal incontinence**

| Type of incontinence | Frequency | | | | |
|---|---|---|---|---|---|
| | Never | Rarely | Sometimes | Usually | Always |
| Solid | 0 | 1 | 2 | 3 | 4 |
| Liquid | 0 | 1 | 2 | 3 | 4 |
| Gas | 0 | 1 | 2 | 3 | 4 |
| Wears pad | 0 | 1 | 2 | 3 | 4 |
| Lifestyle alteration | 0 | 1 | 2 | 3 | 4 |

Follow-up: the follow-up of the patient (with clinic visits or by phone) was carried out on 1, 2, 4, and 8 weeks and again after 6 months of the operation for symptoms of recurrence or any complications.

### Short-term outcomes

(1) Intraoperative: duration of surgery and intraoperative blood loss.
(2) During hospital stay: postoperative pain, postoperative bleeding, urinary retension, and hospital stay duration.

Long-term outcomes (after 6 months postoperatively): bleeding, stenosis, recurrence, incontinence, and perianal fistula.

### Statistical analysis

Data were collected, revised, coded, and entered to the Statistical Package for Social Science (IBM SPSS Inc. United States, Chicago) version 23. The quantitative data were presented as mean, SD, and ranges when parametric and median and interquartile range when data were found nonparametric.

Also, qualitative variables were presented as number and percentages.

The comparison between groups with qualitative data was done by using $\chi^2$-test.

The comparison between two groups with quantitative data and parametric distribution was done by using independent *t*-test.

While the comparison between two groups with quantitative data and nonparametric distribution was done by using Mann–Whitney test.

The confidence interval was set to 95% and the margin of error accepted was set to 5%. So, the *P* value was considered significant as the following:

*P*>0.05: nonsignificant.
*P*<0.05: significant.
*P*<0.01: highly significant.

## Results

### Descriptive data regarding demographic data

The mean age group is 40.74 years. In total, 34 patients (68%) were males and 16 patients (32%) were females (Table 2, Fig. 11).

Descriptive data of MM and SH regarding age and sex.

The mean age group of MM group was 40.08 years. The mean age group of SH group was 40.40 years (Fig. 12). In MM group, 48.0% of the patients were females versus 52.0% for males (Fig. 13). In SM group, 16.0% of the patients were females versus 84.0% for males (Table 3).

### Intraoperative results

The mean duration of surgery in MM group was 47.20 min with range from 30 to 60 min. The mean duration of surgery in SH group was 43.60 min with range from 30 to 60 min. There was no significant difference between the two groups as regards the duration of surgery (Fig. 14). The mean volume of intraoperative blood loss in MM group was 59.80 ml with range from 40 to 75 ml. The mean volume of intraoperative blood loss in SH group was 38.20 ml with range from 20 to 50 ml (Fig. 15). There was significant decrease in the volume of intraoperative blood loss in SH group (Table 4).

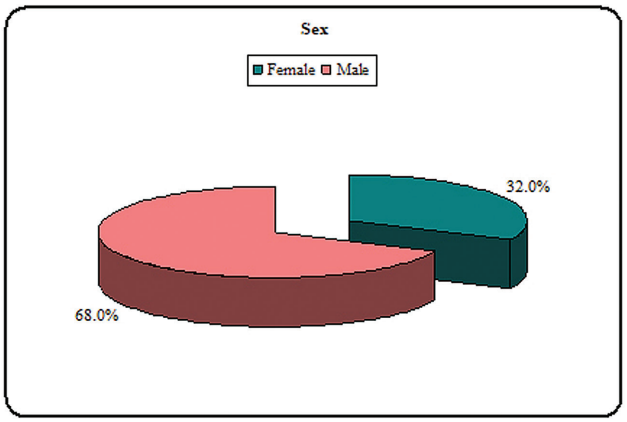
**Table 2 Descriptive data regarding demographic data**

| | *N*=50 |
|---|---|
| Age | |
| Mean±SD | 40.74 ± 10.03 |
| Range | 24–64 |
| Sex [*n* (%)] | |
| Female | 16 (32.0) |
| Male | 34 (68.0) |

**Figure 11**

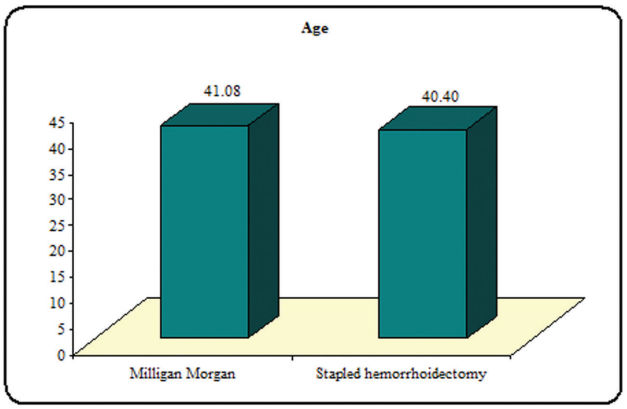
Final result.

**Figure 12**




Descriptive data regarding sex.

**Figure 13**




Comparison between Milligan–Morgan and stapled hemorrhoidectomy regarding age.

**Table 3 Descriptive data of Milligan–Morgan and stapled hemorrhoidectomy regarding age and sex**

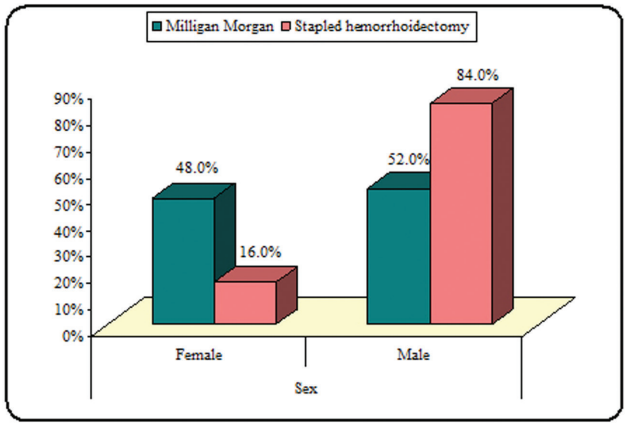
| | Milligan–Morgan | Stapled hemorrhoidectomy | Test value | *P* value | Significance |
|---|---|---|---|---|---|
| | *N*=25 | *N*=25 | | | |
| Age | | | | | |
| Mean±SD | 41.08 ± 10.70 | 40.40 ± 9.52 | 0.237• | 0.813 | NS |
| Range | 24–64 | 24–55 | | | |
| Sex [*n* (%)] | | | | | |
| Female | 12 (48.0) | 4 (16.0) | 5.882* | 0.015 | S |
| Male | 13 (52.0) | 21 (84.0) | | | |

*$\chi^2$-test. •Independent *t*-test. *P*>0.05, nonsignificant (NS). *P*<0.05, significant (S). *P*<0.01, highly significant (HS).

### Early postoperative outcomes

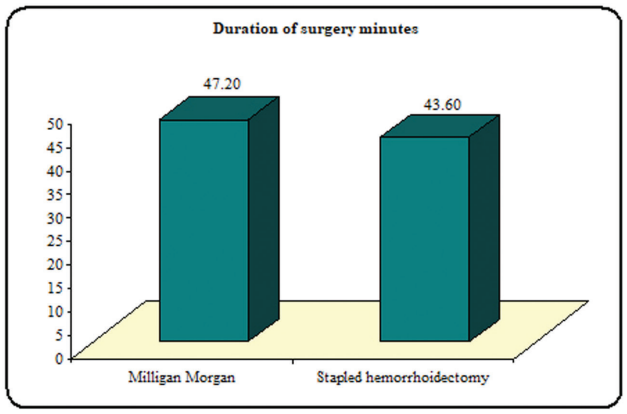
According to the VAS, the median pain score in MM group was 6 and 25% of cases had pain score greater than or equal to 8. In SH group, the median pain score was 8 and 25% of cases had pain score greater than or equal to 9 (Fig. 16). There was significant increase in pain score in cases of SH more than MM (Fig. 17). Three cases (12%) had postoperative bleeding in MM group and they were treated conservatively. Only one case (4%) had postoperative bleeding in SH group and he was treated conservatively. There was no significant difference in postoperative bleeding between the two groups (Fig. 16). In total, eight cases (32%) developed postoperative urine retension in MM group, while 11 cases (44%) developed urine retension in SH group, with no significant difference between both groups (Fig. 16). Also, there was no significant difference in the hospital stay period and wound infection between both groups. Urgency was more common in SH group (Table 5).

**Figure 14**




Comparison between Milligan–Morgan and stapled hemorrhoidectomy regarding sex.

**Figure 15**



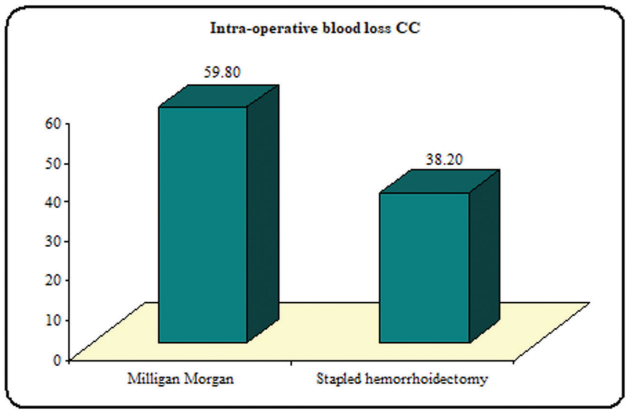

Comparison between Milligan–Morgan and stapled hemorrhoidectomy regarding duration of surgery in minutes.

**Table 4 Intraoperative results**

| | Milligan–Morgan | Stapled hemorrhoidectomy | Test value• | *P* value | Significance |
|---|---|---|---|---|---|
| | *N*=25 | *N*=25 | | | |
| Duration of surgery in minutes | | | | | |
| Mean±SD | 47.20±7.08 | 43.60±7.84 | 1.703 | 0.095 | NS |
| Range | 30–60 | 30–60 | | | |
| Intraoperative blood loss CC | | | | | |
| Mean±SD | 59.80±14.40 | 38.20±12.66 | 5.634 | 0.000 | HS |
| Range | 40–75 | 20–50 | | | |

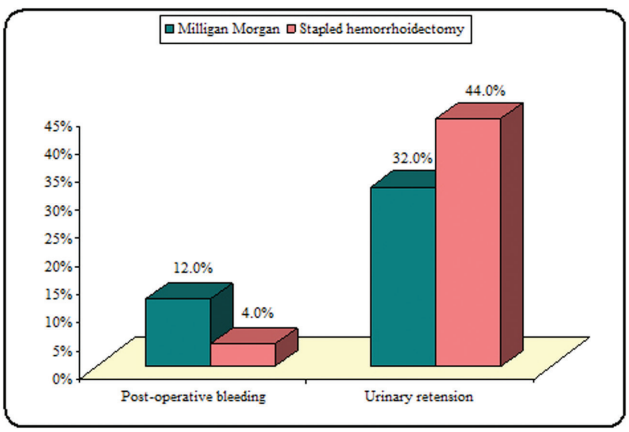
HS, highly significance.

**Figure 16**




Comparison between Milligan–Morgan and stapled hemorrhoidectomy regarding intraoperative blood loss Cubic centimeters (CC).

**Figure 17**



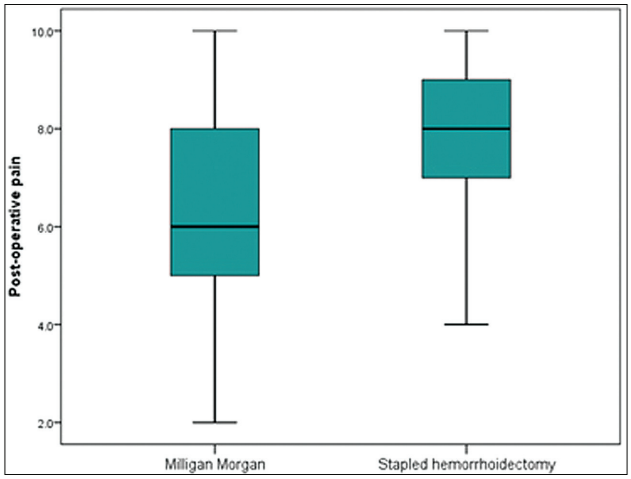

Comparison between postoperative bleeding and urinary retension regarding Milligan–Morgan and stapled hemorrhoidectomy.

**Table 5 Early postoperative outcomes**

| | Milligan–Morgan | Stapled hemorrhoidectomy | Test value | *P* value | Significance |
|---|---|---|---|---|---|
| | *N*=25 | *N*=25 | | | |
| Postoperative pain | | | | | |
| Median (IQR) | 6 (5–8) | 8 (7–9) | –2.227‡ | 0.026 | S |
| Range | 2–10 | 4–10 | | | |
| Postoperative bleeding [*n* (%)] | | | | | |
| No | 22 (88.0) | 24 (96.0) | 1.087* | 0.297 | NS |
| Yes | 3 (12.0) | 1 (4.0) | | | |
| Urinary retension [*n* (%)] | | | | | |
| No | 17 (68.0) | 14 (56.0) | 0.764* | 0.382 | NS |
| Yes | 8 (32.0) | 11 (44.0) | | | |
| Hospital stay duration (days) | | | | | |
| Median (IQR) | 2 (1–2) | 1 (1–2) | 0.987‡ | 0.328 | NS |
| Range | 1–5 | 1–4 | | | |
| Wound infection [*n* (%)] | | | | | |
| No | 22 (88) | 24 (96) | 1.087* | 0.297 | NS |
| Yes | 3 (12) | 1 (4) | | | |
| Urgency [*n* (%)] | | | | | |
| No | 24 (96) | 18 (72) | –5.357 | 0.021 | S |
| Yes | 1 (4) | 7 (28) | | | |

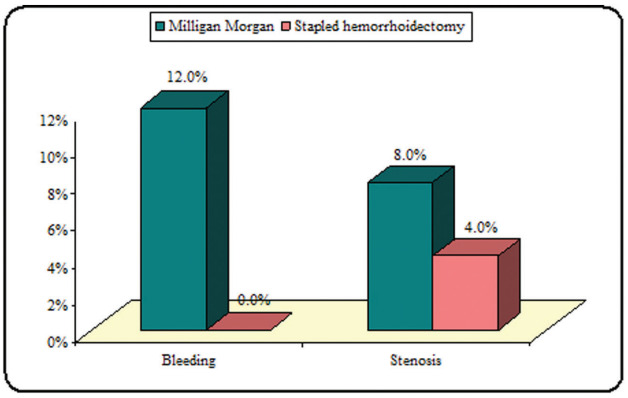
IQR, interquartile range; S, significance.

**Figure 18**




Relation between Milligan–Morgan and stapled hemorrhoidectomy regarding postoperative pain.

**Figure 19**




Late postoperative outcomes: 6 months or later.

### Late postoperative outcomes: 6 months or later

Three cases (12%) had spotting of blood after defecation in MM group and those patients still had residual piles (Fig. 18). No cases reported with bleeding in SH group (Fig. 19). Two cases (8%) developed anal stenosis in MM group. One case (4%) developed anal stenosis in SH group. There was no significant difference between both groups as regards stenosis (Table 6). In MM group, seven cases (28%) had recurrent/residual hemmorrhoids (internal and external components) that needed second-stage hemorrhoidectomy. Only one case in SH group had recurrent residual hemorrhoids and they were mainly an external component (Fig. 20). SH significantly decreases the recurrence rate in circumferential piles (Fig. 20). Only one case had mild incontinence in MM group and it was incontinence to flatus once per week (grade 2 on Wexner fecal incontinence score). While no cases had incontinence in SH group. No cases of perianal fistula occurred in MM group. In SH group, two patients had low intersphincteric perianal fistula and they were treated with lay open of the fistulous tract (Table 6).

## Discussion

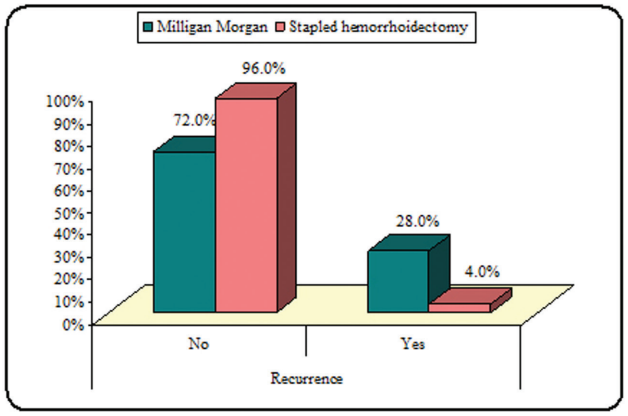
Hemorrhoids are one of the commonest benign anorectal problems worldwide. Hemorrhoids are usually considered the most troublesome anal diseases. They can slide down, prolapse, dilate, and bleed occasionally [1].

**Table 6 Late postoperative outcomes: 6 months or later**

| | Milligan–Morgan [*n* (%)] | Stapled hemorrhoidectomy [*n* (%)] | Test value | *P* value | Significance |
|---|---|---|---|---|---|
| | *N*=25 | *N*=25 | | | |
| Bleeding | | | | | |
| No | 22 (88.0) | 25 (100.0) | 3.191* | 0.074 | NS |
| Yes | 3 (12.0) | 0 | | | |
| Stenosis | | | | | |
| No | 23 (92.0) | 24 (96.0) | 0.355* | 0.552 | NS |
| Yes | 2 (8.0) | 1 (4.0) | | | |
| Recurrence | | | | | |
| No | 18 (72.0) | 24 (96.0) | 5.357 | 0.021 | S |
| Yes | 7 (28.0) | 1 (4.0) | | | |
| Incontinence | | | | | |
| No | 24 (96.0) | 25 (100.0) | 1.020 | 0.312 | NS |
| Yes | 1 (4.0) | 0 | | | |
| Perianal fistula | | | | | |
| No | 25 (100.0) | 23 (92.0) | 2.083 | 0.149 | NS |
| Yes | 0 | 2 (8.0) | | | |

S, significance.

**Figure 20**




Late postoperative outcomes: 6 months or later.

Millions of people are affected around the world. It is a major medical and socioeconomic problem. The etiology of hemorrhoids includes many factors such as constipation and prolonged straining [2].

MMH has been the most popular among the various surgical techniques performed. And the traditional surgical operation was excision according to MM technique. Till the 1990, this operation was considered the gold-standard treatment [6].

The MM operation is painful, particularly during defecation, which has been described as 'like passing bits of broken glass' by a patient and has been mentioned by [12].

Then, a newer technique, which is the stapled hemorrhoidopexy, was introduced. This is usually reserved for third and fourth degrees [8].

Stapled hemorrhoidopexy is a newer modality that represents a paradigm change in the treatment of hemorrhoids. However, it has been met with both skepticism and interest [9].

Stapled hemorrhoidectomy is the result of both progress in medical technology and modern pathophysiology of hemorrhoidal disease. The idea of interruption of the arterial supply to the hemorrhoids and higher fixation of the prolapsed mucosa is not new, as other methods such as sclerotherapy and rubber band ligation have the same purpose. The difference from the other methods is that the stapled technique achieves this in the whole circumference of the anus, so as to prevent recurrence from untreated aemorrhoidal cushions. The main advantage of the stapled technique is that it causes less postoperative pain than the conventional hemorrhoidectomy [13].

SH has better short-term outcomes, including shorter operating times, less postoperative pain, early return to work, and greater patient satisfaction [10].

Khan and colleagues reported that in a study that included 60 patients, 16.39% of patients were found to have postoperative bleeding in MM, while in SH group, 4.91% patients had bleeding, a significant difference was observed between both groups with *P* value of 0.03. In comparison with our study, we had 12% of cases who had postoperative bleeding in MM group and they were treated conservatively. While only one case (4%) had postoperative bleeding in SH group and he was treated conservatively [14].

Stadt and colleagues presented only a numerical advantage of stapled hemorrhoidopexy compared with

MM hemorrhoidectomy, but no significant difference was observed in the long-term follow-up [15].

Zhanga and colleagues reported that anal stenosis, although rare, is probably the most troublesome long-term complication.

Eskandaros and Darwish reported that in a study that included 80 patients, anal stenosis occurred in two (5%) patients in MM with no patients affected in SH.

Pandey and colleagues conducted a study that showed in ST, only 2% of patients had anal stenosis, which was considered nonsignificant.

In our study, two cases (8%) developed anal stenosis in MM group. And one case (4%) developed anal stenosis in SH group.

Wang and colleagues reported that in a study that included 480 patients, the incontinence scores were significantly worse in the MM group than in the stapled group. This may be related to removal of a significant part of the sensitive anal mucosa that is spared in the stapling operation. In our study, only one case had mild incontinence in MM group and it was incontinence to flatus once per week (grade 2 on Wexner fecal incontinence score), while no cases had incontinence in SH group [16].

Khan and colleagues reported that in a study that included 60 patients, the patients who received stapled hemorrhoidopexy had high recurrence rate found in 22.13% patients as compared with conventional hemorrhoidectomy (5.74%) patients, a significant difference was observed between both groups. In comparison with our study, we have in MM group seven cases (28%) who had recurrent/residual hemorrhoids that needed second-stage hemorrhoidectomy. While in SH group, only one case had recurrent/residual hemorrhoids and they were mainly an external component.

Out of the total 100 patients, the mean age of patients in the MM group was 43.56, while for SH, the mean was 41.16 years, operative time is shorter for the stapled procedure (mean 35.5 min) as compared with open hemorrhoidectomy (mean 50.2 min), postoperative pain measured according to Visual Analog Score was 2.2 in SH group compared with open hemorrhoidectomy (3.3), and mobilization out of bed, postoperative hospital stay, and return to routine work was found to be statistically significant for stapled group with *P* less than 0.05 and 95% confidence interval. In terms of postoperative bleeding, a 28% incidence was found in open group and 8% in stapled group. On 4 months of follow-up, recurrence of symptoms and fecal urgency were wound more in SH group (12%) as compared with MM group (4%). On observation, we found that comparing conventional with SH showed the stapled procedure to have better outcomes with regard to operating time, postoperative pain, length of hospital stay, and time to return to normal activity. However, SH was also reported to have higher rates of symptom recurrence and fecal urgency than conventional hemorrhoidectomy [17].

In our study, according to the VAS, the median pain score in MM group is 6 and 25% of cases had pain score greater than or equal to 8. While in SH group, the median pain score is 8 and 25% of cases had pain score greater than or equal to 9. There is significant increase in pain score in case of SH more than MM in early postoperative outcomes with *P* value of 0.026. We had also 12% of cases that had postoperative bleeding in MM group and they were treated conservatively. While only one case (4%) had postoperative bleeding in SH group and he was treated conservatively.

We had two cases (8%) that developed anal stenosis in MM group. And one case (4%) developed anal stenosis in SH group. Only one cases had mild incontinence in MM group and it was incontinence to flatus once per week (grade 2 on Wexner fecal incontinence score), while no cases had incontinence in SH group.

We had in MM group seven cases (28%) that had recurrent/residual hemorrhoids that needed second-stage hemorrhoidectomy. While in SH group, only one case had recurrent/residual hemorrhoids and they were mainly an external component.

## Conclusion

From this study, we concluded that SH is superior to MM technique in treatment of third-degree and fourth-degree circumferential piles, as SH had significant decrease in intraoperative blood loss and significant decrease in the recurrence rate, with no effect on fecal continence. The complication rate showed a statistically nonsignificant difference with respect to the postoperative complications, such as postoperative bleeding, urinary retention, and anal stenosis.

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#### Conflicts of interest

There are no conflicts of interest.

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