

# Comparison Of Surgical Treatment Of Hemorrhoids - Stapled Versus Open And Closed Hemorrhoidectomy

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## Abstract

**Aim:** To make a comparative assessment of the following procedures for haemorrhoids: a) Stapled haemorrhoidectomy b) Open haemorrhoidectomy and c) Closed haemorrhoidectomy, in terms of operating time, postoperative pain, postoperative complications (immediate and late), hospital stay, time to return to work, and cost of the procedure. **Materials and Methods:** This non-randomised prospective study included 50 patients (stapled haemorrhoidectomy (n=20), open haemorrhoidectomy (n=20) and closed haemorrhoidectomy (n=10). Pain was assessed using the visual analogue scale. The patients were followed up for 6 months. **Results:** The mean age was 45 years; the majority of the patients were males. Mass per anus, pain during defecation and constipation were the predominant symptoms. In the study, 22 patients had grade II and 28 patients had grade III haemorrhoids. The average time taken for a stapled haemorrhoidectomy was 45.75 minutes and for an open one it was 38.75 minutes. Closed haemorrhoidectomy took an average of 62 minutes (45-80min.). The average pain scores on postoperative day 1, day 2 and day 3 in the stapled group were 3.8, 2.4 and 1.6 as against 5.6, 4.6 and 4.1 in the open group and 5.4, 4.3 and 3.9 in the closed group, respectively. Pain during the passage of stools was considerably less in the stapled group. The average duration of hospital stay for the stapled group was 1.5 days and for the open and the closed group it was 5.8 days and 6.2 days, respectively. The average time to return to work in the stapled group was 5.3 days as against 13.2 in the open group and 13.1 days in the closed group. None of the patients in any of the groups had any

postoperative wound infection. Two patients in the stapled group had recurrence of the symptoms. One patient in stapled group developed fecal urgency. No major late complications were noted in the closed group. Conventional procedures were cost-effective in our setting. **Conclusion:** Stapled haemorrhoidectomy offers much less pain when compared to the conventional methods and allows early return to work. However, long-term complications are still unknown with most of the surgeons still in the learning curve. It is up to the treating surgeon to use his experience, skill and acumen in selecting the procedure for treating his patient with haemorrhoids which is suitable to the patient economically, socially and curatively.

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## Aim Of The Study

The aim of this study was to make a comparative assessment of the following procedures for haemorrhoids: a) Stapled haemorrhoidectomy b) Open haemorrhoidectomy and c) Closed haemorrhoidectomy, in terms of operating time and blood loss, postoperative pain, postoperative complications (immediate and late), hospital stay, time to return to work, and cost of the procedure.

## Introduction

Haemorrhoids are one of the oldest illnesses known to mankind. The exact definition of haemorrhoids is difficult to formulate for the reason that the pathophysiology of this condition remains elusive. At least 50% of the people over the age of fifty have some degree of haemorrhoid formation.<sup>1</sup> Ferguson said "Hundred percent of the population does suffer from haemorrhoids at least once in their lifetime".<sup>2</sup> Excision of the piles or haemorrhoidectomy (closed or open) has stood the test of time and is considered the gold standard in the treatment of piles. This procedure has very few complications and the rate of recurrence is almost negligible, but the patients are known to experience considerable pain in the postoperative period and are known to require absence from work for several days. Among the newer modalities of treatment, haemorrhoidectomy performed by using the circular anal stapler (Longo-Milito) is said to decrease the postoperative pain and allow early return to work. The current study was a prospective study conducted to compare the results of the conventional haemorrhoidectomy procedures (open and closed) with the stapling technique. We made a comparison of open haemorrhoidectomy, closed haemorrhoidectomy and stapled haemorrhoidectomy procedures in terms of operative time, postoperative pain, hospital stay, length of absence from work or disability time and complications (early and late).

## Methods

This prospective study included a total number of 50 patients with a minimum follow-up of 6 months. Of the total of 50 patients in the study, 20 underwent stapled haemorrhoidectomy, 20 patients open haemorrhoidectomy and 10 the closed haemorrhoidectomy procedure. The study

was not randomised, patients were informed about the procedures and they underwent the procedures depending upon their affordability and will. All the patients received prophylactic antibiotics in the preoperative period and also an enema, either soap water or proctoclysis. All the procedures were performed under spinal anaesthesia and the patient was placed in the lithotomy position for all the procedures. Pain was assessed using the visual analogue scale in which a score of 0 meant no pain and a score of 10 meant maximum pain.

## Results

### Age Distribution Of The Patients

The youngest patient was 24 and the oldest 72 years old at the time of inclusion in the study, the mean age being 45 years.

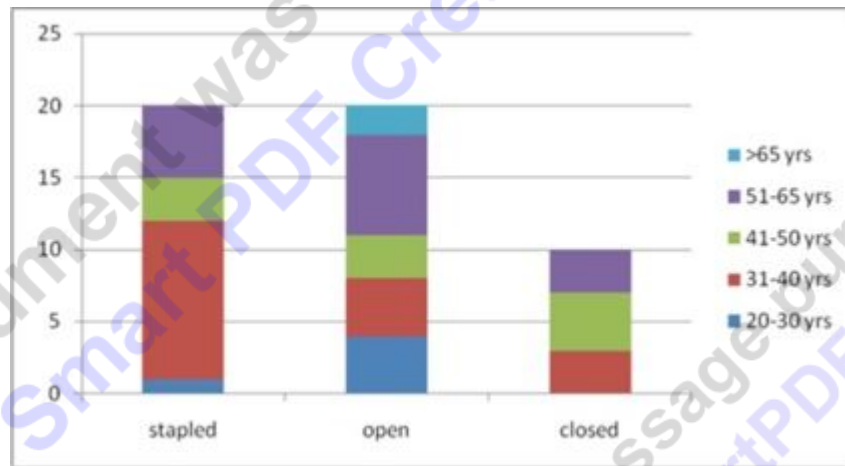


Figure 1. Age distribution in the study population

### Sex Distributon

The majority of the patients included in the study were males. In the stapled group, of the 20 patients 14 were males and 6 were females, in the open group there were 19 males and 1 female patient and in the closed group, of the ten patients 6 were males and 4 were females.

SEX	STAPLED	OPEN	CLOSED
MALES	14	19	6
FEMALES	6	1	4

Table 1 showing the sex-wise distribution of the patients in each of the groups.

### Presenting Complaints

Bleeding per rectum was the presenting complaint in the majority of the patients with 45 of the 50 patients presenting with it; 26 patients gave complaints of a mass per anus and 10 patients complained of pain during defecation; 13 patients gave other associated symptoms such as constipation (9) and generalised weakness (3), and one patient complained of itching sensation around the anus. In this study, 22 patients had grade II and 28 patients had grade III haemorrhoids.

## Degree Of Haemorrhoids

DEGREE	STAPLED	OPEN	CLOSED
I	-	-	-
II	8	10	4
III	12	10	6

Table 2 showing the degrees of haemorrhoids and their distribution in the study groups

## Operating Time

The time duration for surgery was calculated from the time of starting to paint to the time of placement of anal pack. The average time taken for a stapled haemorrhoidopexy was 45.75 minutes (30-70min.). The time for an open haemorrhoidectomy was 38.75 minutes (30-60min.). Closed haemorrhoidectomy took an average of 62 minutes (45-80min.).

TIME IN MIN.	STAPLED	OPEN	CLOSED
0-30 MIN.	2	5	-
31-40 MIN.	4	9	-
41-50 MIN.	11	5	4
51-60 MIN.	2	1	5
61-70 MIN.	1	-	-
71-80 MIN.	-	-	1
AVERAGE	45.75	38.75	62

Table 3 showing the time taken for surgery in each of the study groups

## Postoperative Pain (Immediate Post-Op)

POST-OP	DAY 1			DAY 2			DAY 3		
	1-3	4-6	7-10	1-3	4-6	7-10	1-3	4-6	7-10
STAPLED	7	12	1	18	-	-	18	-	-
OPEN	-	17	3	-	20	-	5	15	-
CLOSED	-	10	-	2	8	-	3	7	-

Table 4 showing the pain score of the patients on post-op day 1, day 2 and day 3 in the three groups.

The average pain scores on post-op day 1, day 2 and day 3 in the stapled group was 3.8, 2.4 and 1.6 as against 5.6, 4.6 and 4.1 in the open group and 5.4, 4.3 and 3.9 in the closed group, respectively.

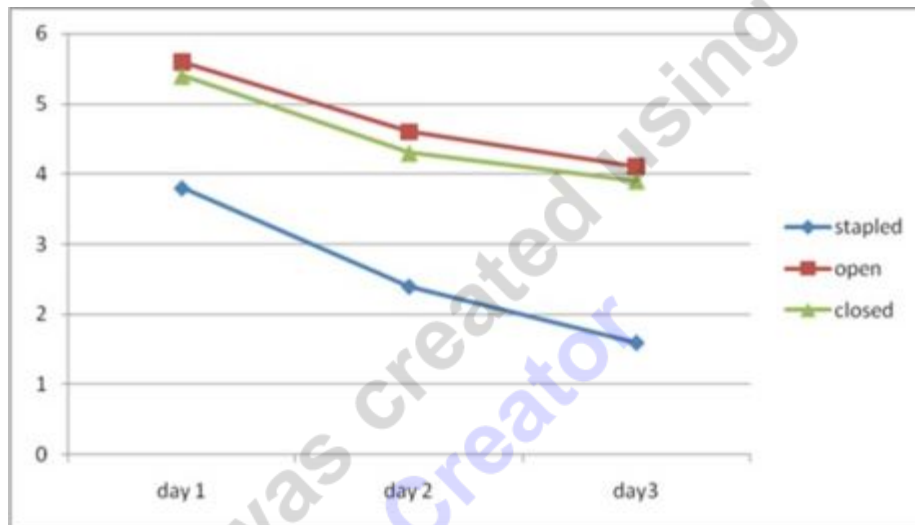


Figure 3 representing the pain scores in the immediate post-op period in the three groups

## First Defecation Post Surgery

Table 5 shows average time for passage of first stools and pain during the passage of stools

STOOLS	TIME	PAIN
STAPLED	20 HRS	3
OPEN	24.9 HRS	6
CLOSED	23.4 HRS	6

The average time for the passage of first stools in the stapled, open and the closed group was 20 hrs, 24.9 hrs and 23.4 hrs, respectively. Pain during the passage of stools was more severe in the open and the closed group when compared with the stapled group.

## Post-Op Complications (Early)

COMPLICATION	URINE RETENTION	SECONDARY BLEED	INCONTINENCE	OTHER
STAPLED	1	-	-	2
OPEN	-	1	-	1
CLOSED	1	-	-	-

Table 6 shows the complications in the early post-op period in each of the groups

One patient in the stapled and the closed group developed urinary retention for which an indwelling catheter was placed. One patient in the open group complained of bleeding per

rectum on post-operative day one for which haemocoagulase was administered systemically and the symptoms subsided without any requirement of surgical intervention. One patient each in the open and stapled group complained of vomiting and nausea on post-op day one and one patient in the stapled group complained of headache following surgery which was treated as an anaesthetic complication and the patient was hydrated and advised bed rest. None of the patients in any of the groups had any post-operative wound infection.

## Hospital Stay

GROUP	TIME IN THE HOSPITAL
STAPLED	1.5 DAYS
OPEN	5.8 DAYS
CLOSED	6.2 DAYS

Table 7 showing the average duration of stay in the hospital in the three groups

The duration of stay in the hospital was calculated from the date of admission to the date of discharge. The average duration of stay in the hospital for the stapled group was 1.5 days, with 13 patients being discharged within 24 hrs of the surgery. The average duration of stay in the hospital for the open and the closed group was 5.8 days and 6.2 days, respectively. A few of the patients in the open group and in the closed group were sourced from the government hospital where there is a considerable time difference between the time of admission and time of surgery, leading to an increase in the hospital stay. The closed group sample size is too small to comment about the duration of stay in the hospital.

## Time To Return To Normal Work

GROUP	TIME
STAPLED	5.3 DAYS (4-7 DAYS)
OPEN	13.25 DAYS (8- 30 DAYS)
CLOSED	13.1 DAYS ( 9-20 DAYS)

Table 8 showing the average time to return to work in each of the groups

During their first visit post discharge, patients in each of the groups were asked about the time they took to get back to their normal activities from the date of surgery and the same was tabulated. The time duration in the stapled group was 5.3 days as against 13.2 in the open group and 13.1 days in the closed group.

## Late Post-Op Complications

Each patient in the study was followed up one week post discharge, at 6 months and at the end of the study period. The study had a follow-up of seventy percent. The average duration of follow-up in the stapled group was 17 months with the longest follow-up being 26 months. Five patients were lost to follow-up in this group. In the open the longest follow-up was 23 months with an



average of 12 months, with five patients also lost in this group. In the closed group, a seventy-percent follow-up was seen, with three patients lost, an average follow-up period of 9 months and the longest follow-up being 17 months.

GROUP	ANAL STENOSIS	ANAL INCONTINENCE	STRICTURE	RECURRENCE	OTHER
STAPLED	NIL	NIL	NIL	1	3
OPEN	NIL	NIL	NIL	NIL	1
CLOSED	NIL	NIL	NIL	NIL	NIL

Table 9 showing the results of the follow-up in the three groups.

In the stapled group, the following observations were made

Two patients had recurrence of the symptoms and of these one was operated for prolapse and was 6 months post surgery at the end of study, the other patient complained about intermittent bleeding per rectum, but was asymptomatic at the end of the study period.

One patient had developed fecal urgency but otherwise had no problem with the procedure.

One patient had complaints of ballooning sensation at the time of defecation.

In the open group, one patient had complaints of persistent pain post surgery. After ruling out an organic cause for the same, a neurological consultation was sought and his complaint was managed accordingly. No complications were noted in the closed group.

## Discussion And Analysis

Among the newer surgical options currently available, haemorrhoidectomy performed by the Longo-Milton technique using circular anal stapler is said to result in less postoperative pain and complications, and early return to work. In this prospective study, we made a comparison between conventional haemorrhoidectomy (open and closed) and the stapled technique.

## Operating Time

The operating time as found by us was much shorter in the open group (average 38.75min.) as compared to the stapled (average 45.75min.) and the closed group (62min.). Bickchandani et al.<sup>3</sup>, in a study comparing open with stapled procedure, found operating time and blood loss to be much lesser in the stapled group. Similar studies by Gravié et al.<sup>4</sup> and Mehigan et al.<sup>5</sup> yielded comparable results.

## Post-Operative Pain

Visual analogue scores at 24, 48 and 72 hours post surgery were significantly more favourable in the stapled group when compared to the other two groups. There was not much difference

between the open and the closed in terms of postoperative pain. The reason for decreased pain in the stapled group is that it does not involve any surgery in the sensitive anal mucosa below the dentate line. Mean pain scores in other studies have shown that the postoperative pain is less after stapled technique. We found that although the pain is higher in the conventional procedures in the immediate postoperative period, it comes down on the 5<sup>th</sup> or 6<sup>th</sup> postoperative day and patients experience pain only during the passage of stools. Gravié et al.<sup>4</sup>, comparing open and stapler techniques, did not find significant differences in the postoperative pain scores during all times of the day except during defecation when the open group experienced severe pain as compared to the stapler group.

In studies comparing open and closed techniques, You and colleagues<sup>6</sup> found the postoperative pain to be lesser in the closed group, but Arbman<sup>7</sup> et al. did not find any difference between the two groups. A study by the American Society of Colon and Rectal Surgeons<sup>8</sup> did not support the assumption that the closed technique was associated with significantly less pain. Similar results were seen in studies by Gencosmanoglu et al.<sup>9</sup> and Carapeti et al.<sup>10</sup> i.e., no significant difference between closed and open in terms of postoperative pain.

## First Stools (Time And Pain)

The time for passage of first stools post surgery was slightly reduced in the stapler group in comparison to the other two groups. No significant difference was noted between the two conventional groups in terms of passage of stools or pain. The passage of stools was associated with significant pain in the conventional group (open and closed group). One patient in the open group complained of passage of blood at stools on the first day but this subsided without any need for surgical intervention.

Other studies have shown significant difference between the conventional and stapler groups in the time taken for the passage of first stools, being earlier in the stapler group and less painful. In the study by You and colleagues<sup>6</sup> a significant difference in the pain at the passage of stools was obtained between the closed and the open group, with pain being severe in the open group, but this is not supported by other studies.

## Postoperative Complications

Postoperative complications seen in the early period were 2 cases of urinary retention, one in the closed and one in the stapler group. One patient in the open group had bleeding on the first postoperative day, which subsided after administration of an injection of botropase and did not require any further surgical intervention. One patient in the stapler group had complaints of nausea and vomiting, which was related to the analgesic being administered (tramadol). In the stapler group one patient had a complication related to anesthesia (head ache) for which the patient was hydrated and advised bed rest. The rate of complications in the stapler group was higher in our study as compared to other studies.



Bickchandani et al.<sup>3</sup>, Shalaby et al.<sup>11</sup> and Mehigan et al.<sup>5</sup> found equal numbers of complications in the open and stapler groups. Molloy and Kingsmore<sup>12</sup> reported a case of severe retroperitoneal sepsis following stapler procedure and they suggest routine use of prophylactic antibiotics before the procedure. In our study, all patients received prophylactic antibiotics and no patients developed sepsis.

There are 2 case reports of rectal perforation after the stapling procedure and one case report of a rectovaginal fistula after stapler haemorrhoidectomy<sup>13,14</sup>. Acute intestinal obstruction due to closure of the rectum by purse-string sutures has also been reported. These complications are suggested to have happened due to inadequate experience and can be overcome once the learning curve is passed.

In our study, three of the patients in the open and one in the closed group had anal dilatation during the surgery before the start of the procedure but this did not show any significance in terms of postoperative pain or complications. Watts & Goligher et al.<sup>15</sup> did not find any benefits by doing anal dilatation, but due to the inherent risks of development of incontinence, Goligher<sup>1</sup> has suggested to abandon this procedure.

## Hospital Stay

The duration of hospital stay was significantly lesser in the stapled group with 13 patients of the 20 being discharged within 24 hours of surgery. The average duration of stay in the hospital for the open and closed group was 5.8 and 6.2 days, respectively. One of the reasons for the prolonged duration of stay in the hospital for the open and closed groups was that some of the patients in these two groups were sourced from the government hospital where there is a substantial delay from the time of admission to surgery. There was no significant difference noted in the hospital stay between the conventional groups in other studies. Bikhchandani et al.<sup>3</sup>, in their study comparing open and stapler technique, found the hospital stay to be lesser in the stapler group. Shalaby et al.<sup>11</sup> also found similar results in their study.

## Time To Return To Work

Disability following the surgery or the time to return to normal work was much lesser in the stapler group when compared to the other two groups in our study. This finding is similar to studies comparing the conventional haemorrhoidectomy with the stapler procedure. No significant difference was seen in the time to return to normal work between the closed and the open group, a finding corroborated by other studies comparing these two procedures.

## Follow-Up

At the end of the study period, the follow-up was 75% in the open and stapled groups and 70% in the closed group. The average duration of follow-up was 17 months with the longest follow-up

of 26 months in the stapler group, 12 months with the longest follow-up of 23 months in the open group and 9 month with the longest follow-up of 17 months in the closed group.

In the stapler group, one patient had recurrence of haemorrhoids and one patient had complaints of fecal urgency. One patient, also in the stapler group, complained of intermittent bleeding in the intervening period but was asymptomatic at the end of the study. The patient was not available for examination and was contacted through phone. The patient had not sought any medical attention for the bleeding symptom which had subsided on its own. One more patient in the stapled group complained of ballooning during defecation but otherwise did not have any problem or recurrence.

Persisting pain post surgery was seen in one patient in the open group; on examination, the patient did not have any organic cause, so a neurologist opinion was sought for and the patient was managed accordingly. No recurrences were seen in this group. No complications were seen in the closed group. In comparative studies of the conventional procedures no significant differences were seen in the late complications or recurrences.

Senagore et al.<sup>16</sup>, in a comparative trial between stapler and closed procedure, found the rate of recurrent surgeries for recurrence or other complications to be lesser in the stapler group, but otherwise the rate of complications remained the same. A meta-analysis of randomised trials comparing conventional with stapled haemorrhoidectomies by Nisar et al.<sup>17</sup> showed the rate of recurrences to be much higher in the stapler group.

Cheetham et al.<sup>18</sup>, in their study of stapled haemorrhoidectomy, found 31% of patients to have fecal urgency and persistent pain following surgery, which persisted for up to 15 months. They stated that the cause of the phenomenon is not clear but suggested that incorporation of muscle in the doughnut might have played a role; alternately, it may result from accidental placement of the purse-string suture too close to the dentate line with accidental stapling of the sensitive anoderm and muscle impingement. This has not been reported in any other study.

## Cost Analysis

In our study, we noted that the cost of the stapled haemorrhoidectomy was very high (an average of 26,000 rupees) whereas a conventional haemorrhoidectomy is, on an average, 7,000 rupees including the number of days in the hospital. This cost was not affordable for many of the patients who presented to our hospitals.

There are a few studies that have analysed the cost of the staple technique compared to the open method and they have concluded that the former is more cost-effective on the basis of early discharge and quick return to work. Nisar et al.<sup>17</sup>, in their meta-analysis of the studies comparing stapled with conventional haemorrhoidectomy, state that in view of the complications associated with stapler (e.g., rebleeding, haematoma) that may require admission to the hospital, they do not find the stapler procedure to be cost-effective.

# Conclusion

Conventional haemorrhoidectomy, performed either with the open or closed technique, is an effective cure for haemorrhoids and has minimal complications, but has increased postoperative pain, prolonged hospital stay and longer duration to return to work when compared to stapled haemorrhoidectomy. Although stapled haemorrhoidectomy offers much less pain when compared to the conventional methods, the cost of the procedure is exorbitant and cannot be offered to all patients as an option. The long-term complications of stapler haemorrhoidectomy are still unknown and it is a novel concept with most of the surgeons still in the learning curve. Closed technique of haemorrhoidectomy does not offer any advantage over the open technique but requires increased intra-operative time when compared with the latter. So it is up to the treating surgeon to use his experience, skill and acumen in selecting the procedure for treating his patient with haemorrhoids, which is suitable to the patient economically, socially and curatively.

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