



## A PROSPECTIVE STUDY COMPARING POST-OPERATIVE OUTCOMES BETWEEN OPEN AND CLOSED HAEMORRHOIDECTOMY AT A TERTIARY CARE CENTRE

Seelam Srinivasa Reddy

### ABSTRACT

**Background:** Hemorrhoidectomy is the treatment of choice for patients with third-degree or fourth-degree hemorrhoids. This prospective randomized clinical study compared the outcome of surgical haemorrhoidectomy by open and closed techniques in terms of postoperative pain, postoperative complications, and wound healing. **Patients and Methods:** This study included 60 patients who underwent haemorrhoidectomy at Surgery Department of KATURI MEDICAL COLLEGE & HOSPITAL. The participants were divided into two groups: Group 1: Open haemorrhoidectomy, Group 2: Closed haemorrhoidectomy. **Results:** In both close & open procedures, no patient was pain free. However, Post-operative pain scores were significantly low in the closed Group than open Group during first 24 hours. In terms of postoperative complications, there was no statistical difference between the two procedures. Length of hospital stay, and faster wound healing time were better in closed group. **Conclusion:** Both the open and closed approaches are less expensive, safe, simple to use, and yield positive outcomes. We discovered that Ferguson's closed approach had significant advantages over Morgan's open approach

### KEYWORDS :

#### Introduction

HEMORRHOIDS can be internal or external. External hemorrhoids are distal to dentate line and are covered with endoderm [1]. 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]. The commonest symptom of third-degree hemorrhoids 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. 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 [1].

Hemorrhoids are classified into four degrees. The first and second degrees require conservative or semi conservative methods. The third and fourth degrees include severe prolapse and usually require surgical intervention [3].

The indication for hemorrhoidectomy includes third- and fourth-degree hemorrhoids, second degree hemorrhoids that have not been cured by nonoperative treatment, fibrosed hemorrhoids, internexternal hemorrhoids when external hemorrhoids is well defined and the other strong indication for surgery is haemorrhoidal bleeding sufficient to cause anemia [4].

Hemorrhoidectomy can be performed using an open hemorrhoidectomy (Milligan-Morgan) or closed hemorrhoidectomy (Ferguson technique). Both involve ligation and excision of hemorrhoids. In Milligan and Morgan technique the anal mucosa and skin are left open to heal by secondary intention but in closed technique the wound is sutured [5]. Although hemorrhoidectomy is the most effective treatment, the presence of postoperative pain and complications as bleeding is the main reason why patients do not want the operation [6].

There are many reports on advantages of closed over open technique for the treatment of hemorrhoids such as less blood loss, less pain and better post-operative outcome [7].

Singh and their colleagues [1] found that both operative procedures i.e., closed technique and open technique are safe and lead to satisfactory results. However, Ferguson procedure is found to cause less postoperative distress, reduced hospital stays and early return to work as healing is faster.

The addition of lateral internal sphincterotomy to both the techniques seems to have a positive effect on reducing the post-operative pain and bleeding.

While Khubchandani [8] found no difference in post-operative pain relief in open group with internal sphincterotomy and without internal sphincterotomy.

#### Patients and Methods

##### Study Design:

Prospective study

##### Sample Size:

Sixty patients who are with grade II, III & IV hemorrhoids are selected. The patients who fit into the criteria will be randomized into two groups A for open hemorrhoidectomy and group B for closed hemorrhoidectomy.

##### Sampling Procedure

- Sampling was done according to age groups
- Patients under similar age groups are compared,
- Overall, groups A & B are compared

TABLE 1: GROUPING OF PATIENTS ACCORDING TO AGE

	No. Of patients (open Hemorrhoidectomy) GROUP A	No. Of patients (closed Hemorrhoidectomy) GROUP B
31-40 yrs.	10	10
41-50yrs	10	10
>50yrs	10	10
	30	30

##### Inclusion criteria

- Patients with complaints of bleeding per rectum with II, III & IV-degree haemorrhoids who are fit for surgery

##### Exclusion criteria

- Haemorrhoids associated with complications (ulceration, recurrent cases, strangulation)

##### Data Collection

- Clinical history along with patient proforma will be collected.
- Informed written consent from the patient will be obtained
- Proctoscopy is done to confirm the diagnosis and to exclude ulcerated & strangulated haemorrhoids.
- If necessary, sigmoidoscopy is done to exclude any other causes.

##### Statistical Analysis

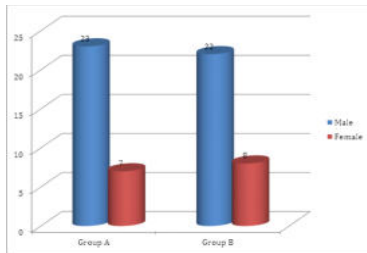
- Descriptive statistical analysis will be carried out in the present study.
- The confidence interval will be 95 %. Significance is assessed at a 5% level of significance.
- Student t-test two-tailed independent will be used for continuous parametric variable
- Mann Whitney u test two-tailed dependent will be used for continuous non-parametric variable
- The chi-square/fisher exact test will be used to study parameters in categorical scale.

P value <0.05 will be considered statistically significant.

**RESULTS**

**TABLE 2: GROUPING OF PATIENTS ACCORDING TO GENDER**

Gender	Group A	%	Group B	%	Total
Male	23	76	22	73	45
Female	7	24	8	27	15
Total	30	100	30	100	60

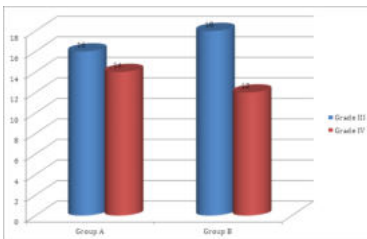


Out of 60 patients in our study, 45 were men, and 15 were women. Of the 45 male patients, 23 underwent open surgery in group A, and 22 underwent closed surgery in group B. Out of the 15 females, 7 underwent open surgery in group A, and 8 underwent closed surgery in group B. gender distribution in two groups was matched.

**TABLE 3: GROUPING OF PATIENTS BASED ON GRADE OF HAEMORRHOIDES**

	Group A	%	Group B	%	Total
Grade III	16	53	18	60	34
Grade IV	14	47	12	40	26
Total	30	100	30	100	60

\*Samples are matched based on grade with a p-value of 0.81



Out of a total of 60 individuals in our study, 34 had grade III haemorrhoids, and 26 had grade IV haemorrhoids. Out of 34 patients with grade III, 16 underwent open surgery, and 18 underwent closed surgery. Out of 26 patients with grade IV, 14 underwent open surgery, and 12 underwent closed surgery. Grades for the two groups were matched.

**TABLE 4: COMPARISON OF PAIN SCORE USING VAS**

PAIN SCORE VAS	GROUP A OPEN	GROUP B CLOSED	P VALUE	T-TEST
6hrs	6.58±0.76	5.66±0.76	0.0004	5.156
24hrs	5.11±0.69	4.61±0.81	0.01	2.56
48 hrs	2.88±0.71	2.52±0.59	0.07	1.79
Three days	1.89±0.59	1.71±0.46	0.16	1.45
Seven days	1.78±0.57	1.51±0.5	0.07	1.82

**P Value Obtained from Mann Whitney U Test**

When compared to group A, group B experienced much less immediate postoperative pain, but there was no discernible change in pain scores at 48 hours, three days, or seven days.

**TABLE 5: COMPARISON OF POST-OPERATIVE COMPLICATIONS**

POST OP COMPLAINTS	GROUP A OPEN	GROUP B CLOSED	P VALUE
BLEEDING AT 24 HRS	14	8	0.18
BLEEDING AT 48 HRS	10	6	0.37

INFECTION	1	3	0.62
ANAL STENOSIS	2	4	0.68

At 24 hours, 14 patients in group A and eight patients in group B had postoperative bleeding. At 48 hours after surgery, ten patients in group A and six patients in group B had bleeding. Stool softeners and sitz baths were used to control the minor postoperative bleeding. In any of the two groups, no intervention was necessary.

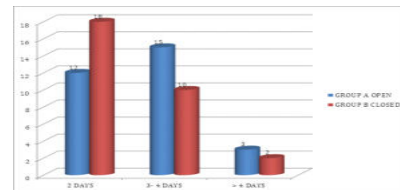
Three patients in group B and one patient in group A both had surgical site infections. By using antibiotics sparingly, it was treated. There was no statistically significant difference between the two groups.

During follow-up, anal dilatation for stenosis was required in 4 patients in the closed group and two patients in the open group. In terms of postoperative complications, there was no statistical difference between the two procedures.

**TABLE 6: COMPARISON OF LENGTH OF HOSPITAL STAY**

LENGTH OF HOSPITAL STAY	GROUP A OPEN	GROUP B CLOSED
2 DAYS	12	18
3- 4 DAYS	15	10
> 4 DAYS	3	2

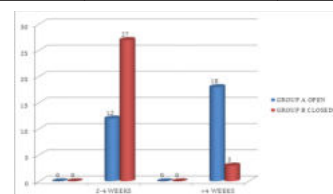
LENGTH OF HOSPITAL STAY	GROUP A OPEN	GROUP B CLOSED	P VALUE	T-TEST
MEAN ±SD	1.74±1.02	2.48±0.83	0.36	0.93



Length of hospital stay was comparatively less in group B patients when compared to group A

**TABLE 7: COMPARISON OF WOUND HEALING RATE**

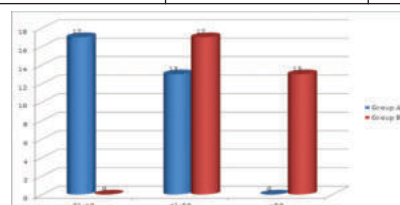
WOUND HEALING RATE	GROUP A OPEN	GROUP B CLOSED
2-4 WEEKS	12	27
>4 WEEKS	18	3
Mean +/- SD	4.77+/- 0.87	2.59+/-0.61



Compared to group A, which had a mean wound healing time of 4.76 weeks, patients in group B had a faster mean wound healing time of 2.5 weeks.

**TABLE 8: COMPARISON OF OPERATIVE DURATION OF SURGERIES**

Operative duration(mins)	Group A	Group B
31-40	17	0
41-50	13	17
>50	0	13
Mean+/-SD	40.53+/-4.47	49.33+/-3.35



Duration of surgery is significantly low in open group A with p value less than 0.001.

## DISCUSSION

Haemorrhoids are the oldest known human illness. According to the 1700 BC Edwin Smith papyrus, the Egyptians employed alum as an astringent to treat anal diseases.

In 2250 BC, Hammurabi of Babylon codified anal disorders, and in 1500 BC, papyrus. In 400 BC, Hippocrates advised cautery and straightforward excision. Anal dilatation was a practice in ancient Greece.

In *De medicina*, Celsus referred to a ligature made of flax thread. Galen also suggested performing surgery with two knots. The ancient Hindu Sanskrit classic *Susruta Samhita* explains the clamp and cautery technique.

In his 1739 book on surgery, Lorenz Heister recommended ligation by needle and thread. Jean Louis Petit developed the sub-epithelial hemorrhoidectomy in 1774. In 1809, Samuel Cooper adopted the concept of Petit and described submucosal hemorrhoidectomy.

Verneuil proposed the theory of haemorrhoids in 1855, and it was investigated through anatomical advancements. According to Houston's use of nitric acid in 1843, conservative therapy of haemorrhoids appears to be most common in Ireland.

30% phenol was first injected into olive oil in 1903 by Mitchell. In the nineteenth century, Copelan in 1814, Fecanier in 1829, and Maisonneuve in 1864 each used their respective methodologies to define anal dilatation. Boyer mentioned the division of the sphincter in 1818 and Dupuytren in 1833. Whitehead proposed total pile excision by suturing in 1882; it was eventually abandoned due to problems, but the idea has since been incorporated into the endo stapling procedure.

Among them is the 1919 Miles V-shaped excision of a pile with a skin tag. Later, open hemorrhoidectomy by Milligan and Morgan became commonplace. Fergusons first described closed hemorrhoidectomy in 1959 and traced it back to the submucosal method. The clamp and cautery method were resurrected by Anderson in 1909 and Cormie and McNair in 1959.

Blanchard used the submucosal injection of 5% phenol to fix patients in 1928. Blaisdell created the following technique for fixing rubber bands in 1954. Barron later improved this method, and Fraser and Gills first used cryotherapy in 1967.

Neiger and Bern popularised infrared photocoagulation, a recent contribution by Nath et al. in 1977. Postoperative pain following hemorrhoidectomy was a major concern. The digestive tract with the densest innervation is the anal canal lining.

Despite being the gold standard of care for decades, hemorrhoidectomy has been associated with significant postoperative morbidity, particularly discomfort. Since postoperative pain is linked to symptoms of the urinary system, postoperative pain management has received considerable attention. Numerous studies that aim to raise morbidity have been written up in the literature.

Stapled hemorrhoidectomy has decreased postoperative morbidity, according to numerous randomised trials. Conventional hemorrhoidectomy is still the go-to procedure despite the availability of other cutting-edge methods due to its affordability and ease of execution.

Open hemorrhoidectomy is associated with significant postoperative pain since it leaves a big wound that needs to heal by secondary intention. There is less anal feeling during open surgery because of the lack of anoderm. Due to a lack of scar retraction, open hemorrhoidectomy may be accompanied by anal stenosis. Postoperative morbidity has been linked to an open wound in the anal canal. Closed hemorrhoidectomy may be advised for the same cause.

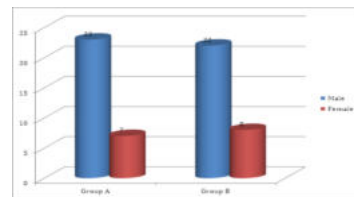
Due to quicker wound healing, improved patient compliance, and reduced postoperative pain, closed hemorrhoidectomy has recently attracted attention in several countries. Randomised controlled investigations have nevertheless found contradictory findings regarding closed vs open hemorrhoidectomy. We are comparing the

postoperative outcomes, complications, and wound healing rates after closed and open hemorrhoidectomy in this study.

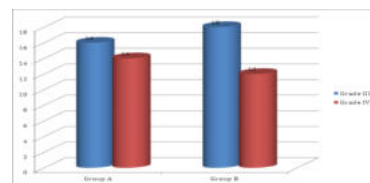
We chose and included in our study over sixty patients undergoing hemorrhoidectomy at Katuri Medical College & Hospital who met the requirements. Two groups of patients are randomly assigned. Thirty patients in Group A will have open haemorrhoids removed. Additionally, 30 patients in group B will have closed hemorrhoidectomy.

The group's average age was 39.1 years, with a standard deviation of 10.06 years. Group B's average age was 37.77 years, with a 9.23-year standard deviation. According to the p-value of 0.304, the age demographic parameters of the two groups are comparable. Out of 60 patients in our study, 45 were men; 23 were in group A, and 22 were in group B. Of the remaining 15 patients, of which 7 underwent open hemorrhoidectomy, and 8 underwent closed hemorrhoidectomy. With a p-value of 1, the demographic gender variable is also comparable between the two groups.

### Chart: Gender distribution



Thirty-four patients with grade III underwent surgery; sixteen underwent group A surgery, and eighteen underwent group B surgery. There were 26 patients in grade IV, and 14 of them underwent surgery in group A while 12 underwent surgery in group B. With a p-value of 0.79, samples are matched according to grade.



Between the two groups, the length of operation was compared. The average operation time in group A was 40.5 minutes, with a range of 30 to 50 minutes. In group A, 56% of the patients underwent surgery in 40 minutes, and the remaining 44% underwent surgery in 50 minutes. The mean operative duration in group B was 49.33 minutes, with a range of 40 to 55 minutes. In group B, 56% of the patients underwent surgery in less than 50 minutes, while the remaining patients underwent surgery in less than 60 minutes.

With a p-value of 0.001 and  $t=5.56$ , the operative duration for open hemorrhoidectomy was substantially less than that for closed hemorrhoidectomy.

There were no postoperative problems, and all of the pedicles were successfully severed. It is acceptable to disregard the less than 10-minute time discrepancy because it had no impact on postoperative morbidity.

This is in line with research by Giordano p, et al., Hadi et al., Arbmam g et al., Pokharel n, et al., and Aziz et al. According to the French Anesthesia Society's recommendations, postoperative pain in our study treated, and it was graded on a visual analogue scale from 0 to 10. Analgesics were given to the patients as needed.

Regarding the pain VAS score, a comparison between the two groups was made. The pain scores were recorded at 6 hours, 24 hours, 48 hours, three days, seven days, and 24- and 48-hours post-defecation. The mean pain score in our study was 6.6 for group A and 5.56 for group B at 6 hours.

With a p-value of 0.0003 and  $t=5.16$ , the pain score after 6 hours was noticeably low in patients who underwent closed hemorrhoidectomy. With a p-value of 0.015, the mean score after 24 hours for group a was 5.133 and 4.6 for group b, both of which were statistically significant.

The mean pain score, however, did not significantly differ between the two groups after 48 hours, three days, or seven days. As a result, compared to open hemorrhoidectomy, early postoperative pain was much lower in the closed hemorrhoidectomy group.

At 24 hours, group a's mean post-defecation pain score was 7.1, while group b's was 6.63, with a p-value of 0.045. At 48 hours, group A's post-defecation pain score is 4.96, whereas group B's score is 4.36, with a p-value of 0.001. Therefore, compared to open hemorrhoidectomy, the post-defecation pain score is much lower for closed hemorrhoidectomy. With a p-value of 0.004, the group b's mean analgesic requirement is 1.7 while group a's is 2.2. Thus, the closed hemorrhoidectomy group likewise has a reduced analgesic demand.

Following investigations have found that the above findings of decreased early postoperative pain and post-defecation pain after closed hemorrhoidectomy and decreased analgesic demand are reliable.

1. Pokharel, N. et al. contrasted the results of the open and closed methods. In the closed group, they saw noticeably less pain, a lower need for analgesics, and quicker wound healing.

2. Hadi et al. used 50 participants with grade iii& iv haemorrhoids in their study of the outcomes of open vs closed hemorrhoidectomy and found that pain was much less in the closed group.

3. Arroyo et al. examined the outcomes of 100 patients who had hemorrhoidectomy surgery using an open and closed technique and found that the closed group experienced much less postoperative pain.

4. Guenin Mo, et al. conducted research and found that closed hemorrhoidectomy had a low perioperative morbidity rate.

5. When comparing the short-term outcomes of closed and open hemorrhoidectomy, Hamid i. Jasim et al. found that postoperative pain was less in the closed group.

However, other studies by Carapeti et al., Gencosmanoglu et al., Ho et al., Arbman et al., and others found mixed results regarding postoperative pain reduction following closed hemorrhoidectomy, with some.

Mean discharge times for groups a and b were 2.73 and 2.5, respectively, with a p-value of 0.3567. Between the two groups, there was no difference in hospital recovery.

With a p-value, less than 0.001, group A's mean wound healing duration was 4.76 and group B's was 2.58.

Numerous studies have shown that patients who underwent closed hemorrhoidectomy saw faster-wound healing rates.

These findings are in line with the research that follows.

1. In 177 patients, Aziz a, et al. compared the results of open and closed hemorrhoidectomy<sup>22</sup>

2. When comparing the outcomes of closed and open hemorrhoidectomy techniques, Arbman G et al. came to the conclusion that the closed technique was superior to the open technique only in terms of wound healing rates.<sup>23</sup>

3. Pokharel, N. et al. observed quicker wound healing when comparing outcomes following hemorrhoidectomy using an open versus closed approach.<sup>24</sup>

4. In 50 patients, Hadi et al. studied wound healing after open and closed hemorrhoidectomy.<sup>25</sup>

5. Gencosmanoglu R, et al. evaluated open and closed hemorrhoidectomy techniques on 80 patients with iii and iv degree haemorrhoids in their study.<sup>26</sup>

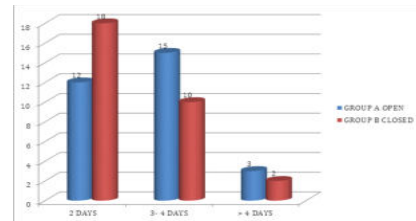
6. For symptomatic haemorrhoids, Arroyo a, et al. compared the outcomes of 100 patients who underwent open hemorrhoidectomy with 100 patients who underwent closed hemorrhoidectomy<sup>27</sup>

7. Guenin mo et al. examined the long-term outcomes of a closed hemorrhoidectomy performed by Ferguson<sup>28</sup>

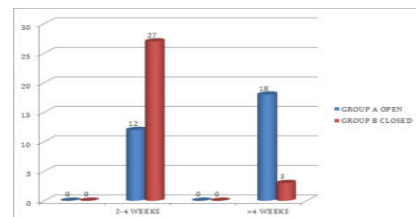
Mean satisfaction scores for groups a and b were 3.83 and 3.9, respectively, with a p-value of 0.410. There was no statistical difference between the two methods.

The mean time to return to work for group a was 11.76, compared to group b's 9.2, with a p-value of 0.002 and a t-value of 3.96. There was a large mean difference.

#### Length of hospital stay



Following both the open and closed approaches, postoperative complications such as bleeding, infection, incontinence, urine retention, and anal stenosis were recorded in both groups without any discernible difference. Compared to group A, which had a mean wound healing time of 4.76 weeks, patients in group B had a faster mean wound healing time of 2.5 weeks.



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#### CONCLUSION

There have been reports of closed hemorrhoidectomy having improved postoperative outcomes in terms of pain and wound healing. Both the open and closed approaches are less expensive, safe, simple to use, and yield positive outcomes. We discovered that Ferguson's closed approach had significant advantages over Morgan's open approach.

Less analgesic medication is needed to manage the pain in the first 24 hours after surgery, which results in a shorter hospital stay, an earlier return to work, and a faster pace of wound healing.

But the closed strategy trades off these benefits for a longer operating period, which can be overlooked because it had no impact on the result. In short, we believe that Ferguson's closed hemorrhoidectomy produces better outcomes for individuals with grade iii and iv haemorrhoids.

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