

# A comparative study of open versus closed haemorrhoidectomy in second and third degree haemorrhoids

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## Abstract

Haemorrhoids are one of the most frequently encountered anorectal conditions in the clinical practice of a surgeon. Haemorrhoidectomy is the most effective approach for haemorrhoidal disease especially for grade III and grade IV disease and also in grade II disease which do not respond to conservative and non-invasive treatment. However, postoperative pain is a major concern, and the surgery itself is with complications including notably bleeding, wound sepsis, pain, and anal stenosis. The patients were explained about their disease and modalities of treatment as Open or closed haemorrhoidectomy with advantages and disadvantages of each. 25 patients were operated by open haemorrhoidectomy and another 25 patients by closed haemorrhoidectomy under spinal anaesthesia. Data was collected according to proforma which included detailed history, clinical examination and investigation. Data was tabulated, analyzed and results interpreted. The mean immediate post-operative pain score in open group was  $2.88 \pm 0.53$  VAS and in closed group was  $2.44 \pm 1.9$  VAS; these differences were significant with p value of 0.027. The mean duration hospital stay in open group was  $4.64 \pm 0.9$  days and in closed group was  $4.28 \pm 0.9$  days (p value= 0.18) the differences were not significant. People who underwent open procedure took 17.5 days and closed group patient took 16.4 days to resume their normal activity, these differences were not significant (p Value = 0.42).

**Keywords:** Haemorrhoids, open haemorrhoidectomy, closed haemorrhoidectomy, complications, post-operative pain, operating time, hospital stay, wound healing

## Introduction

It has been traditional to grade haemorrhoidal disease into four degrees, depending on the extent of prolapse. This is to use the term "piles" in its true meaning <sup>[1]</sup>.

- **First-degree piles:** Are cushions that do not descend below the dentate line on straining and they bleed.
- **Second-degree piles:** Are cushions that protrude below the dentate line on straining and can be seen at exterior, only to disappear again immediately straining stops.
- **Third-degree piles:** Are cushions that descend to the exterior on staining or defecation and remain outside until they are digitally replaced into the anal canal.

- **Fourth-degree piles:** Is the term sometimes used to describe mucosal covered internal cushions that are permanently prolapsed outside the anal verge.

A wide variety of treatment options are available for haemorrhoidal disease, ranging from advise on diet and bowel habit, through a number of non-operative methods of mucosal fixation and widening of anus, to a host of different techniques of excision of internal anal vascular cushions and external vascular channels.

The choice of method depends on the severity and type of symptoms, on the degree of prolapse and on expertise of operator and equipment available [2].

The cause of haemorrhoids is unknown, may be due erect posture, repeated straining at defecation, sedentary life style and diet. The current classification of haemorrhoidal disease is of great importance because on its basis proper treatment can be performed. Non-complicated haemorrhoidal disease (first-and early second- degree) generally responds to dietary alterations, medical management, elastic band ligation, Sclerotherapy, Infrared photocoagulation.

Surgical approach is highly advisable to manage late second degree, third and fourth-degree haemorrhoids. Haemorrhoidectomy is considered to be an efficient but painful treatment for symptomatic haemorrhoidal disease when conservative methods failed [3,4].

At present, the most common method of treating haemorrhoids is by haemorrhoidectomy. This involves excision of pile mass, either by open haemorrhoidectomy (Milligan Morgan) or closed haemorrhoidectomy (Ferguson) method [5].

The Milligan-Morgan operation (Open haemorrhoidectomy) was first described in 1937 and is the most common procedure followed in India and Europe because it seems to lead to healing without infection. The Ferguson technique (Closed haemorrhoidectomy) prevails in the United States of America and in Canada. This operation is considered to be less painful and leads to faster wound healing but is associated with the higher risk of wound infection. However, superiority of one method over the other is still debated [6].

The aim of our study is to assess and compare the response of each modality of treatment, namely open and closed haemorrhoidectomy, for second or third degree haemorrhoids and to know the morbidity and complications in each method of treatment. This study can help to evolve optimum choice of the procedure.

## Methodology

In the present prospective comparative study, 50 cases of 2nd and 3rd degree haemorrhoids were chosen with complaints of bleeding per rectum, mass per rectum, and pain during defecation. Patients were divided into 2 groups of 25 each. One group underwent open haemorrhoidectomy and other underwent closed haemorrhoidectomy.

A detailed history of each patient was taken with personal history, family history, diet history with systemic examination of respiratory, cardiovascular, per abdominal examination to know any associated disease and to rule out any cause predisposing to haemorrhoids and local examination including Digital Rectal examination (DRE) and proctoscopy was done as per proforma made for the study and the data entered in the proforma. Investigations included haemoglobin, total count, differential count, blood sugar, bleeding time, blood urea, serum creatinine, HIV, Hbs Ag and urine routine. Other investigations like Chest, X-ray, electrocardiogram, sigmoidoscopy and colonoscopy were done in selected cases.

Study was not randomized, patients were informed about the procedure depending upon their affordability and will.

## Inclusion criteria

- Patients above 18 years with Second and third degree haemorrhoids.

### Exclusion criteria

- First and fourth degree haemorrhoids
- Age group less than 18 years
- Recurrent haemorrhoids
- Secondary haemorrhoids
- Haemorrhoids with fissure or fistula in ano
- Inflammatory bowel disease
- Previous rectal surgeries.

Patients were prepared the previous day, perianal region, perineum and back were shaved. The informed written consent was taken, pre-anesthetic evaluation was done and a soap water enema was given the night before and on the morning of the surgery. Patients were kept nil orally from the previous night. Patients was administered enema either using soap water or proctolysis. Prophylactic antibiotics were given on the day of surgery, before the procedure. Patient was explained about the effects and complications of the procedure.

All the procedures were performed under spinal anaesthesia and the patient was placed in the lithotomic position for all the procedures. After a gentle four finger anal stretching, the selected procedures were performed. External component of piles is caught with an artery forceps, traction applied and internal component is grasped. With a V-shaped incision given on skin, piles mass is dissected out, transfixed and excised. In closed technique, after excision of piles mass with overlying mucosa the gap is repaired with continuous suture. Operating time (Duration of Surgical procedure) was calculated from the time of starting to paint to the time of placement of anal Pack. Pain was assessed using the visual analogue scale of 0 to 4, where 0 meant no pain, 1 meant for mild pain, 2 meant for moderate pain and 3 meant for severe pain and 4 meant for unbearable (Very Severe) pain. Wounds were taken as healed if they did not show signs of infection, discharge and the mucosal and skin margins were approximately closed.

Analysis was made using SPSS software version 23 on the basis of percentages, mean, standard deviation, p value using student t test and Mann-Whitney U test. P value of 0.05 was considered as statistically significant.

### Results

**Table 1:** Comparative statistics between open and closed Haemorrhoidectomy

Parameters	Open Haemorrhoidectomy (Mean +/- Std. Dev)	Closed Haemorrhoidectomy (Mean +/- Std. Dev)
Mean age	43.37 +/- 11.82 (Range 25-65 yrs)	42.96 +/- 11.77 (Range 24-65 yrs)
Male/ Female Ratio	17/8 (68%/32%)	18/7 (72%/28%)
2o/3o Haemorrhoids Ratio	8/17 (32%/68%)	7/18 (28%/72%)
Symptoms		
Bleeding PR	88%	84%
Mass PR	68%	72%
Pain on Defecation	20%	24%
Duration of Procedure	28.52 +/- 4.52	39.12 +/- 3.84
Immediate post	2.88 +/- 4.52	2.44 +/- 0.71
Operative pain (0-4 Pain Score)		
VAS 0-10 Score	7.2 +/- 1.3	6.1 +/- 1.7
Hospital stay after surgery	4.64 +/- 0.95	4.28 +/- 0.94
Return to work	17.52 +/- 2.6	16.4 +/- 2.26
% Wound healed at 3 weeks	76%	100%

Pain at 3 weeks	0.56 +/- 0.5	0.32 +/- 0.47
% Wound healed at 6 weeks	100%	100%
Pain at 6 weeks	0	0
Complications		
Anal Stenosis	Nil	Nil
Infections	Nil	Nil
Recurrence	Nil	Nil
Wound Dehiscence	Nil	Nil

**Table 2:** Comparative statistics of Duration of Surgery in Closed and Open Haemorrhoidectomy

		Statistics	Std. Error	
Closed Haemorrhoidectomy	Mean	39.12	.769	
	95% Confidence Interval for Mean	Lower Bound	37.53	
		Upper Bound	40.71	
	5% Trimmed Mean	38.93		
	Median	40.00		
	Variance	14.777		
	Std. Deviation	3.844		
	Minimum	32		
	Maximum	50		
	Range	18		
	Interquartile Range	6		
	Skewness	.719	.464	
Kurtosis	1.456	.902		
Open Haemorrhoidectomy	Mean	28.52	.904	
	95% Confidence Interval for Mean	Lower Bound	26.65	
		Upper Bound	30.39	
	5% Trimmed Mean	28.51		
	Median	28.00		
	Variance	20.427		
	Std. Deviation	4.520		
	Minimum	20		
	Maximum	37		
	Range	17		
	Interquartile Range	7		
	Skewness	.209	.464	
Kurtosis	-.850	.902		

**Table 3:** Comparative statistics of Length of Hospital Stay in Closed and Open Haemorrhoidectomy

		Statistics	Std. Error	
Closed Haemorrhoidectomy	Mean	4.28	.187	
	95% Confidence Interval for Mean	Lower Bound	3.89	
		Upper Bound	4.67	
	5% Trimmed Mean	4.26		
	Median	4.00		
	Variance	.877		
	Std. Deviation	.936		
	Minimum	3		
	Maximum	6		
	Range	3		
	Interquartile Range	1		
	Skewness	.374	.464	
Kurtosis	-.535	.902		

Open Haemorrhoidectomy	Mean		4.64	.190
	95% Confidence Interval for Mean	Lower Bound	4.25	
		Upper Bound	5.03	
	5% Trimmed Mean		4.61	
	Median		5.00	
	Variance		.907	
	Std. Deviation		.952	
	Minimum		3	
	Maximum		7	
	Range		4	
	Interquartile Range		1	
	Skewness		.507	.464
Kurtosis		.334	.902	

**Table 4:** Comparative statistics of Return to Normal Activity in Closed and Open Haemorrhoidectomy

		Statistics	Std. Error	
Closed Haemorrhoidectomy	Mean		16.96	.453
	95% Confidence Interval for Mean	Lower Bound	16.03	
		Upper Bound	17.89	
	5% Trimmed Mean		17.01	
	Median		17.00	
	Variance		5.123	
	Std. Deviation		2.263	
	Minimum		13	
	Maximum		20	
	Range		7	
	Interquartile Range		4	
	Skewness		-.017	.464
Kurtosis		-1.137	.902	
Open Haemorrhoidectomy	Mean		17.52	.520
	95% Confidence Interval for Mean	Lower Bound	16.45	
		Upper Bound	18.59	
	5% Trimmed Mean		17.48	
	Median		18.00	
	Variance		6.760	
	Std. Deviation		2.600	
	Minimum		14	
	Maximum		22	
	Range		8	
	Interquartile Range		5	
	Skewness		.083	.464
Kurtosis		-1.329	.902	

## Discussion

Various previous studies have reported that pain persisted for few weeks after haemorrhoidectomy. In the present study 60% of the patients who underwent open procedure and 32% of the patients in closed group experienced mild pain at 3 weeks of follow up. No patients in both the groups experienced severe pain after 3 weeks of surgery. The mean pain score (0-4 score) for open procedure is 0.56 and for closed it is 0.32. The p value of 0.091 indicates that there is no statistically significant difference between open and closed haemorrhoidectomy regarding pain at 3 weeks follow up.

Wound healing, as a normal biological process in the human body, is achieved through four precisely and highly programmed phases: haemostasis, inflammation, proliferation and remodeling. For a wound to heal successfully, all four phases must occur in the proper sequence and time frame. Many factors can interfere with one or more phases of this process, thus causing improper or impaired wound healing. Multiple factors can lead to impaired wound healing. In general terms, the factors that influence repair can be categorized into local and systemic. Local factors are those that directly influence the characteristics of the wound itself, while systemic factors are the overall health or disease state of the individual that affect his or her ability to heal. Many of these factors are related and the systemic factors act through the local effects affecting wound healing. Local factors affecting wound healing includes oxygenation, infection, foreign body and venous insufficiency. Systemic factors include Age and gender, Sex hormones, Stress, Ischemia and Diseases: diabetes, keloids, fibrosis, hereditary healing disorders, jaundice, uremia, Obesity, Medications: Glucocorticoid steroids, non-steroidal anti-inflammatory drugs, chemotherapy, Alcoholism and smoking, Immunocompromised conditions like cancer, radiation therapy, AIDS and Nutrition. Milligan-Morgan (open) technique wound healing is secondary intention and therefore large wound area causes pain in the first postoperative period. In Ferguson's technique wound heals by primary intention.

In the present study, 76% of the patients who underwent open haemorrhoidectomy showed completely healed surgical wounds at 3 weeks of follow up, where as in closed haemorrhoidectomy group showed 100% completely healed wound. The exact number of days taken for wound healing couldn't be estimated. All the studies mentioned in the below table concluded that the wounds heal faster in case of closed haemorrhoidectomy than the open haemorrhoidectomy. The study of Arroya *et al.* [7], Ahmed *et al.* [8] and Ho *et al.* [9] described that wound healing time was shorter and quick in closed haemorrhoidectomy. Arbman *et al.* [10] described that in closed technique the wound heals faster but there is increased risk of wound dehiscence.

In study conducted by You SY *et al.* [11] wound healing following closed haemorrhoidectomy was 75% and 86% respectively and healing rates following open haemorrhoidectomy were 18% in both studies. There is delayed wound healing following open haemorrhoidectomy because the larger areas of anal canal walls are excised and left open. These wounds are contaminated during defecation causing the delay in healing. Johannsson *et al.* [12] observed that in closed haemorrhoidectomy wound heals faster. Gencosmanoglu *et al.* [13] revealed that wound healing time was significantly shorter in patients in whom the Ferguson procedure was performed. Mukesh *et al.* [14] concluded that mean time taken to heal surgical wounds was 3.5 weeks for open group and 2.8 weeks for closed haemorrhoidectomy group.

In the present study, all the patients who underwent open or closed haemorrhoidectomy showed completely healed wounds at 6 weeks of follow up. Study conducted by B K Sharma *et al.* also showed similar results to us. G Arbman *et al.* [10] in their study concluded that only 77% of patients who underwent open haemorrhoidectomy showed completely healed wound at the end of 6 weeks after surgery.

Pain following both the procedures was assessed after 6 weeks and compared with study done by G Arbman *et al.* [10]. In the present study none of the patient who underwent open or closed haemorrhoidectomy reported pain. The study of G Arbman *et al.* [10], in contrast showed presence of pain in the patients who underwent open (24%) and closed (19%) haemorrhoidectomy. R K Shastri *et al.* [15] in their study found that pain was negligible in both groups at 6 weeks of follow up.

Anal stenosis, Anal incontinence, wound dehiscence, Recurrence, discharge, bleeding, retention of urine and Infection of the wounds are few of the late complications of both open and closed haemorrhoidectomy. Diathermy dissection has been reported as a probable cause of wound dehiscence, it may also increase the risk of infection.

In the present study none of the patient who underwent haemorrhoidectomy presented with anal stenosis, wound dehiscence and infection of wounds or any other late complications of haemorrhoidectomy mentioned above. G Arbman *et al.* [10] described that in closed technique the wound heals faster but there is increased risk of wound dehiscence. In his study, he reported one case (2%) of wound infection in the patient who underwent open haemorrhoidectomy. Mukesh *et al.* [14] in his study observed one case (2.5%) of anal stenosis in closed group and nil in open group. Abdul Razaque *et al.* [16] in their study made following observation. They reported anal stenosis in 2.91% of patients in closed group and nil in open group. They observed one case (0.9%) of wound infection in open procedure and two cases (1.8%) in closed haemorrhoidectomy group. It was reported by them that 2.91% wound dehiscence in closed group and one case (0.9%) of anal incontinence in open group. R K Shastri *et al.* [15] observed wound dehiscence in 3.7% of closed group, 4.87% cases of anal stenosis in open haemorrhoidectomy group. Adnan Aziz *et al.* [17] reported 4% cases of anal stenosis in open group and one case in closed haemorrhoidectomy group. Carapeti *et al.* [18] reported a wound dehiscence in 55.5% of patients in closed group. Arroyo also found a high (45% of the patients) dehiscence of the wound suture with the Ferguson technique.

## Conclusion

- Both procedures open and closed haemorrhoidectomy are effective methods of treatment of haemorrhoids. They are safe, easy to perform without requirement of any costlier instrument and operating set up. Post-operative complications were insignificant in both groups. However, the closed haemorrhoidectomy has advantage over open haemorrhoidectomy in terms of duration of surgery, less post-operative pain and faster rates of wound healing.
- With this study we conclude that closed haemorrhoidectomy is the treatment of choice for 2nd degree haemorrhoids which did not respond to conservative treatment and non-invasive therapy and 3rd degree haemorrhoids.

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