

THE COMPARATIVE STUDY BETWEEN OPEN TECHNIQUES VERSUS LIMBERG FLAP TECHNIQUE IN MANAGEMENT OF SACROCOCCYGEAL PILONIDAL SINUS

Dr. Deepak Meena¹, Dr. Vinod Bhavi¹, Dr. Jas Karan Singh¹, Dr. Gurpreet Singh¹

¹Department of Surgery, Guru Gobind Singh Medical College & Hospital, Faridkot, Punjab

Article Info: Received 20 July 2021; Accepted 21 August 2021

DOI: <https://doi.org/10.32553/ijmbs.v5i9.2180>

Corresponding author: Dr Vinod Bhavi

Conflict of interest: No conflict of interest.

Abstract

Background: Comparative study of laparoscopic and open surgical method in management of peptic ulcer perforation

Methods: The present study was conducted in patients presented with perforation peritonitis to the emergency department in G.G.S medical college and hospital, a tertiary care hospital in Faridkot, Punjab in which comparison of the clinical outcome between laparoscopic and open surgical methods for treatment of Gastro duodenal perforation was study.

Results: Mean operative time of laparoscopic repair group was higher (158.2 ± 0.64 min) in comparison to open repair group (70.8 ± 0.42 min). In the present study post-operative pain score was assessed in each and every patient using Visual analogue scale. On post-operative day 1, mean VAS for OR Group was significantly higher in comparison to LR Group. Later on postoperative day 3, Majority of patients of in LR group had a highest score of 1-4 while in OR group was score 5-7. Next on postoperative day 5, again mean VAS for LR patients was less in comparison to OR Group.

Conclusion: As this is the first kind of study in our geographical area in which role of alcohol proved to be an important risk factor. Laparoscopic approach for repair of perforated peptic ulcer may offer significant advantage over open repair approach with lesser post-operative pain, lesser postoperative complications like wound infections, comparable reperforation rates and lesser duration of hospital stay.

Keywords: Laparoscopic, Open, Repair

Introduction

Pilonidal sinus is a chronic inflammatory process of the skin and subcutaneous tissue of the sacro-coccygeal region. It presents clinically as a depression or one or multiple holes in the midline in the intergluteal cleft. In the course of the disease, the inflammation may exacerbate or even an abscess may form.¹

Pilonidal cyst is usually diagnosed in young males (4 times more often than in females), usually of Caucasian descent, less frequently African or Asian, most commonly after puberty (mostly in 2nd and 3rd decade of life). In females, the disease develops at a younger age, which is probably due to earlier beginning of puberty.²

Treatment of a pilonidal cyst is difficult due to low efficacy of therapeutic methods. Clinical assessment is necessary, and the choice of proper management depends on disease stage. In the case of a shallow (depth less than 2cm) lesion with protruding hair, a trial of conservative treatment may be attempted. However, the patient should accept the risk of developing an abscess on every stage of treatment. Conservative treatment is only possible for non-infected pilonidal cysts.³ Every abscess requires surgical intervention. Conservative methods used in the past, such as phenol injection, cryosurgery, thermal destruction, local radiation, are no longer recommended due to high rate of complications and patient's discomfort. While applying conservative

methods, it should be remembered to remove all hairs from the pilonidal sinus accessible through the skin opening.⁴

One of conservative methods is application of fibrin glue for cyst closure. This method may only be used in patients with early lesions, with no history of abscesses, who have never underwent surgical treatment and have only one opening of the pilonidal sinus.⁵

A fundamental principle of surgical treatment is total resection of the lesion, including its lateral channels, up to fascia of sacrum. Application of dye to the external opening makes it easier to identify lateral channels of the cyst.⁶

The most commonly used method is simple excision of pilonidal cyst. Primary wound closure shortens healing time, however, it is associated with an increased complication rate, including infection and dehiscence, and recurrence of the disease as a result. Leaving the wound 'open' to heal requires longer convalescence time, but also with lower rate of recurrence. Relocation of flaps should be reserved for patients with extensive chronic lesions. In the case of less extensive pilonidal cysts, deep incisions with mobilization of subcutaneous tissue allows for faster healing and is more acceptable by patients than flap surgery.⁷

Time spent off work and perceived recurrence rates and methods which includes the laying open the all tracks with

or without marsupialization, the excision of all tracks with or without primary closure and the excision of all tracks and then closure by some other means designed to avoid a midline wound (Limberg procedure, Z-plasty, Karydakis procedure) but it is usually surgeon preference, which influence the choice of method.⁸

Material and Methods

Study Setting

- Guru Gobind Singh Medical College and Hospital, Faridkot in Surgery Department from March 2018 to August 2019.

Study Population

- Patients with pilonidal sinus disease attending Surgery Department OPD in Guru Gobind Singh Medical College and Hospital, Faridkot.

Inclusion Criteria:

1. Pilonidal sinus in the natal cleft of the sacrococcygeal area
2. Patients aged between 16 and 60 years.
3. All patients diagnosed with pilonidal sinus which are fit for undergoing surgery.

Exclusion Criteria:

- Pilonidal abscess
- Patients having systemic conditions which affect postoperative wound healing like diabetes mellitus, Human immunodeficiency virus positive patients, on cancer chemotherapeutic drugs, immunosuppressant therapy.
- Patient having spinal deformities.

Study Design

- Hospital based descriptive study.

Sample Size

- 60 consecutive patients included and using randomisation software were divided into two groups GROUP-A and GROUP- B.

Group-A

- Included patient's who underwent wide excision and primary closure using limberg flap method.

Group-B

- Included patients with wide excision and healing by secondary intention.
- Data collected and compared, and analysed for operative time, post-operative pain, duration of hospital stay, post-operative complication such as seroma formation, post-operative wound infection, flap necrosis, wound dehiscences, and time to complete healing.

Sampling Technique/ Method

- Non probability convenient sampling.

Results

The present study was conducted in the Department of General Surgery at Guru Gobind Singh Medical College and Hospital, Faridkot to compare Limberg flap vs Lay open technique in treatment of pilonidal sinus.

Sixty patients underwent for pilonidal sinus surgery were studied in a prospective manner. Patients were randomized into two groups comprising of 30 patients each.

Limberg flap group	Lay open group
Patients underwent wide local excision followed by limberg flap primary closure.	Patients underwent wide local excision followed by healing by secondary intention.

Table 1: Demographic-Wise Distribution of Patients

	Limberg Flap	Lay Open	Total Number of Patient
Age	28.46±9.00	26.86±7.05	27.66±8.05
Male : Female	28 : 2	29 : 1	57 : 3
Duration of surgery	53.59±7.32	37.48±4.82	45.58±10.22

Mean age of the subject of the limberg flap group and lay open group was 28.46±9.00 years and 26.86±7.05 years respectively which was comparable in both group. It was observed that 95% of the patients (57 patients) of the present study were males, while the remaining 5% patient (3 patients) were female respectively with male to female ratio 19:1 which shows predilection for males. Gender wise distribution was comparable in both the groups.

Table 2: Distribution Of Cases According To Pain InEarly Post-Operative Day 1

Postoperative port site pain onVAS		GROUP	
		LIMBERG FLAP	LAY OPEN
POST OPERATIVE Day 1	1- 4	7	12
	5-7	15	10
	8-10	8	8
	Mean±SD	6.00±2.27	5.86±2.13
	p-value	0.314 (NS)	

In our study post-operative pain on day 1 compared found that mean grading of pain according to visual analog scale found to be 6.00±2.27 for limberg flap group and 5.86±2.13 for lay open group, the difference found to be statistically insignificant.

Table 3: Distribution of Cases According To Pain On Post-Operative Day 3

Postoperative port site pain onVAS		GROUP	
		LIMBERG FLAP	LAY OPEN
POST OPERATIVE Day 3	1- 4	16	10
	5-7	11	14
	8-10	3	6
	Mean±SD	4.66±2.02	5.4±1.66
	p-value	0.001 (NS)	

In our study post-operative pain on day 3 compared found that mean grading of pain according to visual analog scale found to be 4.66±2.02 for limberg flap group and 5.4±1.66 for lay open group, the difference found to be statistically significant.

Table 4: Distribution of Cases According To Pain InEarly Post-Operative Day 5

Postoperative port site pain onVAS		GROUP	
		LIMBERG FLAP	LAY OPEN
POST OPERATIVE Day 5	1- 4	26	17
	5-7	4	10
	8-10	0	3
	Mean±SD	3.26±1.20	4.3±2.00
	p-value	0.001 (Sig.)	

In our study post-operative pain on day 5 compared found that mean grading of pain according to visual analog scale found to be 3.26±1.20 for limberg flap group and 4.30±2.00 for lay open group, the difference found to be statistically insignificant.

Table 5: Distribution of Cases According to SeromaFormation in

Seroma Formation	Groups				Total	
	Limberg Flap		Lay open			
	No.	%	No.	%	No.	%
Yes	3	10%	1	3.3%	16	32.0
No	27	90%	29	96.6%	34	68.0
Total	30	100%	30	100%	50	100

In the present study 10% patients (3 patients) in limberg flap group had seroma formation while in lay open group 3.3% patient (1 patient) had seroma formation,

Table 6: Distribution of Cases According to Post- Operative Infection

Post-operative Infection	Groups				Total	
	Limberg Flap		Lay open		Numberof patient	Percentage
	Number of patient	Percentage	Numberof patient	Percentage		
Yes	6	20%	8	26.7%	14	23.3%
No	24	80%	22	73.3%	46	76.6%
Total	30	100%	30	100%	60	100%
p-value	0.542 (NS)					

In present study, post operative Infection at sutures site was present in 20% patients of Limberg flap group. In lay open group, 26.7% patients had infection at sutures site. The difference is statistically insignificant.

Table 7: Distribution Of Cases According To FlapNecrosis In Both Groups

FLAP NECROSIS	Groups				Total	
	Limberg Flap		Lay open		Numberof patient	Percentage
	Number of patient	Percentage	Numberof patient	Percentage		
No	26	86.7%%	30	100%	56	93.3%
Yes	4	13.3%	0	0	4	6.7%
Total	30	100	30	100	60	100
p-value	0.038 (Sig.)					

In present study flap necrosis seen only in limberg flap group in 13.3% patient (4 patient). No flap necrosis seen in lay open group. Difference is statistically significant.

Table 8: Distribution of Cases According to WoundDehiscence in Both Groups

Wound Dehiscence	Groups				Total	
	Limberg Flap		Lay open		Numberof patient	Percentage
	Numberof patient	Percentage	Number of patient	Percentage		
No	28	93.3%	30	100%	58	96.7%
Yes	2	6.7%	0	0	2	3.3%
Total	25	100	25	100	50	100
p-value	0.150 (NS)					

In present study, wound dehiscence seen only in limberg flap group in 2 patients. The difference statistically insignificant.

Table 9: Distribution of Cases According to HospitalStay (Days)

Hospital Stay (days)	Groups				Total	
	Limberg Flap		Lay open		Numberof patient	Percentage
	Number of patient	Percentage	Number of patient	Percentage		
2	2	13.3%	3	10%	7	11.7%
3	10	46.7%	10	33.3%	24	40%
4	12	26.7%	9	30%	17	28.3%
5	6	13.3%	8	26.7%	12	20%
Total	30	100	30	100	50	100
Mean±SD	3.73±0.86		3.73±0.98		3.73±0.91	

In limberg flap group 4 patient stayed at hospital for 2 days while 14 patient stayed at hospital for 3 days, 8 patient stayed for 4 days and 4 patient stayed for 5 days. In lay open group 3 patient stayed for 2 days, 10 patient stayed for 3 days, 9 patient stayed for 4 days, 8 patient stayed for 5 days.

Mean duration of hospital stay in limberg flap and lay open group are 3.73 ± 0.86 and 3.73 ± 0.98 days respectively, the difference is statistically insignificant.

Table 10: Distribution of Cases According to Time to Complete Healing

Time to complete wound healing (in days)	Groups			
	Limberg Flap		Lay open	
	Number of patient	Percentage	Number of patient	Percentage
20-30days	17	56.7%	0	0
31-40days	12	40%	1	3.3%
41-50days	1	3.3%	4	13.3%
51-60days	0	0	19	63.3%
>60days	0	0	6	20%
Total	30	100%	30	100%
Mean \pm SD	30.33 \pm 5.44		54.83 \pm 5.89	
p-value	0.001 (Sig.)			

In our study most of the patient in limberg flap group 56.7% patient achieved complete wound healing around 20-30 post operative day while in lay open group 63.3% patient achieved complete wound healing around 51-60 post operative day.

Mean duration of complete healing in limberg flap and lay open flap are 30.33 ± 5.44 days and 54.83 ± 5.89 days respectively, difference found statistically significant.

Discussion

In present study post operative pain evaluated on day 1, 3, 5 interval, data recorded on the basis of visual analog score. A mean of visual analog score 6.0 and 5.86 of limberg flap and lay open respectively recorded on post operative day 1. On post operative day 3 mean of 4.66 ± 2.02 in limberg flap and 5.4 ± 1.66 in lay open visual analog score for pain recorded.

On post operative day 5 visual analog score of pain mean 3.26 ± 1.20 in limberg flap and 4.3 ± 2.00 in lay open noted.

In early post operative period limberg flap and lay open has comparable pain score but later on there was significant decrease in pain limberg flap group. Similar result found by Jamal A *et al*⁹ who studied 49 patients, reported the patient perceived less pain after Limberg procedure compare to lay open procedure.

In present study 3 (10%) out of 30 patients had seroma formation while in case of lay open only 1 (3.33%) out of 30 patients had seroma formation at wound site.

Similar results found in Ekici U *et al* (2019) studied and reported seroma formation in 7% patients in limberg flap surgery and 1.9% patients in lay open surgery.¹⁰

A seroma is a collection of fluid that builds up under the surface of skin. Cause of seroma formation is tissue disruption or tissue removal. To prevent seroma formation we placed vacuum suction tube drain all cases. A clear discharge from wound indicates seroma such differential tendencies for the two procedures are accounted by more tissue handling in the limberg flap procedure which leads to more seroma formation seroma was drained externally to prevent infection, abscess formation, delayed wound healing, wound dehiscence, flap necrosis that may lead to prolonged hospitalization.

All patient included in this study got similar antibiotic coverage. First 48 hours antibiotic was given then switched off to oral antibiotic coverage. Wound infection was indicated by presence any factor listed below

- local rise of temperature,
- purulent discharge from the wound,
- presence of fever
- tenderness

Some patients had seroma collection that becomes infected while few got infection due to poor local hygiene. Most of the patient got wound infection on 4th-5th post operative day.

A thorough look at the immediate postoperative complication profile of the two procedures leads to the conclusion that wound collections (seroma) tend to occur with Limberg flaps whereas suppurative wound infections tend to occur more with lay open procedure. Such differential tendencies for the two procedures are accounted by the extensive dissection for the flap procedure and strained wound at the basin of natal cleft for the lay open.

In present study observed wound infections rate 26.7% and 20% in lay open and limberg flap group respectively. Ekici U *et al*¹¹ (2019) studied and reported post operative infection in 20.2% patients in limberg flap surgery and 9.4% patients in lay open surgery respectively. Local hygiene is very important to prevent wound infection. Most of the infection were reported after 2-3 days of discharge from the hospital. Patient having daily ASD presented with less wound infection. Those patient who were not having daily ASD presented with local wound infection.

In present study flap necrosis seen only in limberg flap group in 13.3%patient (4 patient). No flap necrosis seen in lay open group.

Flap necrosis can occur either due to ischemia/pressure necrosis or due to tension at suture line. All patient were advised to lie in prone position for 48 hours after surgery to prevent ischemia and pressure necrosis. Most of flap necrosis was epidermal so managed conservatively.

In present study wound dehiscence in 6.7% cases of Limberg flapgroup. No wound dehiscence recorded in lay open group.

Two factors were responsible for wound Dehiscence

- Suppurative wound infection
- Tension at suture line

Tension at suture line was seen in limberg flap due to transposition of flap. Suppurative wound infection is also the major cause of wound dehiscence.

No recurrence seen in any patients in present study, may be due to short duration of follow up.

In present study mean duration of wound complete healing found to be short 30.33±5.44 days in limberg flap group and longer 54.83±5.89 days for lay open group.

Similar result was found in Anandaravi *et al*⁶⁵ study, Al-Hassan *et al*⁷¹ stud

Author and Year of Study	Mean Duration of Wound Healing in Limberg Flap	Mean Duration of Wound Healing in Lay Open
Anandaravi <i>et al</i> ¹²	14.2 days	51.64 days
Al-Hassan <i>et al</i> ¹³	91 days	10.3 days
Present study	30.33±5.44days	54.83±5.89 days

Conclusion

Despite of longer operative time and demanding surgical skills, Limberg flap should be preferred treatment for pilonidal sinus disease due to its less post-operative pain, and short duration of complete healing, thus helping in early returning to normal activity. Limberg flap method provides an effective procedure for the treatment of pilonidal sinus disease. Limberg Flap technique has better outcomes compared with lay open technique. Therefore, we recommended Limberg Flap technique for treatment of pilonidal sinus disease.

References

1. Kratzer G.L.: Pilonidal disease. *Of Man Colon Rectal. Dis.* 1985; 10: 125
2. Allen-Mersh T.G.: Pilonidal sinus: finding the right track of treatment. *Br.J. Surg.* 1990; 77: 123–132
3. James Bagot Oldham, 1899-1977, surgeon the united Liverpool Hospitals, Liverpool, UK. *Bailey & Love's Short Practice of Surgery 27th ed.* Pg. 1347.
4. Bielecki K., Dziki A.: *Proktologia. PZWL, Warszawa* 2000; 187–188.
5. Isik A., Eryilmaz R., Okan I. *et al.*: The use of fibrin glue without surgery in the treatment of

pilonidal sinus disease. *Int. J. Clin. Exp. Med.* 2014; 7 (4): 1047–1051

6. Guner A., Aydin B., Ozkan O.F. *et al.*: Limberg flap versus Bascom cleft techniques for sacrococcygeal pilonidal sinus: prospective randomized trial. *World J. Surg.* 2013; 37: 2074–2080
7. John U Bascom, 1925-2013, American surgeon, formerly of Eugene, OR, USA. *Bailey & Love's Short Practice of Surgery 27th ed.* Pg. 1348-49.
8. da Silva J.H. "Pilonidal cyst: cause and treatment." *Diseases of the Colon and Rectum.* 2000; Vol. -43:Pg.1146–1156.
9. Jamal A, Shamim M, Hashmi F, Qureshi MI. Open excision with secondary healing versus rhomboid excision with Limberg transposition flap in the management of sacrococcygeal pilonidal disease. *J Pak Med Assoc* 2009;59(3):157-60.
10. Glenn F. Intraoperative color-marking of sinus tracts with methylviolet solution to confirm adequate wide excision is helpful, with a 2.5% recurrence rate. *Pilonidal sinus. N Engl J Med* 1932;207:544-546.
11. Ekici U, Kanlıöz M, Ferhatoğlu MF, Kartal A. A comparative analysis of four different surgical methods for treatment of sacrococcygeal pilonidal sinus. *Asian J Surg Asian J Surg* 2019;42(10):907-913.

12. Anandaravi BN, Viswanathan A. Comparative study between excision with lay open and excision with primary closure in treatment of pilonidal sinus Int Surg J. 2019;6(4):1242-6.
13. Al-Hassan HKL, Francis IM, Neglen P. Primary closure or secondary granulation after excision of pilonidal sinus. Acta Chir Scand 1990;156:695-9.