

ORIGINAL RESEARCH

A Study of comparison between Excision with primary closure and Limberg flap reconstruction technique in the treatment of uncomplicated Sacrococcygeal Pilonidal sinus in a Tertiary care Hospital, Coimbatore, Tamil Nadu

Dr. P. Balamurugan MS.¹, Dr. K. S. Saravana Raju MS.^{2*}, Dr. B. Palanisamy MS.³

¹Senior Resident, Department of General Surgery, Government Medical College and ESI Hospital, Coimbatore, Tamil Nadu, India.

^{*2}Senior Resident, Department of General Surgery, Government Medical College and ESI Hospital, Coimbatore, Tamil Nadu, India.

³Senior Resident, Department of General Surgery, Government Medical College and ESI Hospital, Coimbatore, Tamil Nadu, India.

Corresponding Author: Dr. K. S. Saravana Raju, Senior Resident, Department of General Surgery, Government Medical College and ESI Hospital, Coimbatore, Tamil Nadu, India.

ABSTRACT

Background: Pilonidal sinus is a chronic intermittent disease, usually involving in the Sacrococcygeal region. Various treatment modalities have evolved. Excision with primary closure or without closure are the older methods which has the higher complications in the post-operative period and in recurrence rate. Flap procedures reduces the complications like recurrence and had a better postoperative course and outcome. **Aim:** The aim of this study is to compare the excision with Primary closure and with modified Limberg flap in the treatment of uncomplicated sacrococcygeal pilonidal sinus disease.

Methods: This is a cross sectional study done in the Department of General Surgery in the GMC and ESI Hospital, Coimbatore, Tamil Nadu, for a period of March 2019 to February 2022. The study participants who fulfilled the inclusion and the exclusion criteria were included in this study. The final sample size obtained was 50. 25 in each group. Demographic details like name, age, sex were taken. Duration of surgery, Postoperative complications and recurrences were noted. The collected data was entered in the MS excel and statistical analysis were done with SPSS 23. Categorical variables expressed in numbers and percentages and continuous variables were expressed in terms of mean and standard deviation. P value <0.05 is considered as significant.

Results: Among the study participants majority were in 21-30 years of age. Male predominance is observed in our study. The mean operating time was found to be more in the Limberg technique compared to the excision with primary closure technique. Post operative infections and macerations were more in Excision with Primary closure group. The early return to work was found to be more in Limberg technique and it was found to be statistically significant.

Conclusion: Our study concluded Limberg technique was better than the Excision with Primary closure technique in terms of Less Postoperative infections and early return to work.

Keywords: Pilonidal sinus, Sacrococcygeal, Limberg Flaps, Excision

INTRODUCTION

The most common inflammatory disorder which occurs in the Sacrococcygeal region is the Pilonidal sinus. A condition where the natal cleft overlying the coccyx which contains one or more

usually non infected, midline opening which tends to communicate with a fibrous tract which is lined by granulation tissue and hair lying loosely within the lumen is known as Pilonidal sinus. It is also referred to as jeep disease. This term is coined as it is seen among the Jeep Drivers during the second world war.⁽¹⁾ In 1833 it was defined by Herbert Mayo. The term was derived from the Latin, for hair as pilus and nest as nidus and was used by Hodge in 1880.⁽²⁾

Deep natal cleft is considered as an favourable environment for maceration, sweating, bacterial contamination and penetration of hairs. Thus these causative factors has to be eliminated for the prevention and treatment.⁽³⁾ It usually affects the middle and young age men. Most commonly it affects 15-30 years of age after the puberty which is due to the effect of sex hormones on the pilo sebaceous glands and the healthy body hair growth change. The incidence is 26 per 100000.⁽⁴⁾ The most common site for the pilonidal sinus is intergluteal region. Other sites are umbilicus, finger which usually occurs in hair dressers.⁽⁵⁾ Sedantary lifestyle ,obesity and local irritation found to be associated with the pilonoidal sinus.⁽⁶⁾

It present clinically as pilonidal abscess which is acute in state, chronic pilonidal sinus and pilonidal disease which is complicated or recurrent. There are multiple treatment modalities, which includes non operative management, incisional procedures and excision and primary closure and flaps.⁽⁷⁾ The available skin flaps techniques includes the advancement flap (Karydakis procedure), rotational flap (Limberg flap), Gluteus maximus myocutaneous flap (Modified Limberg flap) and local advancement flap (V-Y advancement flap).^(8,9) The surgical wound after the primary excision left open for healing through secondary intention or by closed method which is done through primary closure (healing by primary intention).

The aim of this study is to compare the two techniques for the treatment of uncomplicated sacrococcygeal pilonoidal disease i.e, excision with the primary closure and limberg flap among the patients.

MATERIALS AND METHODS

Study Setting

This study was conducted in the Department of General Surgery, Inpatient ward, Government Medical College and ESI Hospital .The study was done for a period from March 2019 to February 2022.

Study Design

Comparative Cross sectional study

Sample Size

The study participants fulfilling the inclusion and the exclusion criteria were included in the study throughout the study period. The final attained sample is 50. The study participants were grouped into two. The study participants undergone excision with primary closure in Group 1. In Group 2 those who had Limberg flap done.

Inclusion Criteria

- All the patients with uncomplicated sacrococcygeal pilonidal sinus who require surgical management were included in our study .

Exclusion Criteria

- Age < 12 years
- Infected cases
- Abscess formation
- Immuno deficiency, hypertension, diabetes mellitus
- Existing recurrent disease or with previous history of surgery in sacrococcygeal region.

- Female patients with severe hirsutism.
- Psychiatric disease.
- Poor hygiene.
- Secondary opening >2 cm from the primary opening.
- Patients with contraindication to spinal anesthesia or prone position.

Data Collection Method

After obtaining the Institutional Ethical Committee clearance, the study was started after obtaining patients consent. The study participants recruited during the study period i.e 50 will undergo the routine investigations and then the preanesthetic fitness.

Participants who had Excision with Primary closure were grouped 1 and those who under gone Limberg flap were grouped 2. The surgical consent was obtained from the study participants before the procedure.

Excision and Primary Closure

Excision site was marked 1 cm away from the sinus opening all around. Then a vertical elliptical incision was made around the sinus which was extended upto the pre sacral fascia. The tissue was resected and hemostasis was obtained. The wound was closed in layers with vaccum drain .Sterile dressing was done. Post operative analgesics and antibiotics was given.

Limberg Flap Technique

The excision and the flap site was mapped. The ratio of length and width was 60%. The incision was made in rhomboid shape and was extended till the pre sacral fascia. The tissue was excised. The fasciocutaneous flap was divided from the underlying gluteus muscle and will be rotated to the defect. The wound was closed with vaccum drain. Sterile dressing was done. Post operative analgesics and antibiotics was given.

The baseline demographic details like patients name, age, sex, clinical presentation, operating time, postoperative complications were noted.

Statistical Analysis

The obtained data was entered in the MS Excel Windows 10. Statistical analysis was done with the help of SPSS 23. Continuous data was expressed in terms of Mean and Standard deviation. Categorical data was expressed in terms of Numbers and percentages. Test of association for Categorical data was Chi square test and for Continuous data was t test and Anova test.

RESULT

Table 1: Demographic characteristics of the study participants

Characteristics	Primary closure	Modified Limberg Flap	P value
Age			0.32
< 20years	5	3	
21-30 years	11	15	
>30 years	9	7	
Mean age	27.2±3.6	26.4±4.2	0.47
Sex			0.38
Male	21	23	
Female	4	2	

The mean age of our study participants in Group 1 was found to be 27.2 ± 3.6 and Group 2 was found to be 26.4 ± 4.2 . Majority of our study participants were in 21-30 years of age 26(52%) followed by 21-30 years of age 16(32%). Male predominance is observed in our study 44(88%).

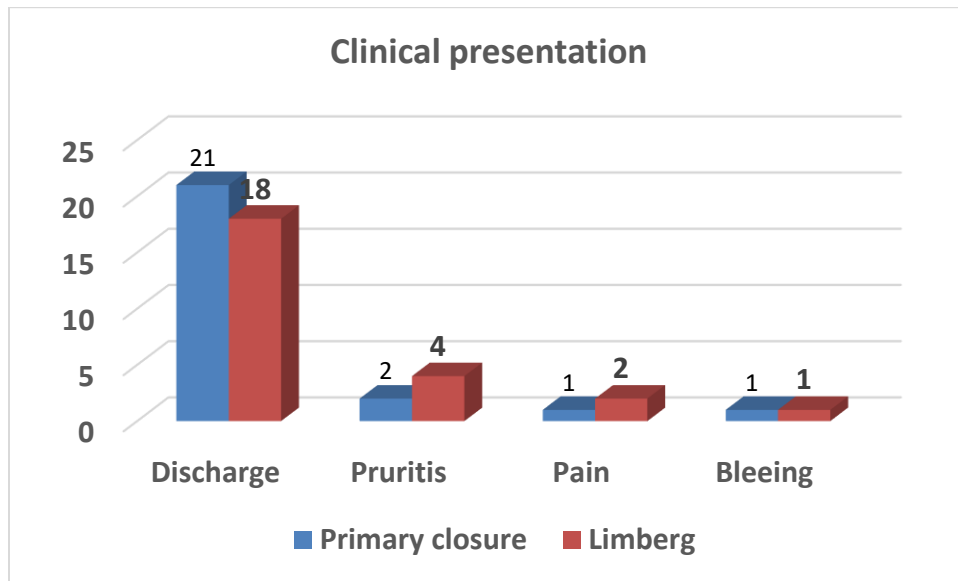


Figure 1: Clinical presentation among the study participants

The most common clinical presentation was Discharge followed by Pruritis in both the groups.

Table 2: Duration of surgery among the study participants

Duration of the surgery (Minutes)	Primary closure	Limberg Flap	P value
Mean	46.62	72.6	<0.001*
Standard Deviation	6.04	6.2	

The mean duration of surgery of the Limberg Flap was found to be more with the range of 60-70 mins when compared to Primary closure method where the range of surgery was 40-50 mins.

Table 3: Postoperative complications

Variables	Primary closure	Limberg Flap	P value
Return to work on POD	13(52%)	23(92%)	<0.001*
Post-operative infection	11(44%)	5(20%)	0.03*
Post -operative Maceration	2(6%)	3(12%)	0.63
Recurrence	7(28%)	2(8%)	0.03*
Hospital stay mean duration	3.56 ± 1.42	2.25 ± 0.42	<0.001*
Postoperative pain Day 1	5.52 ± 1.23	6.46 ± 0.8	0.02*

Day2	4.3±1.1	7.01±0.94	<0.001*
First week	2.95±0.86	3.02±1.01	<0.001*
1 st month	2.01±0.74	1.8±0.70	0.30
3 rd month	1.21±0.66	0.86±0.56	0.04*
6 th month	0.76±0.76	0.06±0.24	<0.001*

Postoperatively patients follow up was done on 7th day and every 15 days for first two months, then every month upto 6 months. Postoperative infection 5(20%) and recurrence 2(8%) in Limberg flap group. Post operative infection 11 (44%) and recurrence 7 (28%) in Primary closure group. The difference was found to be statistically significant. Return to work on 14th POD was more in Limberg Flap 23(92%) compared to Primary Closure 13(52%). The difference was found to be statistically significant. Post operative maceration was found to be more in Limberg flap 3(12%). Hospital stay duration was less in Limberg flap technique compared to Excision with primary closure and the difference was found to be statistically significant. The comparison of postoperative pain through VAS score between both the groups stated that there is a statistically significant difference was found between the groups in PO day1, day2, First week, 3rd month and 6th months.

DISCUSSION

In the sacrococcyx region pilonidal sinus present in the natal cleft where one or more midline opening present which will connect with fibrous tract which is lined by granulation tissue where the hair will be present in the lumen. In 1847 Anderson who described this condition in his paper “Hair extracted from the ulcer”. In 1854 it was Warren who described that further in his work “Abscess containing hair on the nates”. Later in 1880 it was Hodge who coined the term “Pilonidal sinus”.

For the pilonidal sinus though numerous operative and non-operative treatment were described, no treatment comprises of the features like minimal tissue injury, minimal postoperative morbidity, short hospital stay, lowcost, low recurrence rate and satisfactory cosmetic results.^(10,11) The most simple and rapid procedure is the Excision and primary closure technique. But the tension which is built on the suture line and the accumulation of hair in the deep midline cleft will affect the success rate and thus increases the recurrence rate.⁽¹²⁾

The Limberg flap technique was introduced and gained its popularity as the recurrence rate was low, simplicity in the procedure and the low complications rate.^(13,14,15) Majority of the study participants were in the age group of 21-30 years. Similarly in arnous et al study nearly 85% of the study participants were in the age group between 15-30 years. The mean age of the study participants was found to be 27.2 in primary closure group and 26.4 in the limberg flap group. Whereas in Meena Ok et al⁽¹⁶⁾ study the mean age was more than our study. Male preponderance was observed in our study 44(88%) which is similar to arnous et al⁽¹⁷⁾ study 86%. Similarly in Khan N et al⁽¹⁸⁾ study male preponderance was observed. It was postulated in a study that the pilonidal sinus was found to be correlated with male sex hormones and generally affects the males in the second and third decades of life.

In our study we compared both the techniques. One group with excision with primary closure and the second group with Limberg flap technique. The safety and efficacy of any procedure will be judged by the overall complications and their recurrence rate. The most common clinical

presentation was Discharge followed by Pruritis in our study Similar results was also seen in Arnous et al⁽¹⁷⁾ study

The duration of surgery in our study was found to be more in the Limberg Flap group compared to the Primary closure group. In our study the wound related complications was found to be less in the Limberg flap group compared to Excision with primary closure group. Similar results was also seen in Muzi et al study and Acka et al study.^(19,20)

In our study the recurrence rate in the Primary closure group was 28%. Sondenna et al study has reported high recurrence of 7-42% for the primary closure. The hospital stay duration was also found to be lower in the Limberg flap group compared to excision with primary closure. In our study the post operative pain on Day1 and Day 2 was found to be statistically significant. But the pain was found to be more in Limberg flap technique on first two days. On first week, first month, third and sixth month the pain score was more in Primary closure technique compared to limberg flap technique which states that patients were pain free 3rd and 6th month. Pain score had a statistically significant difference.

Limitations of the Study

The sample size is small. Our study was done in a tertiary care centre which is a small geographical area. Multicentre trial has to be done to draw solid conclusions. Limited duration of follow up study was done among the study participants.

CONCLUSION

The present study analyse the outcomes of the two groups, excision with primary closure and the limberg flap technique in terms of operating time, postoperative complications and recurrence. It is concluded from our study that Limberg flap technique is the best method compared to the other in terms of low morbidity rate and recurrences.

Funding

None of the authors received funding for this study.

Competing Interest

There is no Competing interest.

Authors Contribution

All authors in our study contributed to the data collection of the patients.

Acknowledgement

The authors like to thank the Dean, Head of the Department of General Surgery, GMC & ESI Hospital, Coimbatore -641015, TamilNadu.

REFERENCES

1. Buie LA. Classic articles in colonic and rectal surgery 1890-1975.:Jeep Disease (Pilonidal sinus disease of mechanized warfare).Dis Colon Rectum :1982;25(4):384-90
2. Mayo OH.Observations on injuries and disease of rectum.London :Burgess and Hill;1883:45-46
3. Schoeller T, Wechselberrger G. Definite surgical treatment of complicated recurrent pilonidal disease with a modified fasciocutaneous V-Y advancement flap.Surgery 1997;121:258-63
4. Mc Callum IJD, King PM, Bruce J. Healing by Primary Closure versus open healing after surgery for pilonidal sins :Systematic review and metaanalysis.BMJ 2008;336(7649):868-871
5. Lee PJ, Raniga S, Biyani DK. Saccrococcygeal pilonidal disease. Colorectal Dis 2008;10(7):639-650

6. Sondenaar K, Andersen E, Nesvik I, Soreide JA. Patient Characteristics and symptoms in chronic pilonidal sinus disease. *Int J Colorectal Dis.*1995;10(1):39-42
7. Topgul K. Surgical treatment of sacrococcygeal pilonidal sinus with rhomboid flap. *J Eur Acad Dermatol Venereol* 2010;24(1):7-12
8. Spivak H, Brooks VL. Treatment of chronic pilonidal disease. *Dis Colon Rectum.*1996;39:1136-9
9. Menten BB, Leventoglu S. Modified Limberg transposition flap of sacrococcygeal pilonidal sinus. *Surg Today* .2004.34:419-23
10. Elbanna HG, Emile SH, Youssef M. Novel Approach of treatment of pilonidal sinus disease with thrombin gelatin matrix as a sealant. *Dis Colon Rectum* 2016;59(8):775-780
11. Elalfy K, Emile S, Lotfy A. Bilateral gluteal advancement flap for treatment of recurrent sacrococcygeal pilonidal disease:A Prospective cohort study. *Int J Surg* 2016;29:1-8
12. Sondenaar K, Nesvik I, Andersen E, Soreide J. Recurrent pilonidal sinus after excision with closed or open treatment: Final result of a randomized trial. *Eur J Surg* 1996;162(3):237-240
13. Limberg AA. *The planning of Local Plastic Operations on the Body Surface:Theory and Practice* .Tunbridge Wells: Castle House Publications;1984
14. Menten BB, Leventoglu S, Cihan A. Modified Limberg transposition flap for sacrococcygeal pilonidal sinus. *Surg Today* 2004;34(5):419-423
15. Urhan MK, Kucukel F, Topgul K. Rhomboid excision and limberg flap for managing pilonidal sinus. *Dis Colon Rectum* 2002;45(5):656-659
16. Meena OK, Kalwaniya DS, Arya SV, Kuppaswami M, Bajwa JS, Pradhan RS. A comparative study of excision with primary closure versus Limberg flap in pilonidal sinus. *Int surg J.*2016;6:4282-9
17. M. Arnous, H. Elgendy, W. Thabet, SHE mile, SA Elbax, WK hafagy. Excision with primary midline closure compared with Limberg Flap in the treatment of sacrococcygeal pilonidal disease:a randomized clinical trial. *Ann R Coll Surg Engl* 2019;101:21-29
18. Khan N, Singhal P, Chandrasekar S, Goel D, Patel K, Deshpande N. Is Limberg flap better than excision and primary closure for treatment of sacrococcygeal pilonidal sinus:a prospective randomized study of 30 cases. *Int Surg J.*2021;8:699-703
19. Muzi .MG, Milito G, Cadeddu F, Nigro C, Andreoli F, Amabile D .Randomized comparison of Limberg flap versus modified primary closure for the treatment of pilonidal disease. *Am J Surg.*2010;200(1):9-14
20. Akca T, Colak T, Ustunsoy B, Kanik A, Aydin S. Randomized clinical trial comparing primary closure with the Limberg flap in the treatment of primary sacrococcygeal pilonidal disease. *Brit J Surg.*2005;92(9):1081-4
21. Calva J, Bojalil R. Antibiotic use in a periurban community in Mexico: a household and drugstore survey. *Soc Sci Med* 1996; 42:1121-1128