



Original Research Article

A prospective study on limberg flap procedure for pilonidal sinus

Ashok Kumar Nayak¹, Sanjay Kumar Mahapatra², Akhil Unnikrishnan¹, Samarendra Satpathy^{1,*}¹Dept. of General Surgery, Veer Surendra Sai Institute of Medical Sciences and Research, Burla, Odisha, India²Dept. of Urology, Veer Surendra Sai Institute of Medical Sciences and Research, Sambalpur, Odisha, India

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ABSTRACT

Background: Pilonidal sinus is a blind ending track containing hair follicles within it and is primarily a disease involving sacrococcygeal region. The exact etiology of this disease process is unknown and is still controversial. There are various treatment methods for pilonidal sinus and the preferred method is Limberg flap reconstruction surgery due to its less complications and less recurrence.

Materials and Methods: Our study was a prospective study including 28 patients who were admitted for pilonidal sinus and operated by Limberg flap reconstruction surgery at Veer Surendra Sai Institute of Medical Sciences And Research from January 2018 to June 2020.

Results: Our study included 28 patients, and the female to male ratio is 1:13. Duration of symptoms had a range from 1-4 months and the mean age of the study population was 28.5 year. Patients underwent Limberg flap reconstruction surgery and 89.28% followed a normal course after surgery, 7.14% developed seroma and 3.57% developed surgical site infection in their post-operative period.

Conclusions: Limberg flap reconstruction surgery is the most preferred method of treatment for pilonidal sinus because of its low infection and recurrence rates, better aesthetic results after surgery and short duration of hospital stay.

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1. Introduction

Chronic Pilonidal sinus is a common disease of young men individuals, mainly affecting the sacrococcygeal region.¹ Pilonidal sinus means 'nest of hairs' in Latin. The incidence of pilonidal sinus in 100000 population is nearly 26 and it is affected in men more as compared with women.^{2,3} Men affected more and within the age group of 10-40.⁴

Earlier, it was thought to be a congenital condition occurring secondary to the remnant of post coccygeal epidermal cell rests. But Karydakakis proposed that high quantity of hair, local trauma and vulnerability of the skin to infection are the causes of pilonidal sinus.⁵

Currently, congenital theory is not considered because congenital tracts do not contain hair follicles and they only contain hair. Hence acquired theory is widely accepted. Poor personal hygiene, deeper natal cleft, friction movements, moisture and sweating also contribute to the formation of pilonidal sinus.^{6,7}

Pilonidal sinus can be treated using several defined conservative and surgical methods but recurrence rates remain high.⁸ Complete removal of the sinus track and appropriate reconstruction can lead to successful recovery.⁹

Flap reconstruction techniques eradicate the aetiology of the disease by flattening the inter gluteal sulcus.¹⁰ The treatment options include Karydakakis, Bascom, Limberg rhomboid flap etc.^{11,12} Among these procedures, various literature shows that Limberg procedure has less recurrent

* Corresponding author.

E-mail address: raj.9438666688@gmail.com (S. Satpathy).

rate and also good patient compliance.¹³

2. Materials and Methods

This is a Prospective study conducted in Veer Surendra Sai Institute of Medical Sciences And Research, Burla, Odisha on patients who presented to Surgery department with complaints of pain and purulent or watery discharge from the natal cleft region.

This study was conducted from January 2018 to June 2020 over 28 patients who were operated after the thorough workup. Patients with both primary and recurrent pilonidal sinus were included in our study.

The demographic information assessed included the age of the patient, sex, family history of the same disease, duration of symptoms, operative time, post-operative hospital stay and duration of the follow-up.

Patients included in our study were contacted over telephone and then called back to the department for clinical assessment. Patients were enquired about pilonidal sinus-related factors including postoperative care of wound, duration of operation and the appearance of recurrence and if any previous operations underwent.

Patients were advised to return to their routine activities after the removal of stitches or skin staplers on 10-14 days post operatively. Follow up of all those patients was done on 14th day post operatively, monthly basis for first three months and on 6th month of post-operative period.

The duration of the procedure was noted from the time of incision to the completion of the closure of wound. The post-operative hospital stay was recorded as the day of surgery considered as day zero.

Surgical site infection (wound infection) was defined as the purulent discharge from the incisional site along with the growth of microbes. Flap necrosis was defined as the complete necrosis of the flap. Most common post-operative complications includes hematoma formation, wound separation, wound infection, seroma formation, flap necrosis etc.

2.1. Surgical procedure

Limberg flap reconstruction surgery was done after giving spinal anaesthesia to the patient and then converting the patient to prone position. Preoperatively hair removal of the local parts were done and all patients have received a single dose of Ceftriaxone 1g and Metronidazole 500 mg infusion intravenously. Both buttocks were retracted using adhesive tapes for better visualisation during the procedure.

Before the surgery is started, a rhomboid shape is marked with a pen. A rhomboid area of skin and subcutaneous fat was excised including both the midline pits and any extensions laterally.

The long axis of the rhomboid was in midline. First line was drawn from point A to point C that is adjacent to the

perineal skin. Line BD was such that it was perpendicular to the line AC. BD was extended along in equal distance to the right to make a point E, so that BA= DE. Then a line was drawn parallel to DC from point E to point F, so that AD= EF.

The tissues within the ABCD rhomboid area was totally excised up to the level of sacral fascia . The flap was incised along the DE and EF exposing the gluteal fascia. A vacuum drain was kept before the sutures were given. Interrupted vicryl 2-0 including fascia and fat was applied over the drain. Skin was closed with stapler or poly amide .Patients were treated post operatively with Intravenous antibiotics, analgesics and advised to lie always in prone position. Drain was removed on post-operative day 2 or 3 depending upon the amount and regular sterile dressings were done. Sutures were removed on day 10 -14 depending on the nature of the wound healing.



Fig. 1: Schematic representation of Rhomboid flap



Fig. 2: Incision for Limberg procedure



Fig. 3: Post operative image

3. Observations

Our study consisted of 28 patients, of which 26 were males and 2 were females, indicating that the males are most commonly affected than females. The age of the patients range from 17-40 years with a mean age of 28.5 year. 64.28 % of patients had a family history of pilonidal sinus. 75% of patients had etiology related risk factors including deep natal cleft, local trauma , familial history, obesity, hirsute body status and sedentary life style. Two patients had been previously treated for the same disease from other hospitals. The duration of symptoms in the patients were ranging from 1 to 4 months.

Table 1: Demographic characteristics

Characteristics	total
Age (years)	17-40 years (mean age -28.5)
Males	26 (92.85%)
Females	2 (7.14%)
Duration of symptoms	1-4 months
Familial history	18 (64.28%)
Any proven etiology	21 (75%)
Previous history of same illness	2 (7.14%)
Operative time (minutes)	30-90 min (average time -60 minutes)
Post-operative hospital stay (days)	5-14days (mean duration -7 days)

All patients underwent Limberg flap surgery under spinal anaesthesia. The mean operative time was 60 minutes (ranging from 30 to 90 minutes). Post operatively, patients were treated with intravenous antibiotics, analgesics and dressings at regular intervals. Dressings was done on day 3 and 5 and drain was removed on post-operative day 3.

Sutures or skin staplers were removed depending on the healing of the wound ranging from 10th to 14th post-operative days and were discharged with advice for follow up. They were followed up at regular intervals at 14 days, monthly basis for first three months and again at six months of procedure.

Post-operative complications includes seroma, surgical site infection and epidermolysis. These complications were managed conservatively. The average length of hospital stay was 7 days. The healing of the surgical site was with minimal scarring and pain in the post-operative period. There was no case of recurrence noted during the follow up period also. None of the patients needed readmission due to the same disease condition again.

Table 2: Complications associated

Complications	Frequency
Seroma	2 (7.14%)
Surgical site infection	1 (3.57%)
Flap necrosis	0
Normal course	25 (89.28%)

4. Discussion

Patient with pilonidal sinus have a low quality of life due to the pain caused by it, discharge from sinus and also abscess formation. The recurrence of this disease is mainly due to the omission of any of the tracts during the first operation. Wound infection and also abscess formation leads to new sinus tract formation which also leads to recurrence in later stages.¹⁴ The predisposing factors for pilonidal sinus includes accumulation dead tissues in the natal cleft, excessive sweating, friction and poor personal hygiene.^{6,7} To minimise the recurrence, the emphasis should be on flattening the natal cleft along with achieving an off-midline closure of the resultant defect in order to minimize wound-related complications and recurrence.¹⁵⁻¹⁷

The various surgical treatment options include Limberg flap reconstruction surgery, Karydakias procedure, Excision with primary closure, excision with marsupialisation, V-Y plasty, Z- plasty, W-plasty. Among all these procedures, Limberg flap reconstruction procedure is the most preferred method for treatment because of its low infection rates, low recurrence rates, better aesthetic results after surgery and short duration of hospital stay. Limberg flap procedure is found to be superior than simple excision of the sinus, marsupialization procedure and various other flap procedures like Bascom and Karydakias.¹⁸⁻²¹

Certain complications associated with Limberg flap reconstruction surgery includes wound site infection, wound dehiscence, seroma formation, flap necrosis and recurrence. These complications can be minimised to a certain extent by a better surgical procedure and proper post-operative care.

Comparison of outcomes between our study and others:-

Table 3: Comparison with others

S. No	Study	Year of study	Study sample	Recurrence %	Complications %
1	Azab et al	1984	30	0	17
2	Gwynn et al	1986	20	5	-
3	Manterola et al	1991	25	0	0
4	Bozkurt et al	1998	24	0	0
5	Urhan et al	2002	102	4.9	7
6	Katsoulis et al	2006	25	0	16
7	Aslam et al	2009	110	1	5
8	Srikanth et al	2013	30	0	16.66
9	Yogishwar appa et al	2016	52	0	11.4
10	Jaspreet S Bajwa et al	2019	100	0	4
11	Our study	2020	28	0	10.71%

5. Conclusion

Limberg rhomboid flap reconstruction surgery is the treatment preferred for pilonidal sinus due to its low recurrence rates, less complications and better patient compliance. This procedure is so effective for both primary or recurrent disease.

6. Conflict of Interest

The authors declare that there are no conflicts of interest in this paper.

7. Source of Funding

None.

References

- Spiral H, Brooks VL, Nussbaum M. Treatment of chronic pilonidal disease. *Dis Colon Rectum*. 1996;39(10):1136–9.
- Sondenaa K, Anderson E, Nesbit I. Patient characteristics and symptoms in chronic pilonidal sinus disease. *Int J Colorectal Dis*. 1995;10(1):39–42.
- Mccallum IJD, King PM, Bruce J. Healing by primary closure versus open healing after surgery for pilonidal sinus: systematic review and meta-analysis. *BMJ*. 2008;336(7649):868–71.
- Clothier PR, Haywood IR. The natural history of the post anal pilonidal sinus. *Ann R Coll Surg Engl*. 61984;6(3):201–3.
- Brearily R. Pilonidal sinus: a new theory of origin. *Br J Surg*. 1955;43(177):62–8.
- Sondenaa K, Anderson E, Soreide JA. Morbidity and short term results in a randomised controlled trial of open compared to closed treatment of chronic pilonidal sinus. *Eur J Surg*. 1992;158(6-7):351–5.
- Doll D, Matevosian E, Wietelmann K. Family history of pilonidal sinus predisposes to earlier onset of disease and a 50% long term recurrence rate. *Dis Colon Rectum*. 2009;52(9):1610–5.
- Urhan MK, Kucukel F, Topgul K, Ozer I, Sari S. Rhomboid excision and Limberg flap for managing pilonidal sinus: results of 102 cases. *Dis Colon Rectum*. 2002;45(5):656–9.
- Yildiz MK, Ozkan E, Odaba M, Kaya B, Eris C, Abuoglu HH, et al. Karydakias flap procedure in patients with sacrococcygeal pilonidal sinus disease: experience of a single centre in Istanbul. *Scientific World J*. 2013;p. 807027. doi:10.1155/2013/807027.
- Khatri VP, Espinosa MH, Amin AK. Management of recurrent pilonidal sinus by simple V-Y fasciocutaneous flap. *Dis Colon Rectum*. 1994;37(12):1232–5. doi:10.1007/BF02257787.
- Karydakias GE. Easy and successful treatment of pilonidal sinus after explanation of its causative process. *Aust N Z J Surg*. 1992;62(5):385–9.

- Bascom J. Pilonidal disease: origin from follicles of hairs and results of follicle removal as treatment. *Surgery*. 1980;87(5):567–72.
- Topgul K. Surgical treatment of sacrococcygeal pilonidal sinus with rhomboid flap. *J Eur Acad Dermatol Venerol*. 2010;24(1):7–12. doi:10.1111/j.1468-3083.2009.03350.x.
- Khadrawy OE, Hashish M, Ismail K. Outcome of the rhomboid flap for recurrent pilonidal disease. *World J Surg*. 2009;33(5):1046–8.
- Petersen S, Koch R, Stelzner S, Wendlandt TP, Ludwig K. Primary closure techniques in chronic pilonidal sinus: a survey of the results of different surgical approaches. *Dis Colon Rectum*. 2002;45(11):1458–67.
- Mccallum, King P, Bruce J. Healing by primary versus secondary intention after surgical treatment for pilonidal sinus. *Cochrane Database Syst*. 2007;17(4):CD006213. doi:10.1002/14651858.CD006213.
- Al-Khamis A, Mccallum I, King PM, Bruce J. Healing by primary versus secondary intention after surgical treatment for pilonidal sinus. *Cochrane Database Syst*. 2010;1. Available from: http://www.cochrane.org/CD006213/WOUNDS_healing-by-primary-versus-secondary-intention-after-surgical-treatment-for-pilonidal-sinus.
- Akca T, Colak T. Primary closure with Limberg flap in treatment of pilonidal sinus-randomized clinical trial. *BJS*. 2005;5074:1081–5.
- Azab AS, Kamal MS, Saad RA, About AL, Atta KA, Ali NA, et al. Radical cure of pilonidal sinus by a transposition rhomboid flap. *BJS*. 1984;71(2):154–5.
- Mentes O, Bagci M, Biglin T, Ozgul O, Ozdemir M. Limberg flap procedure for pilonidal sinus disease: results of 353 patients. *Langenbecks Arch Surg*. 2008;393(2):185–9.
- Can MF, Sevinc MM, Hahcerliogullari O, Yilmaz M, Yagci G. Multicentre prospective randomized trial comparing modified Limberg flap transposition and Karydakias flap reconstruction in patients with sacrococcygeal pilonidal disease. *Am J Surg*. 2010;200(3):318–27.

Author biography

Ashok Kumar Nayak, Associate Professor

Sanjay Kumar Mahapatra, Assistant Professor

Akhil Unnikrishnan, Junior Resident

Samarendra Satpathy, Junior Resident

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