

Limberg Transposition Flap in Primary Pilonidal Sinus- A Case Series

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ABSTRACT

Sacrococcygeal Pilonidal Sinus (PS) is common among the young male adult population. There are multiple treatment options available ranging from non medical and surgical procedures. Medical management is not in vogue. This case series is about 10 patients with a common manifestation of serous discharge from the sinus in the sacrococcygeal region. The patients warranted a definitive cure for their condition. Though not life-threatening, it is socially embarrassing and adversely affects the quality of life in terms of education and livelihood among the young. The Limberg flap technique was advocated in all these patients, only one out of 10 patients showed wound infection. All the patients were satisfied with the surgical outcome. The surgical choices varied from simple excision to flap procedures. Overall the Limberg (rhomboid) flap technique has fewer postoperative complications and low recurrence rate and has a shorter learning curve, and is emerging as the standard of care.

Keywords: Rhomboid, Sacrococcygeal region, Wound infection

INTRODUCTION

Pilonidal sinus in Latin means “nest of hairs”. It is commonly seen in young adults and hirsute males. The prevalence in Asia is roughly 6.6% whereas in the Unites States of America (USA) it is 26/1,00,000 [1]. The pathogenesis of the disease theory has evolved over the years from congenital to a definitive acquired aetiology. The three main factors responsible were high quantity of hair, extreme force and vulnerability to infection [2]. Multiple subcutaneous sinuses and abscess formation occur following secondary infection.

Recurrence of the disease is the primordial challenge currently. The Limberg technique is employed to avoid recurrence which mainly incorporates a flap procedure that achieves primarily an off-midline closure and obliterates the natal cleft. Surgical treatment options widely practised are excision of the sinus tracts with primary closure or secondary healing [2,3].

CASE SERIES

A total of 10 patients of primary chronic pilonidal sinus who underwent Limberg flap technique in the General Surgery Department from February 2021 to February 2022 and with a median follow-up duration of one year were included [Table/Fig-1]. The mean age of all the patients was 26.5 years.

All the patients were diagnosed only clinically. The presenting symptoms of all the 10 patients in this case series had reported minimal serous discharge from the sinuses, lasting for 5-10 days. However, the disease had a waxing and waning course for nearly 1-2 years. On visual inspection, the sinus openings were identified in the midline natal cleft in single tracts. Only one patient with multiple tracts had a secondary tract 1 cm lateral to the midline [Table/Fig-2]. All the primary sinus openings were positioned within 5-8 cm in the midline.

All the patients had been preoperatively assessed with Magnetic Resonance Imaging (MRI) for any foci of abscess. The standard protocol for surgery was adhered and preoperative i.v. ceftriaxone 1 gm was administered.

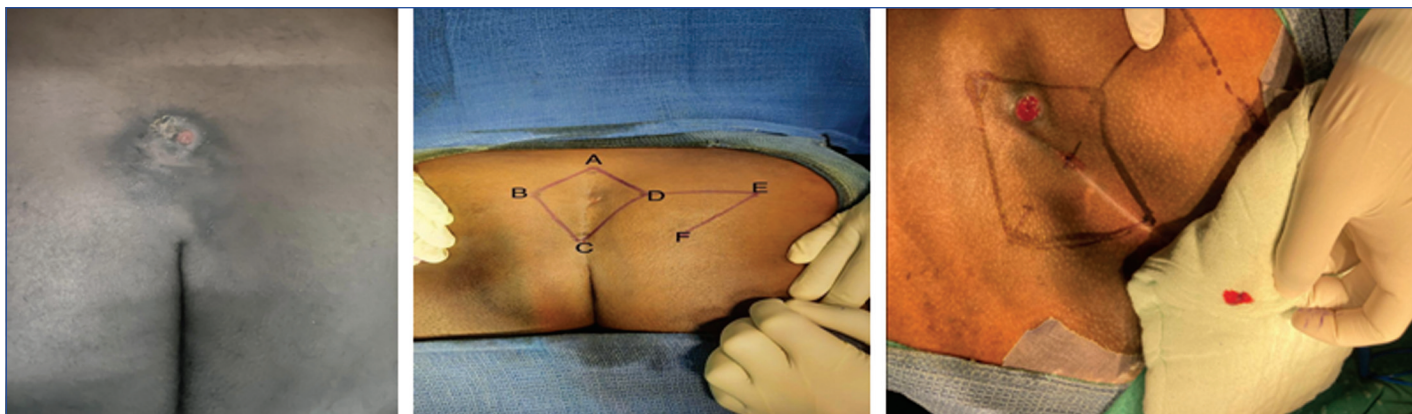
The patient was placed in a jack-knife position following spinal anaesthesia. The buttocks were retracted by adhesive tapes for exposure of the operative site. The surgical site was sterilised with 10% povidone-iodine.

Methylene blue dye was injected into the sinus. The rhomboid excision was done including all the sinus orifices in the centre.

S. No.	Age (in years)	Sex	MRI	Follow-up	Postoperative stay	Wound infection
1.	30 years	M	Single 1 cm tract	12 months	5 days	Nil
2.	19 years	F	Multiple tracts with multiple sinus largest tract 2 cm	2 months	10 days	+
3.	21 years	M	Single tract 2 cm	12 months	5 days	Nil
4.	40 years	M	0.5 cm single tract	9 months	5 days	Nil
5.	34 years	M	Single large tract of 4 cm	10 months	7 days	Nil
6.	17 years	M	Single tract of 3 cm	13 months	6 days	Nil
7.	35 years	M	Single and secondary tract of 3 cm	14 months	6 days	Nil
8.	20 years	F	Single tract of 2 cm	10 months	6 days	Nil
9.	18 years	F	Single tract of 2 cm	11 months	5 days	Nil
10.	28 years	M	Single tract of 1 cm	11 months	5 days	Nil

[Table/Fig-1]: Demographic trends/imaging/mean age and postoperative outcome.
MRI: Magnetic resonance imaging

The line AC was drawn with a ruler and marker pen at an angle of 60 degrees [Table/Fig-3]. The line BD angle was 120 degrees. The line BD transects the line AC at 60% of the AC distance. {e.g., if AC=10 cm, BD transects at 6 cm of AC}. The line BC was convexly marked and the line DC was concavely placed to lateralise the lower end of the flap (point C) avoiding the inter gluteal cleft [Table/Fig-4]. The rhomboid excision dissection was performed with both scalpel and monopolar diathermy up to the presacral fascia. The transposition flap DE and EF was fashioned including the skin, subcutaneous tissue and gluteal fascia [Table/Fig-5,6]. The flap edges were reassessed for vascularity to avoid flap necrosis. The subcutaneous tissue was approximated with vicryl 2 ‘O’ after placing a negative pressure drain [Table/Fig-7]. The skin was sutured with prolene 3 ‘O’. The flap closure was to be tension free. The patients were nursed in the prone position in the postoperative period. The suction drain was removed on the 5th Postoperative Day (POD) after



[Table/Fig-2]: Secondary tracts in pilonidal sinus. **[Table/Fig-3]:** Design of a Limberg flap. **[Table/Fig-4]:** Marked ABCD is a parallelogram BC as convex and DC as concave. (Images from left to right)



[Table/Fig-5]: Rhomboid excision. **[Table/Fig-6]:** Fully mobilised. (Images from left to right)

the discharge was <20 mL per day. Sutures were removed from the 12th to 14th POD.

Only one patient out of the 10 patients had reported minimal wound infection and it was due to the wider excision (Rhomboid) of the primary area in view of multiple sinuses [Table/Fig-8]. There were no cases of flap necrosis/reoccurrences.



[Table/Fig-7]: Upto presacral fascia. Limberg flap immediate postop with vacuum drain. **[Table/Fig-8]:** Wound infection. (Images from left to right)

DISCUSSION

The Limberg or Rhomboid flap reconstruction, which has been employed in present case series, has several advantages. It was initially designed by Dr Alexander Limberg in 1948. This design minimised the tension produced with the mobilisation of the flap to its new position. The Limberg flap, and its modifications are associated with extremely low recurrence rates (less than 5% in most studies), minimal complications, and good patient acceptance [4,5]. In a similar study by Jawade KK and Bande V, the results are comparable in terms of minor wound infection, only one patient had reported out of 10 patients [6]. Another study by Jain AKC and Thambuchetty N, also with a case series of nine patients had a complication rate of 15.79% vs present case series of 10% [7].

It is suitable for treating recurrent disease as well as with multiple sinuses, since a wide excision area is plausible. Another factor which has a beneficial impact is drain placement, which contributes to faster healing time [7]. The armamentarium of the general surgeons in cases of pilonidal disease includes several procedures. Acute PS disease is managed with incision and drainage of the abscess, which is associated with 15-40% recurrence rate [8]. These patients later require a second definitive procedure. The most popular technique practised by surgeons is the local excision with no primary closure, which has a prolonged healing time due to secondary intention of wound healing. The healing process is about 1-3 months and there is a delayed return to work. The recurrence rate ranges from 2%-35% [8,9]. Among the techniques for reconstruction after wide excision are the Karydakis flaps, the Limberg flap, the Bascom flap, the V-Y advancement flap. Bascom cleft lip procedure is a simpler technique which includes only the excision of midline pits and avoiding removal of deep tissues [10]. Modified Limberg flap is an off midline closure technique, the cephalic and caudal apex of the rhomboid is placed 2 cm from the midline, in contrast to classical Limberg flap where the apices are in the midline [11].

Many surgical procedures have been described for sacrococcygeal pilonidal disease but a consensus on the single most effective modality has not been advocated because all procedures involve complications and recurrences [8,12]. It has been widely accepted that use of flap technique by flattening and lateralisation of the natal cleft will avoid recurrence. The Karydakis technique has difficulty in mobilisation and closure for complex disease. Z-plasty and Y-V advancement flaps cover the wound defect by moving full thickness skin and subcutaneous tissue into the midline defect [8,12].

Among the flap techniques Modified Limberg flap procedure is reported to be safer and reliable technique in treatment of sacrococcygeal pilonidal disease with low complications and recurrence rates. It flattens the natal cleft with a large, well vascularised pedicle and is a particularly useful technique for complex sinuses with multiple pits and extended tracts when radical excision leaves a large defect [9,11]. Contrary to these results, a study showed Karydakis flap superior to Limberg flap [8]. Limberg flap is superior to open excision with secondary healing [12,13]. In present cases, the healing was reasonably good in all cases in the first week after surgery which is supported by the shorter hospital stay.

CONCLUSION(S)

Rhomboid excision with the Limberg transposition flap technique is observed to be a safe modality for the management of primary pilonidal disease and also includes multiple sinuses. It has fewer postoperative complications and a shorter hospital stay.

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REFERENCES

- [1] Duman K, Girgin M, Harlak A. Prevalence of sacrococcygeal pilonidal disease in Turkey. *Asian J Surg*. 2017;40(6):434-37. Doi: 10.1016/j.asjsur.2016.04.001. Epub 2016 May 14. PMID: 27188235.
- [2] Kang AS, Kang KS. Rhomboid flap: Indications, applications, techniques and results. A comprehensive review. *Ann Med Surg (Lond)*. 2021;68:102544. Doi: 10.1016/j.amsu.2021.102544. PMID: 34285803; PMCID: PMC8278203.
- [3] Aithal SK, Rajan CS, Reddy N. Limberg flap for sacrococcygeal pilonidal sinus a safe and sound procedure. *Indian J Surg*. 2013;75(4):298-301. Doi: 10.1007/s12262-012-0489-5. Epub 2012 May 6. PMID: 24426457; PMCID: PMC3726804.
- [4] Boshnaq M, Phan YC, Martini I, Harilingam M, Akhtar M, Tsavellas G. Limberg flap in management of pilonidal sinus disease: Systematic review and a local experience. *ActaChir Belg*. 2018;118(2):78-84. Doi: 10.1080/00015458.2018.1430218. Epub 2018 Feb 1. PMID: 29390948.
- [5] Topgül K. Surgical treatment of sacrococcygeal pilonidal sinus with rhomboid flap. *J Eur Acad Dermatol Venereol*. 2010;24(1):07-12. Doi: 10.1111/j.1468-3083.2009.03350.x. Epub 2009 Jul 13. PMID: 19627408.
- [6] Jawade KK, Bande V. Study of clinical profile, surgical interventions and outcome in a series of patients with pilonidal disease. *IntSurg J*. 2019;6:4512-16.
- [7] Jain AKC, Thambuchetty N. Management of pilonidal sinus disease: A 5 years retrospective analysis. *Int Surg J*. 2016;3(2):586-88.
- [8] Kumar NA, Sutradhar P. Karydakias procedure for sacrococcygeal pilonidal sinus disease: Our experience. *Indian journal of plastic surgery: Official publication of the Association of Plastic Surgeons of India*. 2014;47(3):40.
- [9] Karaca T, Yoldaş Ö, Bilgin BÇ, Özer S, Yoldaş S, Karaca NG. Comparison of short-term results of modified Karydakias flap and modified Limberg flap for pilonidal sinus surgery. *International Journal of Surgery*. 2012;10(10):601-06.
- [10] Rabea M. Bascom's cleft lift versus rhomboid flap procedure for the management of primary sacrococcygeal pilonidal sinus. *The Egyptian J of Surgery*. 2015;34(3):146-51.
- [11] Khan KJ, Ghaffar A, Choudhary S, Irshad K. Comparison of early outcome between modified limberg and karydakias flap procedures in patients with sacrococcygeal pilonidal sinus. *PJMHS*. 2016;10(2):631-34.
- [12] Singh PK, Gohil RK, Saxena N. Limberg flap procedure for sacrococcygeal pilonidal sinus: A prospective study. *Int Surg J*. 2017;4(7):2238-42.
- [13] Ray K, Albendary M, Baig MK, Swaminathan C, Sains P, Sajid MS. Limberg flap for the management of pilonidal sinus reduces disease recurrence compared to Karydakias and Bascom procedure: A systematic review and meta-analysis of randomized controlled trials. *Minerva Chir*. 2020;75(5):355-64. Doi: 10.23736/S0026-4733.20.08362-5. Epub 2020 Sep 25. PMID: 32975384.

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