Original Article

LIMBERG FLAP PROCEDURE FOR SACROCOCCYGEAL PILONIDAL SINUS- A PERMANENT CURE TO THE DISEASE

Dr. Anuradha Dnyanmote[1], Dr. Abhinav Arigela[2*], Dr. Pravin Mane[3]

[1] Professor, Department of General surgery, Dr. D.Y. Patil medical college and hospital.
[2] Resident, Department of surgery, Dr. D.Y. Patil Medical college and hospital.
[3] Resident, Department of General surgery, Dr. D.Y. Patil medical college and hospital.
Corresponding Author: Dr. Abhinav Arigela, Resident, Department of surgery, Dr. D.Y. Patil Medical college and hospital.

DOI: 10.47750/pnr.2023.14.S02.58

Abstract

Background: Sacrococcygeal pilonidal sinus (SC-PSD) is an acquired condition usually seen in young adults especially males associated with high recurrence rate after surgery.Many conventional surgical procedures are described for its management with their merits and demerits.The present study aims to evaluate the efficacy and determine effects of the Limberg flap rotation and its feasibility to the patients, their compliance, and outcomes such as wound infection, post- operative pain relief, recurrence rates, and return to work.

Methods: 25 consecutive patients underwent Limberg flap reconstruction between January 2021 to may 2022 and were evaluated for various parameters.

Results: All patients successfully underwent surgery, with very minimal postoperative pain, average hospital stay for 5 days, returned to work after 2 weeks with 1 patient having seroma, 1 having flap edema, 1 developed wound infection and no recurrences so far.

Conclusions: Limberg flap reconstruction after excision of sacrococcygeal pilonidal sinus is an effective and reliable technique, easily performed, with high patient satisfaction, associated with complete cure and low incidence of post-operative complications.

Keywords: Limberg flap, Pilonidal sinus, Sacrococcygeal, Sacrococcygeal pilonidal sinus (SC-PSD).

Introduction

Pilonidal sinus is a common disease and is found in the midline of the sacrococcygeal region of young hirsute men.The name pilonidal is taken from Latin meaning **"**nest of hairs."It generally presents as a cyst, abscess or sinus tracts with or without discharge. Men affected more often than women, rare both before puberty and after the age of 40 years.[1]It is essentially a cleavage between the buttocks (i.e., natal cleft), and diagnosis is made by identifying the epithelialized follicle opening (i.e., sinus).

The aetiology of the pilonidal sinus is a matter of debate. Mayo in 1833 described it as congenital origin that was secondary to a remnant of an epithelial lined tract from post coccygeal epidermal cell rests or vestigial scent cells.[2]Now the view widely shifted toward acquired theory[2] and is based on the observations that congenital

tracts do not contain hair and are lined by cuboidal epithelium. Karydakis proposed three main factors causing the disease, namely high quantity of hair, extreme force, and vulnerability to infection.[3]

Diagnosis is usually clinical and presentation is usually a chronic inflammation or a sinus with persistent discharge or acutely there may be an abscess or multiple subcutaneous tracts.

Pilonidal sinus can be treated using several defined conservative and surgical methods but recurrence rates remain high.[4] Complete removal of the pilonidal sinus or sinuses and reconstruction of the defect give successful recovery.[5]

The management varies from clipping of hairs with good hygiene of the area, wide excision of the area, and newer flap procedures, but none is widely accepted.Excision and packing, excision and primary closure, marsupialization and flap techniques like Limberg flap,[6] modified Limberg transposition flap,[7] elliptical rotation flap[8]and rotation advancementfasciocutaneousflap[9] are the surgical procedures that have been suggested for the treatment.

Amongst different surgical methods for treatment of sacrococcygeal pilonidal sinus, flap reconstruction techniques eradicate the aetiology of the disease by flattening the inter gluteal sulcus with much less hairy fasciocutaneous flaps and less perspiration,[10] the most commonly used is the rhomboid excision with the Limberg flap. With this technique of flattening the natal cleft, a tension-free repair is made using a wide, well-vascularized flap. It is reported as one of the best treatment methods, with a 0-16 % of surgical area-related complication and a recurrence rate of 0-5 %.[11]

This article evaluates the use of Limberg flap, which is based on the superior gluteal and sacral perforators for reconstruction of the sacrococcygeal region after excision of pilonidal sinus.

Limberg rhomboid flap for sacrococcygeal pilonidal sinus was designed by Limberg in 1946, [12] who described a technique for closing a 60 ° rhombus-shaped defect with a transposition flap. This flap was easy to perform, with sutures away from the midline giving rise to a tensionless flap of unscarred skin in the midline, which helps in good hygiene maintenance, reducing sweating maceration, erosions, and scar formation.

Hence, this study was performed in our setup to evaluate the usefulness of Limberg flap procedure in sacrococcygeal pilonidal sinus, patient compliance, complications, and long-term recurrence rates following the procedure.

Material and methods

The study involves 25 patients, from January 2021to may 2022. Most of the patients were males; of those 6 were females. Average age was 24 years—the oldest was 29 years and the youngest was 15 years.All patients were subjected to complete history taking and routine clinical, local examination and laboratory investigations. Written and informed consent was obtained from all patients after explanation of the procedure and expected results of the flap in this area. Data of the patients were collected from the forms, which were created preoperatively and used for postoperative follow up period, for each patient. The patients having other local pathologies like eczematous, fungal or other deforming pathologies were excluded from the study. All the patients underwent Limberg flap reconstruction as the surgical procedure.

Surgical procedure:

The natal cleft was shaved the day before surgery. Cefotaxime 1 gram and Metronidazole 500 mg were administered intravenously prophylactically before placing incision. All operations were performed under spinal anaesthesia. Patients were placed in prone position and the buttocks strapped apart by adhesive tapes.

Using a sterile skin-marking pen a rhomboid area of skin was marked over pilonidal sinus involving all midline pits and lateral extension if any. The flap design was mapped on the skin (Figure 1). The long axis of the rhomboid in midline was marked as A-C, C being adjacent to perianal skin, A placed so that all diseased tissues can be

included in the excision. The line B-D transected the midpoint of A-C at right angles and is 60 % of its length. D-E was a direct continuation of the line B-D and was of equal length to the incision B-A, to which it was sutured after rotation. E-F was parallel to D- C and of equal length(Figure 1). After rotation, it was sutured to A- D .[13] A rhombic-shaped excision of the sinus-bearing skin and subcutaneous tissue up to the pre-sacral fascia was done by electrocautery(Figure)

Figure 1

Figure 2

Then elevation of perforator-based Limberg flap (based on the superior gluteal and sacral perforators according to the study done by Koshimaetal on a cadaver dissection)[14] in the same manner(Figure 3) and the level of dissection is pre muscular fascia, good haemostasis achieved and the adhesive tapes which retracted the buttocks were released to allow suturing of the flap without tension(Figure 4).A right or left sided fasciocutaneousLimberg transposition flap, incorporating the gluteal fascia, was fully mobilized on its inferior edge and transposed medially to fulfil the Limberg defect

The defect thus created was closed in linear fashion . Interrupted Vicryl 2-0 sutures to include fascia and fat were placed over a vacuum drain, and then finally the skin was closed with Ethilon 2-0 .[15] The operation produces a tension-free flap of unscarred skin in the midline. Antibiotics were given for 7 days initially intravenously, then orally, suction drain removed after 2 days, staples removed around 10th day. The patient was advised not to put pressure on the flap for 3 weeks. All the patients were evaluated for flap healing, seroma formation, oedema, flap necrosis, surgical site infection, pain and length of hospital stay.

The objective grading of pain was done by visual analogue scale. The patients were followed at 1 and 6 months after surgery.

Figure 3

Figure 4

Results

In this study 25 patients were included. Among them 19 were males and 6 were females. Mean age was 24 years (range 15–29 years). Of the 25 patients, 11 had primary disease, 5 had recurrent disease, and 9 came up after having previous incision and drainage for abscess.

All patients came with pilonidal sinus, from January 2021 were assessed for its severity and investigated, and then they underwent Limberg flap surgery under spinal anesthesia. Postoperatively patient made to lie on sides, then made them ambulant after first postoperative day, with drain in situ. The patient received antibiotics and regular dressing of the wound. Drain was removed approximately on the second postoperative day, following which the patient got discharged with advice of not to pressure for 3 weeks. Sutures were removed during follow-up around 10th day. All patients are followed up initially 2 weekly interval, then bimonthly for next 1 year. Two patients had complications - one had flap necrosis and the other had persistent serous discharge from the wound. It took 3 weeks to heal completely with diligent dressing and usage of antibiotics. One patient had flap edema, which resolved by 10 days. One had persistent discharge at the tip which took 4 weeks to settle down, since he was HbsAg positive and had two surgeries before. All other patients wound healed nicely with minimal scarring, with very less postoperative pain, with no recurrence so far. None needed readmission due to pilonidal sinus, and most patients returned to work after 3 weeks.

Discussion

Sacrococcygeal pilonidal sinus is blind epithelial tract situated in the skin of the natal cleft, close to anal verge, generally containing hair. The etiology is matter of debate; initially congenital origin was thought of which is now given up. Main causes for the formation of this sinus are hirsutism, sweating in the area, repeated maceration due to trauma, leading to breakage of the skin barrier, attracting hair inside which initiates a foreign body reaction leading to infection with abscess or sinus formation.

Surgical treatment for this sinus is by the way of excision of the diseased tissue down to the sacrococcygeal fascia, but the next step of what to do with defect is a matter of concern. In this regard, one has to take into account of patient compliance, postoperative pain, infection and recurrence rates, hospital stay, frequent wound dressings, and cosmetic outlook with preservation of the bottom.

Reconstruction of the defect with Limberg flap has many advantages as it is easy to perform and design, and it flattens the natal cleft with large vascularized pedicle, sutured without tension. This in turn maintains good hygiene, reducing the friction, preventing maceration, and avoiding scar in the midline. This flap procedure found better than simple excision and closure, marsupialization, [16,17] other flap procedures such as bescom and Karydakis.[18,19] Several series reported recently about the usefulness of this flap in treatment for sacrococcygeal pilonidal sinus have been comparable with our series in terms of complications and recurrences. Katsoulis had 25 patients, with 16 of them having complications with no recurrences.[20] Aslam had 110 patients, with 5 of them having complications and 1 recurrence. [21] Mentes and Urhan were other studies. [22,23] In our series we had two complex wound infections, three minor flap edemas, and one flap tip discharge—all healed in due time. No recurrence was reported so far.

Conclusion

Sacrococcygeal pilonidal sinus is challenge to both the patient and the treating physician because of its repeated infection, persistent pain with discharge, and high recurrence rates with regular procedures. Following Limberg flap reconstruction after excision of the pilonidal sinus, the patient got immense relief from the weeping and smelling bottom without distortion of the contour of the bottom.

The technique is easy to perform in quick time, useful in both primary and recurrent diseases, with very low complication and recurrence rates, which further can be reduced by meticulous skin closure, without skin edge eversion, with a wide flap to obliterate the midline natal cleft.

Other advantages are quick healing time, short hospital stay, and early return to daily life.

Acknowledgments

Authors would like to thank their patients who gave them the opportunity to serve and learn.

Funding:

No funding sources

Conflict of interest:

None declared

Ethical approval:

The study was approved by the institutional ethics committee

References

1. Clothier PR, Haywood IR. The natural history of the post anal pilonidal sinus. Ann R College Surg England. 61984;6(3):201-3

2. Brearley R (1955) Pilonidal sinus: a new theory of origin. Br J Surg 43:62–68

3. Karydakis GE. Easy and successful treatment of pilonidal sinus after explanation of its causative process. Aust NZJ Surg. 1992;62:385-9.

4. 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.

5. Yildiz MK, Ozkan E, Odaba M, Kaya B, Eris C, Abuoglu HH, et al. Karydakis flap procedure in patients with sacrococcygeal pilonidal sinus disease: experience of a single centre in Istanbul. Scientific World J. 2013.

6. Eryilmaz R, Sahin M, Alimoglu O, Dasiran F. Surgical treatment of sacrococcygeal pilonidal sinus with the limberg transposition flap. Surg. 2003;134(5):745-9.

7. Cihan A, Ucan BH, Comert M, Cesur A, Cakmak GK, Tascilar O. Superiority of asymmetric modified Limberg flap for surgical treatment of pilonidal disease. Dis Colon Rectum. 2006;49(2):244-9.

8. Nessar G, Kayaalp C, Seven C. Elliptical rotation flap for pilonidal sinus. Am J Surg. 2004;187:3.

9. Schoeller T, Wechselberger G, Otto A, Papp C.Definite surgical treatment of complicated recurrent pilonidal disease with a modified fasciocutaneous VY advancement flap. Surg. 1997;121(3):258-63.

10. Khatri VP, Espinosa MH, Amin AK. Management of recurrent pilonidal sinus by simple V-Y fasciocutaneous flap. Dis Colon Rectum. 1994;37:1232e-5.

11. Topgul K. Surgical treatment of sacrococcygeal pilonidal sinus with rhomboid flap. J EurAcad Dermatol Venereol. 2010;24:7e-12.

12. Wolfe SA, Limberg AA, M.D., 1894-1974 (1975) Plastic and reconstructive surgery 56(2):239–240

13. Farquharson EL, Rintoul RF. Farquharson's textbook of operative general surgery. 9th edn. Hodder Arnold publication; London: 2005:457-458.

14. Koshima I, Moriguchi T, Soeda S, Kawata S, Ohta S, Ikeda A. The gluteal perforator-based flap for repair of sacral pressure sores. PlastReconstr Surg. 1993;91(4):678-83.

15. Kapan M, Kapan S, Pekmezci S, Dugun V. Sacrococcygeal pilonidal sinus disease with Limberg flap repair. Tech Coloproctol. 2002;190:388-92.

16. Akca T, Colak T (2005) Primary closure with Limberg flap in treatment of pilonidal sinus-randomized clinical trial. BJS 5074:1081–1084

17. Azab AS, Kamal MS, Saad RA, Abount AL, Atta KA, Ali NA (1984) Radical cure of pilonidal sinus by a transposition rhomboid flap. BJS 71(2):154–155

18. Mentes O, Bagci M, Biglin T, Ozgul O, Ozdemir M (2008)Limberg flap procedure for pilonidal sinus diseased: results of 353 patients. Langenbecks Arch Surg 393(2):185–189

19. Can MF, Sevinc MM, Hahcerliogullari O, Yilmaz M, Yagci G (2010) Multicenter prospective randomized trial comparing modified Limberg flap transposition and Karydakis flap reconstruction in patients with sacrococcygeal pilonidal disease. Am J Surg 200(3):318–327

20. Katsoulis IE, Hibberts F, Carapeti EA (2006) Outcome of treat- ment of primary and recurrent pilonidal sinus with Limberg flap. Surgeon 4(1):7–10, 62

21. Aslam M, Choudhry A (2009) Use of Limberg flap for pilonidal sinus—a viable option. J Ayub Med Coll Abbottabad 21(4)

22. Urhan MK, Kuckel F, Topgul K, Ozer I, Sari S (2002) Rhomboid excision and Limber flap for managing pilonidal sinus: results of 102 cases. Dis Colon Rectum 45:656–659

23. Mentes BB, Leventoglu S, Cihan A, Tatlicioglu E, Akin M, Oguz M (2004) Modified Limberg transposition flap for sacrococcygeal pilonidal sinus. Surg Today 34(5):419–423