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Outcome Of Limberg Flap Reconstruction for Pilonidal Sinus

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Abstract:

Pilonidal sinus over sacrococcygeal area is an acquired condition which affects young male adults usually. We did a retrospective chart review in the department of general surgery, Kalinga Institute of Medical Sciences, Bhubaneswar, for patients who underwent Limberg flap repair for pilonidal sinus from sept 2015 to sept 2021 (6 years and 8 months). A total of 49 patients with 40 males and 9 females respectively , were operated and they had a minimal post operative pain ,average post operative hospital stay of 6 days and early return to work in 3 weeks. Four out of 49 patients developed seroma, out of which 1 was lost to follow up. Remaining 3 took two weeks to heal with regular dressings and no recurrence so far. One patient developed stitch granuloma and was treated conservatively. Hence, Limberg flap for sacrococcygeal pilonidal sinus was found to be very useful in terms of post operative pain, infection rate, patient compliance, early return to work and almost nil recurrence rates.

Keywords: Pilonidal sinus; Limberg flap repair; Kalinga Institute of Medical Sciences; Limberg flap reconstruction.

Introduction:

Pilonidal sinus disease, a chronic and often recurrent condition, has plagued individuals for decades, causing significant morbidity and impacting their quality of

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life [1]. The management of pilonidal sinus has evolved over the years, with various surgical techniques being developed to address this challenging problem [2]. One such technique that has gained recognition for its efficacy and favorable outcomes is the Limberg flap reconstruction [1].

Pilonidal sinus, also known as "jeep seat disease" or "intergluteal pilonidal disease," typically presents as a painful and inflamed cyst or abscess in the natal cleft, situated just above the coccyx [2]. The condition predominantly affects young adults, especially males, and can lead to recurrent infections, pain, and discomfort [4]. The traditional treatment for pilonidal sinus involved wide excision and primary closure, but this approach often resulted in a high recurrence rate and prolonged postoperative recovery [5]. The name pilonidal is taken from Latin meaning “nests of hairs” estimated incidence is 26 per 1,00,000 people [1,2]. It generally presents as a cyst, abscess or sinus tract with or without discharge [3]. Men are affected more often than women [1] and its rare before puberty and after 40 years of age [4].

In the quest for better surgical techniques, the Limberg flap reconstruction emerged as a promising alternative [5]. Named after the Russian surgeon Alexander Limberg, who introduced it in the mid-20th century, this procedure involves the creation of a rhomboid-shaped skin flap in the gluteal region to cover the defect left after excising the sinus and its associated tracts [3]. The flap is then rotated and sutured in place, effectively reconstructing the area while minimizing tension on the wound [1].

Several factors have contributed to the growing popularity of the Limberg flap reconstruction for pilonidal sinus management [2]. First and foremost, this technique addresses one of the primary concerns in pilonidal sinus surgery: wound closure without tension [2]. By utilizing a local flap, the Limberg procedure avoids the need for extensive undermining of surrounding tissue and the resultant dead space, reducing the risk of hematoma and seroma formation, which are common complications of other surgical approaches [4].

While the Limberg flap reconstruction has garnered praise for its potential advantages, it is essential to evaluate its overall outcomes in the management of pilonidal sinus disease [2]. Numerous studies and clinical experiences have reported favorable results

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with this technique [1-5]. Recurrence rates following Limberg flap reconstruction have been consistently lower compared to primary closure techniques, with some studies reporting recurrence rates as low as 2-5% [3]. Moreover, patient satisfaction with the Limberg flap reconstruction tends to be high, thanks to the reduced postoperative pain, shorter hospital stays, and better cosmetic outcomes [8-10]. Patients often experience a quicker return to their daily activities and report improved overall quality of life.

Materials And Methods:

In Limberg flap reconstruction, patient is under spinal anaesthesia, in prone position with buttocks strapped outwards to table using wide plaster (Fig 1 a). After cleaning and draping (Fig 1b), a rhomboid shaped area of skin was marked over the sacrococcygeal pilonidal sinus including any lateral extensions (Fig 1c).The angle of the excised area of skin were 120-degree at the medial and lateral aspects .Methylene blue dye injection is done to the sinus for delineation of sinus tract (Fig 1d) and sinus opening approximated to avoid spillage of dye outside (Fig 1e) .

Fig 1 (a-e): Steps of Limberg procedure

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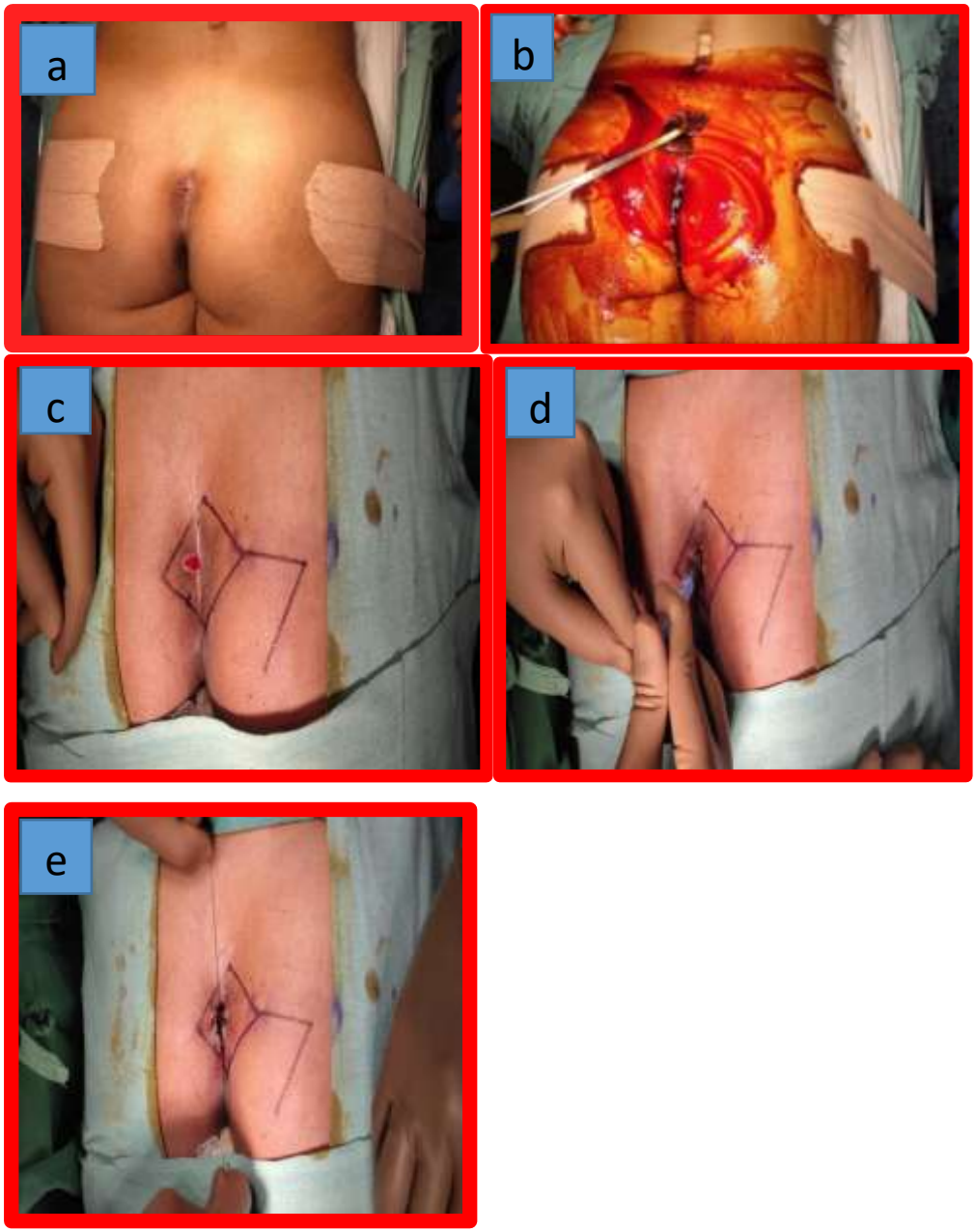

The skin and the subcutaneous tissue of the rhomboid shaped area was incised and elevated at the level of the pre-sacral fascia and above the gluteus maximus fascia (Fig 1 f). All affected tissue was excised (Fig 1g). A Limberg flap was then designed with limb length comparable in size to the rhomboid shaped defect (Fig 1h). Hemostasis was achieved and the wound was thoroughly irrigated. A number 14 Romovac suction drain was given underneath (Fig 1k) and Limberg flap reconstruction was then transposed into the defect (Fig 1l). Buttocks strap should be released before suturing. The flap and the donor site were closed using subcutaneous

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absorbable sutures ,first sutures should be placed over the angles followed by other sutures (Fig 3 m). Pressure dressing is placed .

Fig 1 (f-m):

The vascular territory of the Limberg flap is supplied by the lateral sacral and superior gluteal arteries arising from the posterior division of the internal iliac artery. The lateral sacral arteries enter the anterior sacral foramina in the pelvis and exit through the corresponding posterior sacral foramina, supplying the skin and the muscles of the posterior surface of the sacrum and forming abundant vascular communication with branches of the superior gluteal artery over the gluteus maximus muscle [6]. It is

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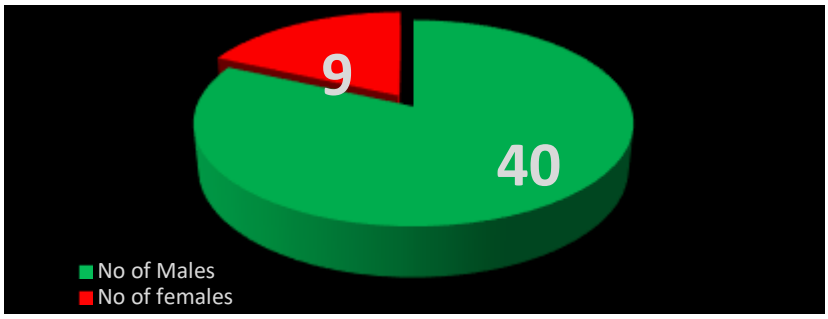
therefore possible to design the Limberg flap as a random pattern cutaneous flap which can be transposed medially to fill the defect remaining after pilonidal sinus excision .Designed as a random pattern cutaneous flap and not a perforator flap ,the blood supply to the Limberg flap does not come from a single recognized artery ,but many small unnamed vessels (the majority of which are derived from lateral sacral and superior gluteal arteries.

Results:

In this study of 49 patients ,81.63 % were males and 18.36 % were females (Graph 1) and 75.51 % were between 16-25 years and 24.49 % were more than 25 years.

Graph 1: Gender



All patients were assessed for severity, investigated and then they underwent Limberg flap surgery. Post operative patient were made to lie on sides and then made to ambulate after first post operative day with drain in situ. The patient received antibiotics and regular dressing of the wound. Drain was removed between post-operative day 5 to 7. Suture was removed on follow up visit on around 10th post operative day (Fig 4). Patient was discharged with advice of not to apply pressure on the operative region for 3 weeks.

Fig 4 : POD 10 :After suture removal

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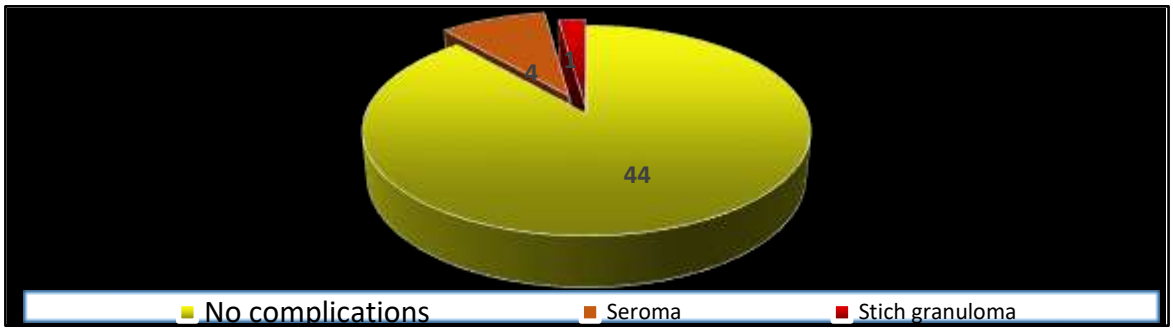
All patients are followed up for a duration of 1 month and then as and when required by the patient. 4 patients had complication of seroma formation, out of which 1 was lost to follow up. Patient with seroma took 2 weeks to heal with regular dressings. One patient developed stich granuloma which was managed conservatively. No recurrence so far.

Graph 3: Complications



All other patients wound healed well with minimum scarring very less post operative pain and with no recurrence so far. None needed readmission due to pilonidal sinus and most patients returned to work after 3 weeks .

Discussion:

The occurrence of midline pilonidal illness is widespread. According to previous research [5-6], there is a positive correlation between the depth of the intergluteal sulcus and the anaerobic nature of the environment, as well as the abundance of anaerobic bacteria present.

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Furthermore, there is a prevailing belief that the suction action generated by substantial gluteal muscles plays a role in the pathogenesis of pilonidal illness. The phenomenon of suction induces the migration of anaerobic microorganisms, hair, and detritus towards the subcutaneous adipose tissue. If the causative elements contributing to the initiation of the disease are not eradicated, they will also exert a substantial influence on the reoccurrence of the disease [7-8].

Despite the existence of various surgical and nonsurgical therapy modalities, the most effective therapeutic approach for pilonidal illness remains undetermined. The surgical removal of the sinus in its entirety is a frequently performed technique; nevertheless, there is ongoing debate regarding the subsequent management of the lesion following excision. According to the source cited as [9-13], various surgical procedures have been developed for the management of pilonidal sinus, including excision and packing, excision and primary closure, marsupialization, and flap approaches [10].

Surgeons have developed ways to address the challenges posed by a persistent congenital cleft following pilonidal sinus surgery, in order to effectively eliminate the gluteal furrow [11]. According to Bascom's hypothesis, the process of infection commences within the exposed orifices of hair follicles, hence triggering the development of both infection and sinus [1,2]. The author proposed the removal of the midline fissures through excision, accompanied by the implementation of lateral open drainage to address any abscesses that may be linked to them [3]. Karydakis employed an asymmetrical excision technique coupled with primary closure in order to mitigate the ingress of hair into the natal fissure [5].

In this method, the natal cleft undergoes compression, resulting in the lateral transfer of both the incisional line and scar from the midline. A range of plastic reconstructive procedures, including Z-plasty, W-plasty, V-Y plasty, and flap techniques, have been employed to address the issues of natal cleft and wound tension. The user's text does not contain any information to rewrite [11,12].

Currently, the adipo-fasciocutaneous flap, the traditional Limberg flap, and the modified Limberg flap procedures are widely recognized and commonly utilized in

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clinical practice. In comparison to open packing and marsupialization techniques, excision and primary closure have been documented to yield expedited recovery and faster resumption of occupational activities. A significant proportion of patients often resume their occupational activities within a period of three to four weeks. The user's text does not contain any information to rewrite. Nevertheless, there is a significant incidence of problems associated with tissue tension, despite reports of favorable results from certain surgeons who have employed primary closure [13,14].

The utilization of flap procedures has been correlated with reduced rates of infection and recurrence, a decreased duration of hospitalization, and enhanced cosmetic results. By employing this technique, it is possible to achieve the flattening of the internal fissure and the alignment of tissue without the presence of stress.

Emphasis should also be placed on the significance of post-operative wound care. After refraining from physical activity and maintaining immobility for a period of two weeks, it is imperative for the patient to gradually reintegrate into their regular routines. In order to eliminate any residual hair, it is necessary to trim the edges of the wound. It is imperative to ensure the continuation of this practice until the wound has achieved full healing, and ideally, to sustain it eternally.

We imply that sacrococcygeal pilonidal sinus is a dilemma for the patient due to the weeping and odorous bottom, as well as for the treating surgeon due to repeated infection, persistent pain with discharge, and high recurrence rates with routine procedures. Limberg flap reconstruction facilitates the excision of the pilonidal sinus without distorting the bottom's contour. This technique is simple to perform in a short amount of time, with a brief hospital stay, an early return to daily activities, and extremely low rates of complications and recurrence, which can be further decreased by meticulous skin closure without skin edge eversion and with a wide flap to obliterate the midline natal cleft. It has been determined that the Limberg flap procedure is superior to simple excision and closure, marsupialization [8, 9], and other flap procedures.

Conclusion:

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When it comes to treating pilonidal disease, the Limberg flap has been shown to be highly effective, with few complications, short hospital stays, low recurrence rates, quicker healing, and less time lost from work. The operation does not require much expertise. For patients with Pilionidal sinus, we advise considering Limberg flap surgery.

Conflict of interest:

There is no conflict of interest among the authors of the present study.

References:

1. Cai Z, Zhao Z, Ma Q, Shen C, Jiang Z, Liu C, Liu C, Zhang B. Midline and off‐midline wound closure methods after surgical treatment for pilonidal sinus. The Cochrane Database of Systematic Reviews. 2022;2022(5).
2. Berthier C, Bérard E, Meresse T, Grolleau JL, Herlin C, Chaput B. A comparison of flap reconstruction vs the laying open technique or excision and direct suture for pilonidal sinus disease: A meta‐analysis of randomised studies. International Wound Journal. 2019 Oct;16(5):1119-35.
3. Herrod PJ, Doleman B, Hardy EJ, Hardy P, Maloney T, Williams JP, Lund JN. Dressings and topical agents for the management of open wounds after surgical treatment for sacrococcygeal pilonidal sinus. Cochrane Database of Systematic Reviews. 2022(5).
4. Bi S, Sun K, Chen S, Gu J. Surgical procedures in the pilonidal sinus disease: a systematic review and network meta-analysis. Scientific reports. 2020 Aug 13;10(1):13720.
5. Kumar M, Clay WH, Lee MJ, Brown SR, Hind D. A mapping review of sacrococcygeal pilonidal sinus disease. Techniques in Coloproctology. 2021 Jun;25:675-82.
6. Humphries AE, Duncan JE. Evaluation and management of pilonidal disease. Surgical Clinics. 2010 Feb 1;90(1):113-24.

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7. Søndenaa K, Andersen E, Nesvik I, Søreide JA. Patient characteristics and symptoms in chronic pilonidal sinus disease. International journal of colorectal disease. 1995 Feb;10:39-42.
8. Hull TL, Wu J. Pilonidal disease. Surgical Clinics. 2002 Dec 1;82(6):1169-85.
9. Clothier PR, Haywood IR. The natural history of the post anal (pilonidal) sinus. Annals of the Royal College of Surgeons of England. 1984 May;66(3):201.
10. Wolfe SA. ALEXANDER A. LIMBERG, MD, 1894–1974.
11. 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. Journal of British Surgery. 2005 Sep;92(9):1081-4.
12. KANUNGO A, MISHRA S, MOHAPATRA SS, NAIR P, BEHERA CR. Outcome Of Limberg Flap Reconstruction For Pilonidal Sinus. Journal of Pharmaceutical Negative Results. 2023 Feb 6:704-8.
13. 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. Journal of British Surgery. 2005 Sep;92(9):1081-4.
14. Azab AS, Kamal MS, Saad RA, Abou al Atta KA, Ali NA. Radical cure of pilonidal sinus by a transposition rhomboid flap. British journal of surgery. 1984 Feb;71(2):154-5.