



Limberg's Flap Technique for Pilonidal Sinus Disease Treatment: Our Experience

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ABSTRACT:

Pilonidal sinus disease is an acquired condition usually effects adult males. The disease is characterized by a presence of one or multiple sinuses in natal cleft. There are various treatment methods described in literature, ranging from incision and drainage, marsupialization, simple primary closure and various flap procedures. Out of all procedures, Limberg's flap followed by rhomboid excision showed promising results in literature in terms of low recurrence, less post-operative pain and other complication.

Methodology: We performed an observational study at Hamdard University Hospital from 1st July 2015-30th June 2019 on patients came in outpatient department for the treatment of pilonidal sinus diseases. Patients presentation varied from single sinus and dry, multiple sinus and dry, single sinus with serous discharge, single sinus with pus discharge and pilonidal abscess. Forty-six patients were selected after applying inclusion and exclusion criteria and operated by Limberg's flap technique.

Result: Results were observed for postoperative seroma, hematoma, wound infection, persistent pain and recurrence. Out of 46 patients, 30(65.21%) were male and 16(34.7%) were female. 28 patients (60.8%) were between 31-40 years of age and 12 patients (26.08%) were between 41-50 years of age. After performing Limberg's flap procedure, 35 patients (76%) had no complications at all. 2 patients (4.3%) had seroma formation. 4 patients had Hematoma formation (8.6%). 2 patients (4.3%) patients developed superficial wound infection. 2 patients (4.3%) had persistent pain after 3 months of procedure. 1 patient (2.1%) had recurrence during the follow-up period of 12 months.

KEY WORDS: Pilonidal sinus disease, Limberg's flap, natal cleft.

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I. INTRODUCTION:

The term *pilo-nidal* is derived from Latin meaning "nest of hair."¹ This is a common condition usually seen in young adults mostly involving male population.² The etiology and pathogenesis of this disease is not clearly identified but it is considered as an acquired disease.³ The sinus forms in a cleavage between the buttocks (i.e., natal cleft). The disease usually presents as a cyst, abscess, or sinus tracts with or without pus/serous discharge. It may have an acute, chronic, symptomatic or asymptomatic course. The commonest form is an acute abscess characterized by the presence of a midline pit in the natal cleft typically identified 4 to 8 cm away from the anus with the smooth overlying skin giving the opening a smooth edge.⁴ This primary tract leads into a subcutaneous cavity, which contains granulation tissue and usually a nest of hair that are present in two thirds of cases in men and in one third of those in women and may be found projecting from the skin opening.⁵ This is not a serious condition, but if not treated, it can become a chronic disease which is more complex and characterized by chronic or recurrent abscesses with extensive, branching sinus tracts.⁶ Most of the patients have secondary lateral openings 2 to 5 cm above the midline pit.⁵ The outer skin opening and the superficial portion of the tract are lined with squamous cell epithelium, but the deep cavity and its extensions are not.⁷ It hinders with daily activities and ability to work due to its high rate of recurrence and morbidity associated with it.

The estimated incidence is 26 per 100,000 populations.⁸ It is rare both before puberty and after the age of 40 years.⁹ The disease is also associated with obesity (37%), sedentary occupation (44%) and local irritation or trauma (34%).¹⁰

There is no clinical mutual consensus on the optimal management of the pilonidal sinus. Various management options are described but there is no agreement on the gold standard method as the recurrence remains high, which ranges from 20–40 % as suggested by different studies regardless of the technique.¹¹ The management depends on the presentation of pilonidal sinus disease. Surgery is considered as the mainstay of treatment and ranges from clipping of hair with maintenance of good hygiene, simple incision and drainage to a limited or wide local excision with packing and dressings, marsupialization, simple primary closure or extensive reconstructive procedures that includes flap reconstruction to cover the defect.¹² Various reconstructive procedures are practiced including midline, Z plasty, Karyadakis, Limberg's flap, V-Y flap and Bascom's procedure etc. Each of these procedures have their own pros and cons, ranging from length of the procedure, hospital stay, infection and recurrence.¹³ There are many factors which attributed to recurrence, such as leaving behind some tracts, sutures in midline which causes more trauma with repeated irritation and infection, accumulation of sweat, and friction with potential of the hair being trapped into the wound.¹⁴

Limberg rhomboid flap for sacrococcygeal pilonidal sinus was designed by Limberg in 1946, who described a technique for closing a 60° rhombus-shaped defect with a transposition flap.¹⁵ This procedure was easy to perform which gives a tensionless flap of unscarred skin in the midline, which helps in good hygiene maintenance, reducing sweat maceration, erosions, and scar formation. Literature study showed that this type of reconstruction is a safe and reliable method of closing the pilonidal sinus as compare to primary midline closure as its alleviates the midline and reduces the risk of recurrence.¹⁶

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

II. MATERIAL AND METHODS:

It was a prospective observational study and has been carried out at Hamdard University Hospital Karachi from 1st July 2016 to 31st June 2020. Patients were selected through Simple random sampling technique fulfilling the inclusion and exclusion criteria.

INCLUSION CRITERIA:

All those patients with primary pilonidal disease of either gender, age range 18-60 years, controlled systemic disease and gave consent for the procedure.

EXCLUSION CRITERIA:

Patients with recurrent pilonidal disease, advanced systemic disease, malignancy, severely immunocompromised and those not willing for the Limberg's flap procedure.

DATA COLLECTION:

The patient's details entered and collected in the special proforma. The results were analyzed at the completion of the study and compared with the literature.

TECHNIQUE:

Surgery was performed under spinal anesthesia. Any discharge from the sinus or pus sent for culture and sensitivity. Patients were placed in prone jack-knife position with buttocks strapped for proper exposure. After painting and draping, the area to be excised is marked and flap lines are marked with permanent marker. The rhomboid incision (with each side equal in length), includes the sinus, is made down to the pre-sacral fascia. The flap was constructed by extending the incision laterally down to the fascia of the gluteus maximus muscle. Hemostasis was achieved by the use of electrocautery. The flap was transposed to the rhomboid defect created by excision of the sinus. A suction drain was placed in the wound cavity through a separate stab incision. Subcutaneous tissue was approximated with interrupted vicryl 2-0 suture. The skin was closed with interrupted prolene 2-0 suture. Drain was removed after 48–72 hours. Alternate sutures were removed on 10th postoperative day (POD). Rest of the sutures are removed on the 15th–20th POD. Postoperatively patients are advised to avoid prolonged sitting or exercise for two weeks. Hair removal either by shaving or by hair removal cream is advised for at least 1 month. Patients are followed up in OPD monthly for 12 months.

Post operatively, the record was made for the seroma, hematoma, infection, persistent pain, and recurrence.

Figure: 1 Pre-sacral pilonidal sinus

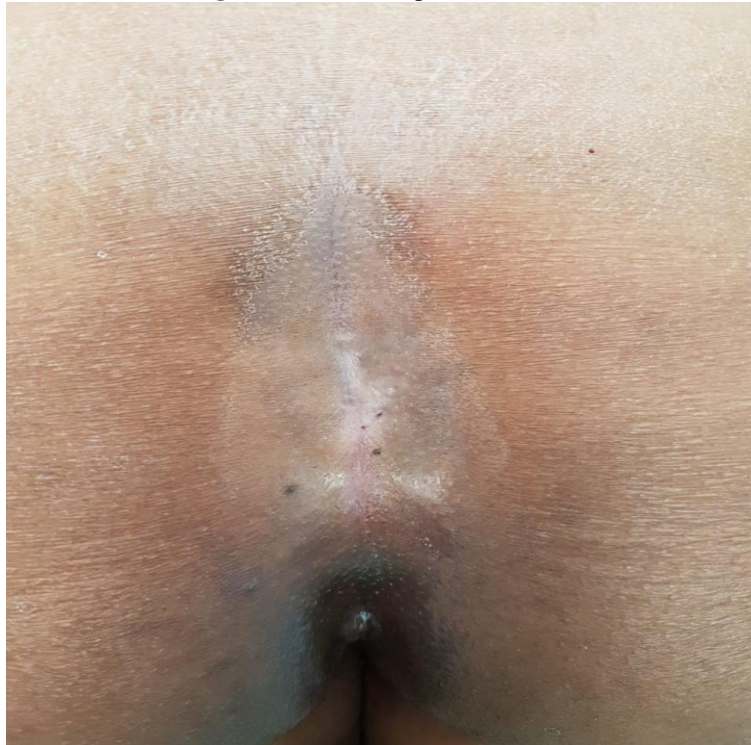


Figure: 2 Area marked for Rhomboid excision and Limberg's flap



Figure: 3 Reconstruction with Limberg's Flap



III. RESULTS:

Out of 46 patients, 30(65.21%) were male and 16(34.7%) were female. 28 patients (60.8%) were between 31-40 years of age and 12 patients (26.08%) were between 41-50 years of age. After performing Limberg's flap procedure, 35 patients (76%) had no complications at all. 2 patients (4.3%) had seroma formation. 4 patients had Hematoma formation (8.6%). 2 patients (4.3%) patients developed superficial wound infection. 2 patients(4.3%) had persistent pain after 3 months of procedure. 1 patient (2.1%) had recurrence during the follow-up period of 12 months.

Table#1: Complications

COMPLICATIONS	FREQUENCY	PERCENT%
Nil	35	76.08
Seroma	2	4.3
Hematoma	4	8.6
Wound infection	2	4.3
Persistent pain	2	4.3
Recurrence	1	2.1
TOTAL	46	100.0

Table#2: Clinical presentation

SINUS	FREQUENCY	PERCENT %
Single sinus and dry	18	39.1
Multiple sinuses and dry	8	17.3
Single sinus + Serous discharge	10	21.7
Single sinus + Pus discharge	6	13.04
Pilonidal abscess	4	8.6
Total	46	100.0

Table#3: Age range of the patients

AGE RANGE	FREQUENCY	PERCENT %
18-30	4	8.6
31-40	28	60.8
41-50	12	26.08
51-60	2	4.3
Total	46	100.0

Table#4: Complications in various patients according to preoperative status of pilonidal sinus

COMPLICATIONS	SINUS					TOTAL
	Single and dry	Multiple and dry	Single + serous discharge	Single sinus + Pus discharge	Sinus + Abscess	
Nil	17	6	7	3	2	35(76%)
Seroma	0	0	1	1	0	2(4.3%)
Haematoma	0	1	1	1	1	4(8.6%)
Wound infection	0	0	0	1	1	2(4.3%)
Persistent pain	1	1	0	0	0	2(4.3%)
Recurrence	0	0	1	0	0	1(2.1%)
Total						46(100.0%)

IV. DISCUSSION:

Variety of surgical procedures have been described for the treatment of Pilonidal sinus disease but the best management still remains debatable and variable. In all the procedures, the general principles and aim of its treatment usually require total excision of the sinus along with all the tracts and early satisfactory healing with the main aim of avoiding recurrence.⁸ Recurrence is the main problem associated with all surgeries described which ranged from 21.4% to 100% for incision and drainage, 5.5%–33% for excision and opens packing, 8% for marsupialization, 3.3%–11% for Z plasty.¹⁸ The early recurrence is thought to be due to failure to excise all sinuses and the late recurrence is considered to be due to secondary infection caused by incomplete excision and the residual hair in the natal cleft or failure to maintain the area hair free after surgery.¹⁹ Among all the suggested procedures, the Flap techniques carry lower complication and recurrence rates.²⁰ With the Limberg flap technique, internal flap cleft can be flattened and tissue can be approximated without tension.

In a study done to observe outcomes of primary closure by Hussain MA and Malik NA, the seroma formation was observed to be 3.39% and hematoma formation was 1.69% where as it was 4.3 % and 8.6% respectively in our study. We used vacuum drainage (Redivac drain) to drain seroma in all of our patients post-operatively. They quoted wound infection rate of 6.78% as compared to ours, which was 4.3%. We used the method of simple dressing with Pyodene and antibiotics to treat wound infection without any adverse outcomes. The recurrence rate observed after the followup of 6 months was 0 % in our study, as compare to 3.39% in above mentioned study.²⁰ Yoldas T, Karaca C and Unalp O et al. reported recurrence rate of 40% after lay open procedure.²¹

Afridi Z. et al observed the results after Bascom's repair for Pilonidal sinus. They stated the seroma formation in 1.9 % of cases and hematoma in 3.8%. They observed wound infection in 5.7%, persistent pain in 3.8% and recurrence in 1.9%.²²

There are studies that shows the favorable results of Limberg's flap in paediatric population also. A study published in Journal of Paediatric Surgery by Yildiz T, Ilce Z and Kucuk A., on comparison of two procedures. Pilonidal sinus excision and primary repair were performed in 8 (20%) of the patients, while rest of 32 (80%) patients underwent the modified Limberg flap technique. Complications were observed in 87.5% of the patients undergoing excision and primary repair, and in 15.6% of those who underwent the modified Limberg flap technique. Recurrence was observed with only the primary repair technique (37.5%).²³

Another study done by Aithal SK et al., published in Indian Journal of surgery. Limberg's flap procedure was performed on 30 patients under spinal anaesthesia. One patient 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. Three patients had flap edema, which resolved by 10 days. One had persistent discharge at the tip. 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.⁹

A study done at Bangalore Medical College and Research Institute, India by CN Yogishwarappa and Abhishek Vijayakumar also showed promising results. They performed Limberg's flap procedure on 52 patients. Among them, 38 (73%) were males and 14 (27%) were female. The mean age was 31, (Range: 17–45 years). 14 (26.9%) presented with recurrent sinus and 5 of them had previous surgery on more than one occasions. Fifty patients (96%) had full primary healing without any complication. Two (4%) patient had minimal epidermolysis of flap corners. However, both healed completely with conservative treatment. The mean length of hospital stay was 2.45 (Range:1–5days) and most patients returned to work within 3 weeks.²⁴

Cagatay Daphan M.D., M. Hakan Tekelioglu M.D.& Cem Sayilgan M.D. conducted a study on 147 male patients with pilonidal sinus disease. All patients were treated by Limberg's flap under regional anesthesia. Three patients (2 percent) had a seroma (with negative culture) and six patients (4.1 percent) had partial wound detachment. Seven patients (4.8 percent) had a recurrence.¹⁶

Thus, we concluded that reconstruction of the defect with Limberg flap has proved to have 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.

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