

## **Modified Limberg Flap in pilonidal sinus: Our experience**

### **ABSTRACT**

**Introduction:** Pilonidal sinus disease is a chronic disease occurring in young hairy adult males. Many Surgical procedures have been described in literature to manage Pilonidal sinus disease, the best surgical technique is still debated. Excision of pilonidal sinus with Limberg flap reconstruction is still one of the most commonly performed procedures for this disease because of its low complication and recurrence rate and higher postoperative quality of life.

**Aim:** The aim of our study was to analyse the long-term results of modified Limberg flap reconstruction technique to manage the defect post rhomboid excision of pilonidal sinus.

**Methods:** We conducted a prospective observational study, to study the results of rhomboid excision and modified Limberg transposition flap closure in the management of the Pilonidal sinus. From September 2016 to September 2022, 27 male patients were treated with modified Limberg flap repair (Mentes modification) under regional anesthesia. Follow-up examinations were made at the end of the 2 weeks and 3, 6, 12, 18, and 24 months after surgery.

**Results:** Average age of Patients was  $24 \pm 4.2$  years with a range of 15-43yrs. Duration of symptoms ranged from 2 months to 36 months with mean of 10 months. Patients usually presented with local pain, swelling, and/or a seropurulent discharge. None of our patients developed total wound dehiscence or flap necrosis. One patient had recurrence at the end of the follow up period.

**Conclusion:** Rhomboid excision of pilonidal sinus and reconstruction by Limberg transposition flap is one of the best methods to manage this notorious condition because of short hospital stay, low recurrence rates, , and earlier return to normal activities

*Keywords* Pilonidal sinus disease, Limberg flap

## **INTRODUCTION**

Pilonidal sinus is a chronic acquired condition that affects young aged hairy individuals most commonly in the natal cleft with incidence 26 per 100000 population affecting men more frequently than women(1). It is uncommon both before puberty and after the age of 40 years. A variety of surgical techniques have been described for management of this disease, but the gold standard surgical technique is yet to be described. The surgical procedures range from simple excision and secondary healing to various flap reconstruction techniques. Deep natal cleft is regarded as the single most important predisposing factor (2,14,15). Any surgical Flap reconstruction technique flattening the natal cleft theoretically should eradicate the etiology of this disease. (3). Among these flap techniques, rhomboid excision of the pilonidal sinus with Limberg transposition flap is the the most commonly used one. This technique results in obliteration of natal cleft and an off midline tension-free final closure line using a wide, well- vascularised flap. Pilonidal Sinus disease is notorious for its recurrence, Limberg Technique is reported as one of the best treatment methods, with a least recurrence rate of 0-5% (4).

**Aim:** The aim of our study was to analyse the long-term results of modified Limberg flap reconstruction technique to manage the defect post rhomboid excision of pilonidal sinus.

## **Material and Methods**

We conducted a prospective observational study, to study the results of rhomboid excision and modified Limberg transposition flap closure in the management of the Pilonidal sinus. From September 2016 to September 2022, 27 male patients were treated with modified Limberg flap repair (Mentes modification) under regional anesthesia.

**Operative Technique:** Patients were admitted a day prior and were advised to take antiseptic shower the night before surgical procedure. Proctoclysis enema were given to all patients the night before and 4 hours before anticipated operation time. Patients were operated on under spinal anesthesia in the prone position, with buttocks strapped apart. The lower back including the natal cleft area of patient was shaved on table with clipper. After the part was prepared with 10% povidone-iodine and draped, the area to be excised as well as the transposition flap were marked. The patients received 1.5 g cefuroxime sodium intravenously as surgical prophylaxis. We injected 0.5-1ml of methylene blue slowly through the most prominent opening of the Pilonidal sinus to help define the margins of the sinus tissue. A wide rhomboid-shaped excision was done incorporating every opening of pilonidal sinus on the skin while taking the the presacral fascia as well using a surgical blade and electrocautery, taking care to remove all sinus tracts en bloc. A right-or left-sided fasciocutaneous rhomboid transposition flap, incorporating the gluteal fascia, was tailored, fully mobilized on its inferior edge, and transposed medially to fill and cover the rhomboid defect without tension. Single 10 F negative suction multiple-hole closed suction drain was placed below the flap, on to the presacral fascia. The modified flap reconstruction as

described by Mentes was used where in the excision defect is tailored asymmetrically to place the lower pole of the flap 1-2 cm away from the inferior midline pole of defect. The flap onset was done in two layers, the subcutaneous layer by 3/0 polyglycolic sutures in interrupted fashion, and the skin was approximated by 3/0 polypropylene interrupted mattress sutures. Antiseptic dressing was done with bolster in place to apply pressure and removed on the 2nd postoperative day. The patients were nursed prone for the first 24 hours and drain was removed on 3<sup>rd</sup> post-operative day, when drain output was less than 10ml/24hr. The patients were discharged on the day of drain removal and advised to follow up on 15<sup>th</sup> post operative day during which Skin sutures were also removed. The patients were followed up at the end of the 2 weeks and 3, 6, 12, 18 and 24 months after surgery.

## RESULTS

The age of patients ranged from 15 to 43years with average age being  $24 \pm 4.2$  years, ( Table 1)

Table 1: Demographic profile

Average age (years)	24±4.2
Mean hospital stay (days)	3.2 (1-7)
Median time for removal of drain (days)	3 (2-7)
Return to normal activity (days)	16.7 (1-36)
Average follow-up	18 months (6-38)

The main symptom was pain in 23/27(85.18%) patients. Symptom description is detailed in Table 2.

Table 2: List of symptoms

Mean duration of symptoms	13 months (2 months-36 months)
Pain	23
Chronic discharge	16
Swelling	12
Abscess	2

The mean duration of symptoms was 13 months, range 2-140 months. On examination most common finding was multiple midline pits in 15/27. Other findings are detailed in Table No 3.

Table 3 : Findings on examination

Single midline pit	8
Multiple midline pits	15
Lateral sinuses	4

The length of hospital stay ranged from 2 to 19 days, with mean duration of hospital stay being  $3.2 \pm 2.85$  days. The Median time for drain removal was 3 days. The Mean time to return to normal activity was 16.7 days. The complications of our modified mentes limberg flap are tabulated in table 4.

Table 4: Complications

Complication and Result	No. of Cases (%)
Urinary retention	3
Headache	4
Seroma	2
Wound detachment (early failure)	1
Recurrence (late failure)	1
Hematoma	1
Wound infection	1
Dysesthesia/ hypoesthesia	3

None from among our patients developed total wound dehiscence or flap necrosis. All of our patients were recurrence free at the end of the follow up period.

## **DISCUSSION**

Reconstruction of the pilonidal excision defect with a transposition Limberg flap has a short learning curve. The technique obliterates the natal cleft with large vascularised pedicle (5). The flattening of natal cleft avoids scar in midline, reduces maceration, friction, and makes it easier for patients to maintain good hygiene. Limberg transposition flap technique has better results than other surgical procedures like simple excision, Bascom flap and Karydakis procedure (6).

The length of hospital stay is variable in studies. In studies conducted by Topgul et al it was 3.1 days (7). In our study mean length of hospital study was 3.2 days. In a study conducted by Erden et al. hospital stay was  $3.5 \pm 1.11$  days (8). In the study conducted by Daphan et al. average hospital study was 5.9 days (9). Historically, Pilonidal sinus is more common in males than females. In present study all patients were males. The age distribution was similar to that reported in the literature. Pilonidal sinus is known notoriously for its recurrence irrespective of surgical procedures performed. In literature, the recurrence rate for Limberg flap varies from 0.8 to 27%. In a study conducted by Topgul et al. with 200 patients, 2.5% had recurrence (7). Out of 147 operated patients recurrence was noted 4.8% in a study conducted by Daphan et al. (9). Ertan et al. Published a comparative study and showed a recurrence rate of 2% with the Limberg flap method and 12% in the primary closure method, they concluded that the Limberg transposition flap technique resulted in a better outcome with respect to complication rate, wound healing time, return to work, recurrence rate, and general health conditions (8). Ahmet et al. compared classical limberg transposition flap with excision and primary closure and found the recurrence rate was 7.1% in classical Limberg flap and 9.2% in excision with primary closure. In our study, one patient has recurrence (10). Out of 25 patients 16 had various complications but none had recurrence in their study on 110 patients by Katsoulis et al. (11). Aslam et al. Reported complication in 5 patients and one recurrence (12). In a study conducted by Aithal et al. Out of 30 patients 6 had complication. No recurrence was reported during then follows up study period (13).

## **CONCLUSION**

Rhomboid excision of pilonidal sinus and reconstruction by Limberg transposition flap is one of the best methods to manage this notorious condition because of short hospital stay, low recurrence rates, , and earlier return to normal activities.

In our unit, the standard treatment for pilonidal sinus is excision and reconstruction by Limberg transposition flap. We use this technique with a small modification wherein the inferior edge of excision falls one to two centimeters off midline.

### **Ethical Approval**

All provisions of the declaration of Helsinki were followed in this study. The Ethical clearance was obtained from the institute ethical committee.

### **Consent**

As per international standard or university standard, patient(s) written consent has been collected and preserved by the author(s).

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**Author's contribution:** MRL contributed to conception and design of the study. PAA and YA acquired the data. PM, MJA, SS, contributed to the analysis, and interpretation of data. MRL, YA, prepared the article for drafting and MRL, SA, did the critical revision of the final manuscript.

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