

# Rhomboid excision with Modified Limberg Flap; a novel treatment for Pilonidal Sinus Disease

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## ABSTRACT

**Background:** Pilonidal sinus is a disease of young adults having single or multiple blind tracks lined by granulation tissue containing tuft of shed hair. Natal cleft is the commonest site; rarely involves umbilicus, axilla and inter-digital cleft. It has various methods of its treatment. The modalities of treatment vary from conservative medical management to complex surgical procedures.

**Aim:** To study the outcome of Rhomboid excision and Limberg's flap closure for the treatment of sacrococcygeal pilonidal sinus.

**Study Design:** Prospective study.

**Place & duration of study:** Department of General Surgery, Khawaja Muhammad Safdar Medical College, Sialkot from January 2015 to December 2016.

**Methods:** A total of 120 patients were included in the study. **Group A** included 60 patients for primary excision while **Group B** included 60 patients of pilonidal sinuses were selected for modified limberg's flap in this study. After initial workup, they were operated under general anesthesia in prone position by Rhomboid excision and Limberg's flap technique with a closed suction drain and were followed up for the next twelve months after one week, two weeks, six months and twelve months) for surgical complications of the treatment (like flap edema, postoperative infection, wound dehiscence) and duration of hospital stay.

**Results:** The infection rates were observed to be 10% in Limberg's flap and 26.6 % in primary closure group. Whereas the recurrence rate were only 3.3% in Limberg's flap as compared to 13.3 in primary closure group. Because of its low complication rate and acceptable long term results, rhomboid excision and the Limberg's flap procedure is preferable to simple excision and primary closure in the treatment of sacrococcygeal pilonidal disease.

**Conclusion:** The modified limberg's flap procedure is an easy and effective technique. Patient comfort, quick healing time, short hospital stay, early return to full activity, and low complication and recurrence rates are the important advantages of this procedure.

**Keywords:** Pilonidal sinus, primary closure, rhomboid excision, limberg's flap.

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## INTRODUCTION

A sinus is a channel often allowing drainage of fluid or pus. Pilonidal sinus arises from chronic inflammation and pressure involving a hair-bearing region. A tract develops connecting the skin surface with a collection of hairs, cell debris and keratinizing epithelial tissue.

The disease more commonly affects the young adults between 17-38 years of age<sup>1</sup>. It causes discomfort that may interfere with daily life of employment, sometimes for prolonged periods. The etiology is uncertain, but relates to the implantation of loose hair in to the depth of the natal cleft. Factors that influence this are the nature of the hair itself, the

force of implantation and the vulnerability of the skin. So the obese individuals having deeper intergluteal grooves and with excessive hair are found to be more affected<sup>2,3</sup>. It appears most frequently in the sacrococcygeal (natal cleft) region. However, rarely it may be located in the axilla, umbilicus, pubis, intermammary region, scalp, ear, amputation stumps, genital tracts of both men and women, interdigital webs of hairdressers, and hands of framers who shear sheep<sup>4</sup>.

Patients present with pain, swelling and discharge when these sinuses become infected<sup>5</sup>. Despite surgical therapy, dating back more than a century, management remains controversial. The management of pilonidal sinus is frequently unsatisfactory. No current method satisfies all the necessary requirements for the ideal treatment, namely rapid healing, no hospital admission, minimal patient inconvenience, and low recurrence.

Conservative non-operative management, closed methods, laying open of the track, wise

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excision and open drainage, wide excision and primary closure, and limited excision, are the methods currently used<sup>6</sup>. Simple excision techniques are associated with high morbidity and recurrence owing to the continuing presence of the natal cleft. Recurrence rates of 7-42 percent have been reported following excision and primary closure<sup>7,8</sup>. Studies have shown that rhomboid excision and limberg's flap closure can be performed for managing primary or recurrent pilonidal sinus with the low complication rate, short hospital stay, short time to return to normal activity, and good long-term results<sup>9</sup>.

The majority of procedure for treatment can be classified in one of the four categories. 1. Incision and drainage, 2. Excision and healing by secondary intention, 3. Excision and primary closure and 4. Excision with reconstructive flap techniques.

**Limberg's procedure:** A rhombus is classically defined as an oblique-angled equilateral parallelogram, whereas rhomboid differs in that it has uneven adjacent sides. Transposition flaps are useful when the size or shape of a lesion does not permit direct closure using a standard fusiform incision. The technique of skin flap elevation is simple. The elevated flap requires sufficient subcutaneous fat, and dissection must be carried past its base to prevent an elevated bump when it is transposed. Rhomboid (limberg) flap, single or multiple, can be applied widely with extreme safety and good cosmetic results.

After successful flap design and implementation, monitor the flap for viability as early recognition of ischemia is important in preventing subsequent flap necrosis thus flap failure, assessment of bleeding from the flap after stabbing it with a small needle is believed to be one of the most reliable methods of clinical assessment<sup>10</sup>.

The objective of the study was to observe outcome of rhomboid excision and limberg's flap closure for treatment of sacrococcygeal pilonidal sinus in terms of complication rates, hospital stay, time to return to normal activity, recurrence and good long-term results.

## METHODOLOGY

The study was conducted at surgical department of Allama Iqbal Memorial Teaching Hospital that is a tertiary care teaching institute affiliated with Khawaja Muhammad Safdar Medical College, Sialkot. Duration of study was two years from January 2015 to December 2016. A total of 60 patients were included in the study. Patients with sacrococcygeal pilonidal sinus with age of more than 13 years were included in the study. Patients with recurrent pilonidal sinus were excluded from the study.

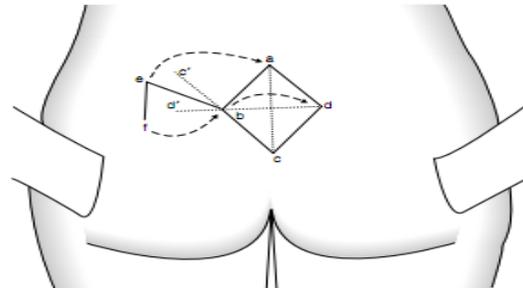
Study hypothesis was local transposition limberg flap closure in the treatment of sacrococcygeal pilonidal disease is superior to other treatment modalities.

Patients were admitted through outpatient department and a detailed history was noted including demographic information like name, age, sex, weight, socioeconomic status and profession. The patients were asked about the symptoms, duration and severity and examined for the level of the problem and any previous surgical treatment for pilonidal sinus. Data was collected on a proforma. After initial workup, they all were operated under general anesthesia in prone position.

**Modification to limberg's flap.** The lesion is excised with a rhomboid-shaped incision with each side equal in length (Fig. 1). After extension of line cb and axis db, line be is created equidistantly between lines bc, and bd, with a length equal to the sides of the rhomboid excision. Line ef is drawn parallel to the ac axis, and also of the same length. The depth of the rhomboid excision is extended to the gluteal fascia at lines be and ef. The flap is dissected deep to the gluteal fascia (subfascial level) so as to raise thick a fasciocutaneous flap. This assures good vascularity of the flap without dead space. The rhomboid flap (cbef) is then rotated from the gluteal fascia to the excised area (abcd) and then sutured without tension in three layers (gluteal fascia with 2/0 Vicryl, subcutaneous fat with 3/0 Vicryl, and the skin with 4/0 Prolene). Subcutaneous tissue and the skin are sutured separately with interrupted sutures.

At the end of the procedure, a suction drain is inserted. Methylene blue is not used. As all sides are equal in length, the flap fits in place without tension. Pressure wound dressing is applied and removed on the third post-operative day. Drains are removed on the fifth to seventh postoperative day. Skin stitches are removed on the 12<sup>th</sup> to 14<sup>th</sup>.

Fig.1:



Patients were followed up for next twelve months (after one week, two weeks, six months, and twelve months) for surgical complication of the treatment (like flap edema, postoperative infection,

wound dehiscence), duration of hospital stay, duration of postoperative drain and return (the post operative day) to normal physiology. All this information was collected through a specially designed proforma. Data analyzed by entering the data in SPSS v 22.

**RESULTS**

Sixty patients of sacrococcygeal pilonidal disease were included. The patients shown in table were divided in three age groups. The first age group had patients of 18-30 years 54(90%), in the second had ages between 31-40 years 4(6.7%), and in the third group, patients aged 41-50 years 2(3.3%). the patients included in this study were 54 males (90%) and 6 females (0%). The male to female ratios were 9:1. The presenting complaints, frequencies and percentages are shown in table. There were discharging sinuses reported in 46 patients (76.7%), 6 patients (10%) complained of swelling and 8 patients (13.3%) had pain. Two patient was smoker (3.3%) and 14 patients were obese (23.3%)

Table 1 frequency distribution of patients according to presenting complaints ( n=60)

Presenting complaints	n	%age
Discharging sinus	46	76.6
Swelling	6	10.0
Pain	8	13.3

Table 2: Frequency distribution of patients according to local finding (n=60)

Local finding	n	%age
Redness	8	13.3
Swelling	6	10.0
Purulent discharge	60	100.0
Tuft of hairs	52	86.7
Multiple tracks	54	90.0
Multiple external openings	50	83.3

Table 3: The morbidity

Complications	Group A	Group B
infection	16(26.6%)	2(3.3%)
Postoperative pain	11(18.33%)	15(25%)
Seroma formation	4(6.66%)	6(10%)
Heamatoma	7(11.66%)	1(1.66%)
Flap oedema	-	2(3.3%)
Dehiscence	-	0
Hospital stay	5 + 2 days	8+3 days
Recurrence	8(13.3%)	2(3.3%)

According to local finding, 8 patient (13.3 %) had redness, 6 patients ( 0%) had swelling, 60 patients (100%) had discharge (purulent), 52 patients (86.7%) had tuft of hairs, 54 patients (90%) had multiple number of tracts and 50 patients (83.3%) had

multiple external openings were noted in modified limberg’s flap procedure as shown in table-2. In subjects who underwent modified limberg’s procedure there were 2 patients (6.6) who had infection and 1 patient had recurrence. The mean hospital stay was 1.63 days after limberg’s flap procedure. Average time period for return to work was 13.4 days.

**DISCUSSION**

In this study, all the patients were less than 40 years of age except one. Mean ages were 23.5 years. It is postulated that the disease is related with male sex hormones, therefore, a disease of young male nevertheless, some studies have shown age more than 40 years<sup>12,13</sup>.

Male to female ratio, in different studies has been observed as follows; Bukhari et al, 12.2:1 in Limberg’s flap and 13.8:1 in primary closure and Saleem and Al-hashimi, 11:1 in limberg’s flap and 13.2:1 in primary closure<sup>14,15</sup>. Whereas, in the present study the ration is 14.1:1 in primary closure, which is comparable with other studies. In this study the complications included wound infection in 6.6% cases reported and recurrence rate of 3.3%. Other studies reported recurrence rates of up to 5% which are comparable to our study.

Ertan el al reported on 100 consecutive cases and observed shorter hospital stay, earlier healing, shorter time of work, lower ratios of complications, lower pain perception and improved general health, are the main advantages of modifieslimberg’s flap in pilonidal surgery<sup>16</sup>. All together these parameters add to patients comfort and satisfaction after surgical treatment. Another study done by Akca et al showed that morbidity developed in 24 patients treated by after limberg’s flap procedure 3 patients had morbidities ( infection 2 and flap edema 1)<sup>17</sup>

Katsoulis el al performed a study with limberg’s flap procedure and they found wound complication rate was 16%, while in 2002, study conducted in 102 cases by urhan et al showed that three patients developed seroma (2.9), two patients (1.96%) had wound dehiscence, and one patient had purulent discharge from the wound<sup>7,12</sup>. Mentis and their colleagues analyzed using 353 patients limberg flap procedure for pilonidal sinus disease which revealed no wound dehiscence and flap necrosis in any patient while 3.2% patients had recurrences at the end of the follow up period<sup>18</sup>. Eryilmaz et al performed a study in 2003 in which he observed wound complications and recurrence in 6% and 3 %, respectively Milito and his colleagues conducted a study on two hundred sixteen patients with excision and rhomboid flap transposition from 1886 to 2004 for pilonidal sinus

which showed flap necrosis in 5 patients (2.3%), post operative infection in 2 patients (0.9%), 4 patients (1.8%) had a seroma, and recurrences occurred in 5 patients (7.4%). In 2006, Lodhi et al in their study use of limberg flap in the treatment pilonidal sinus: on thirty patients found out wound complications in 3 (10%) patients and no recurrence was noted. In this series there was only one recurrent sinus in modified limberg's group, which represents an overall recurrence rate of 3.3% during the study period.

Misiakos et al noted hospital stay of 1 to 2 days for limberg's flap; in jascrike et al studied the mean hospital stay was 7.9 days, whereas Milito et al concluded hospital stay of 3.1 0.30 days. In our study mean hospital stay was 1.6 days which is shorter than other studies.

## CONCLUSION

Although this study had a small number of patients and short follow up period, it can be concluded that for primary sacrococcygeal pilonidal sinus disease rhomboid excision with limberg transposition flap is an effective treatment in terms of its low complication rates, a short hospital stay, the short time to return to normal activity, low recurrence rate, patient comfort and good long-term results. This procedure has good postoperative results and is a comfortable surgical method for the patient.

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