

Original article:

Limberg Flap Reconstruction in Treating Sacrococcygeal Pilonidal Sinus

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Abstract:

Background: Pilonidal sinus is the relatively common condition affecting men almost twice as often as the women we experienced. The estimated incidence is 0.26 per thousand populations in general. The management of pilonidal sinus disease remains controversial, and gold standard treatment modality has yet to be established. Limberg procedure is a safe and reliable technique in the treatment of the sacrococcygeal pilonidal sinus disease, with a low complication and recurrence rates if performed according to the appropriate surgical principles. **Methods:** This is a Prospective study on 24 patients between the period from July 2014 to Dec 2018 in the Department of Surgery in Bangabandhu Sheikh Mujib Medical University (BSMMU) as well as other different hospitals in Dhaka, Bangladesh. The patients having primary or recurrent pilonidal sinus disease underwent the foresaid surgical treatment. **Results:** Twenty four patients underwent this operation. Among them, the picture was that 20(83.3%) were males and 4(16.7%) were female. The mean age was 31, (Range: 17-45 years). 6(25%) patients were presented with recurrent sinus and 5 of them had one or more occasion previous surgery. Twenty one patients (87.5%) had full primary healing without any complication. But 1(4.2%) patient had minimal seroma, 1(4.2%) patient had superficial infection and the remaining other 1(4.2%) had partial flap necrosis. However, all three healed completely with conservative treatment. The mean length of hospital stay was 2.45 (Range: 1-5) days and the most patients returned to their work within 3 weeks. **Conclusion:** Limberg flap is very effective for sacrococcygeal pilonidal sinus disease with low complication rates, shorter hospital stay, low recurrence rates, earlier healing and reduced off-work period. The surgery can be easily mastered. We recommend Limberg flap as preferred surgery in the cases of Sacrococcygeal Pilonidal sinus.

Keywords: Pilonidal sinus, Limberg Flap.

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Introduction:

Pilonidal sinus is a relatively common condition affecting the men almost twice as often as women. The estimated incidence is 260 per one million people generally. It is most frequently seen in the sacrococcygeal region. However, it has also been

described in the axilla, suprapubic area, periumbilical zone and between the fingers of the hand of the barbers.¹⁻²

It usually presents as a cyst, abscess, or one or more sinus tracts with or without discharge in the upper part of the natal cleft. Hair tufts within the sinus,

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seen in about 60% of the cases, are now considered important secondary outcome in the evolution of the sinus. The most important predisposing factors for the development of pilonidal sinus are the existence of a deep natal cleft and the presence of hair within the cleft. A deep natal cleft is a favorable environment for sweating, maceration, bacterial contamination, and penetration of hairs.³ Thus, for the treatment and prevention, these causative factors must be eliminated. Male gender, obesity, smoking, family tendency, poor body hygiene, sinus size, and the surgical procedures performed have been sustained in a number of studies as primary risk factors for the post-operative complications and recurrence.⁴ The management of pilonidal sinus disease remains controversial, and gold standard bench mark treatment modality has yet to be established.

The simple incision and drainage, laying open, open excision, excision and primary closure, the more complex ones include Bascom's, Karydakis and a rhomboid excision with Limberg flap. Limberg procedure is a safe and reliable technique in treating sacrococcygeal pilonidal sinus disease, with very low complication and recurrence rates if performed according to the appropriate surgical principles. In this prospective study, the experience with Limberg Flap technique in treatment of the pilonidal sinus disease is presented.

Materials, Methods and Procedures:

This is a prospective study on 24 patients between the period July 2014 and December 2018 at the Surgery Department in the BSMMU and other different hospitals in Dhaka. The patients with primary or recurrent pilonidal sinus disease complaints underwent this operation. Patients who have had pilonidal abscess had incision and drainage first before the definite treatment.

These patients were advised to return to their normal activities after removal of the stitches after a period near about 10 days, to avoid excessive physical strains and strenuous activities for the next 3 to 4 weeks. Follow up of all patients was performed on outpatient basis, every month for first six months and then six monthly for a period of eighteen months.

Surgery was performed either in general or spinal anesthesia. Patient was placed in jackknife prone position with but tocks strapped for wide exposure. After adequate shaving and skin preparation, area to be excised is carefully marked and flap lines are mapped on the skin (Figure :1 & 2).

The long axis of the rhomboid was in the midline and its shape determined by angles of 60 degrees at A and

C and 120 degrees at B and D. Accuracy is essential for success, and the rhomboid of tissue to be excised and the flap was measured and marked with indelible pen at the start of surgery. First, the line A–C was drawn and its length was also measured. C should be adjacent to the perianal skin, and A was placed so that all diseased tissue included in the excision. The line B–D transected the midpoint of A–C at right-angles and was 60 per cent of its length. It was the ratio of lengths which determined the correct shape to the rhomboid. The flap was planned so that D–E was a direct continuation of the line B–D and 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. After rotation, it was sutured to A–D.

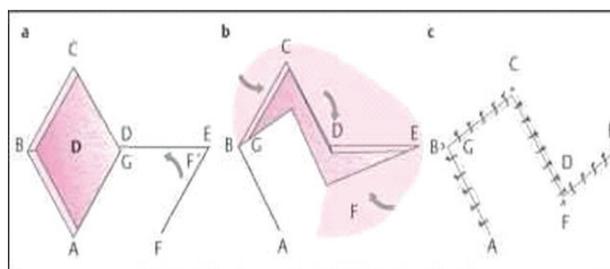


Figure 1 Marking of rhomboid flap.



Figure-2:

The rhomboid incision including the sinus and its extensions is made down to the pre-sacral fascia. The diseased area is removed en bloc. Flap is constructed by extending the incision laterally and down to the fascia of the Gluteus Maximus muscle. Flap should be exactly of the same angles and length of the

defect made by the excision. Thus a rhombic shaped fasciocutaneous flap is developed. The flap was transposed into the rhombic defect without tension. Suction drain is placed in the wound cavity, through a separate stab incision. The subcutaneous tissue is approximated with interrupted 2/0 vicryl . Skin is closed with stapler and or mattress interrupted stitches with prolene 3/0. Antibiotics are given for minimum five days, initially intravenous and then the oral. The suction drain is removed after 48 hrs. Sutures are removed generally on the 10-12th post operative day.



Figure 3: Preoperative after excision and flap marking



Figure 4: Immediate postoperative 3rd day



Figure 5: Immediate postoperative 7th day

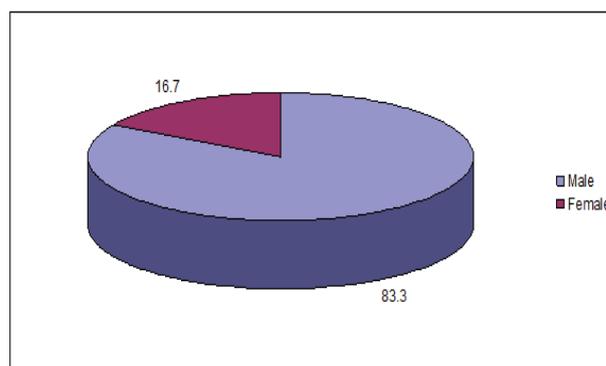
Ethical approval: The study was approved by the ethics committee of Colorectal Department of BSMMU

Expected Results:

Twenty four patients underwent this operation. Among them, 20(83.3%) were male and 4(16.7%) were female. The mean age was 31, (Ranging: 17–46 years). 6(25.0%) presented with recurrent sinus and 2 of them had two or more occasions previous surgery. Twenty three patients (95.8%) had full primary healing without any complications. One (4.2%) patient had seroma, 1(4.2%) had superficial minimal infection and the remaining 1(4.2%) had partial flap necrosis on its apex. However, all three patients healed completely with conservative treatment. The mean length of the hospital stay was 2.45 days on an average (Range: 1-5days) and most of the patients returned to their professional work within 3 weeks.

Table 1: Demographics of the patients(n=24)

Demographic characteristics	Characteristics
Age (years)	31 (17–46)
Duration of symptoms (months)	4.8 (1–8)
Surgical Operation time (minutes)	38 (24-58min)
Pain score (VAS)	3.25 (3-5)
Postoperative hospital stay (days)	2.45 (1-5)



Graph-1: Pie diagram showing the sex parameters of study patients

Table 2: Distribution of the study patients by post-operative complications

Complication	Frequency	Percentage (%)
Seroma	1	4.2
Superficial infection	1	4.2
Partial flap necrosis	1	4.2
Recurrence	0	0.0

Table 3: Comparison with other similar featured studies

Hospital Stay (Days)	Complication (%)	Recurrence (%)	Reference
4.0	16	-	17
3.2	15.7	2.9	18
3.7	7	4.9	19
2-3	2	1.3	20
3.0	5	1	21
5-11	40	10	22
2-3	12.5	-	Current Study

Discussions

Sacrococcygeal Pilonidal Sinus disease occurs in the midline. Increased depth of the intergluteal sulcus leads to an anaerobic media and increased anaerobic bacterial content.⁵⁻⁶

Also, the vacuum effect created between the heavy buttocks is thought to play an additional role in pilonidal disease development. The vacuum effect sucks the anaerobic bacteria, hair, and debris into the subcutaneous fat tissue. If these factors responsible for development of the disease are not eliminated, then they will play a vital role to develop the disease recurrence as well.⁷⁻⁸

Although many surgical and nonsurgical treatment methods have been described, the ideal treatment method has not yet been established for the pilonidal disease. Complete excision of the sinus is widely practiced, but crucial controversy remains about what to do with the wound after excision.⁹

Excision and packing, excision and primary closure, marsupialization, and flap techniques are surgical procedures that have been developed for the treatment of pilonidal sinus.

The very often problems related to a continuing natal cleft after pilonidal sinus surgery has prompted surgeons to discover techniques to eliminate the gluteal furrow. Bascom hypothesized that infection starts in hair follicles, which have open orifices that initiate the development of infection and sinus. He recommended excision of the midline pits with lateral open drainage of any associated abscess³. Karydakos used an asymmetric excision and primary closure to prevent hair penetration into the natal cleft.¹⁰⁻¹¹

With this technique, the natal cleft is flattened, and the incisional line and scar are transferred laterally from the midline. To eliminate natal cleft and wound tension, various plastic reconstructive techniques

such as Z-plasty, W-plasty, V-Y plasty and various flap techniques have been used.¹²

However, adipofascio cutaneous flap, classic Limberg flap, and modified Limberg flap techniques are most recently the common favored techniques. Compared to the open packing and marsupialization, excision and primary closure is known to provide quicker healing and quicker return to the work. Most patients return to their required work in 3 to 4 weeks.¹³ However, a high complication rate has been reported because of tissue tension, although some surgeons have reported good results after primary closure.¹⁴⁻¹⁵

Flap techniques have been associated with the lower infection and recurrence rates, shorter hospital stay, and better aesthetic results. With this technique, the internal cleft can be flattened, and tissue can be approximated without any tension.

The importance of the post-operative wound care should also be stressed. Exercise or sitting down on the wound should be avoided for two weeks and the patient has to return slowly to normal activities. Hair removal either by shaving the edges of the wound is a mandatory. This has to be continued at least until complete healing of the wound, but preferably on a long-term basis.¹⁶

The advantages of Limberg flap reconstruction are: Flattens the natal cleft with a large well-vascularized pedicle that can be sutured without tension; Midline dead space and scar is avoided; Useful in complex sinuses with multiple pits where radical excision leaves large defect; Easy to perform, learn and design; Useful in recurrent pilonidal disease; Reduces hospital stay and time to resume normal activities.

Conclusion:

Limberg flap is very effective for pilonidal disease with low complication rates, shorter hospital stay, low recurrence rates, earlier healing and reduced time off-work. The surgery can be easily mastered. We recommend Limberg flap as preferred surgery for cases of Sacrococcygeal Pilonidal sinus.

Conflict of interest disclosure

The authors have no conflict of interest to declare

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Conceptual work: Faruk MO

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MM, Siddiquee MA, Manuscript writing: Faruk MO

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