

Rhomboid Excision with Limberg Transposition Flap in the Management of Sacrococcygeal Pilonidal Sinus - A Reliable Surgical Technique

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ABSTRACT

Background: Pilonidal sinus disease is common in young adult males. Many surgical and non surgical treatments modalities have been described. Some surgical techniques still have high morbidity and recurrence rate. We present our experience with rhomboid excision and Limberg transposition flap technique for both primary and recurrent pilonidal sinuses.

Methods: Over a period of two years, 62 patients with chronic pilonidal sinus were treated with this method. Five patients had recurrent disease and were previously treated with other types of surgery. Patients were treated with prophylactic antibiotics and wound closed over a suction drain.

Results: Mean post operative hospital stay was four days. There were seven (11.2%) wound complications. A single recurrence (1.6%) of pilonidal sinus was observed over a period of one year of follow-up, which required further surgical excision.

Conclusion: Limberg transposition flap is a satisfactory surgical technique for the treatment of pilonidal sinus with low risk of wound complications and recurrence.

Keywords: Pilonidal sinus; rhomboid excision limberg transposition flap

INTRODUCTION

Sacrococcygeal Pilonidal disease is a chronic inflammatory disorder that predominantly affects men and is common in adults¹. It is characterized by an infected sinus in the natal cleft associated with tuft of hairs². It causes significant morbidity in terms of discomfort and interference with education or employment and has a distressingly higher recurrence rate after all types of surgical treatments. The estimated incidence is almost 26 per 100,000 people³. The condition is most frequent in the third decade of life⁴. Although the exact etiology is uncertain, yet the important causative factors are deep natal cleft, prolonged sitting (travelling or driving) excessive body hairs, folliculitis, obesity and poor local hygiene⁵. Continuous friction generated in the depth of natal clefts by the movement of buttocks, tends to drive the broken hairs subcutaneously through skin abrasions, thus initiating a foreign body reaction. This is superimposed by secondary infection with abscess formation that may erupt spontaneously forming multiple discharging sinuses⁶. Pilonidal disease was first described by Mayo in 1833⁷. Anderson described the treatment of the disease for the first time in 1847. Since then various surgical and non-surgical treatment modalities have been employed but no satisfactory treatment option

can be singled out^{3,8}. The principles of the management are eradication of the sinus tract, complete healing of the overlying skin and prevention of recurrence. The optimal surgical method should be simple associated with short hospital stay and low recurrence rate¹⁰. A number of surgical options are available. The simplest are incision and drainage and laying open, in acute stage¹¹, while excision and laying open or excision and primary closure in chronic cases¹². Simple excisional techniques are associated with high morbidity in terms of prolonged wound care and days off from work and increased recurrence rates due to persistence of natal cleft in the midline, which provides a portal for further hair entry. An important aspect in managing this condition is modifying natal cleft and lateralizing the scar from the midline, which minimize the risk factors of recurrence. Therefore, numerous surgical flap techniques based on this principle are in practice. These are Karydakias flap¹³, Bascom flap¹⁴, V-Y advancement flap¹⁵, Limberg flap¹⁶ and modified Limberg flap¹⁷. The rhomboid flap of Limberg is a transposition flap that has been advocated for treatment of this condition.^{18,19} In 1946 Limberg first described a technique for closing a 60° rhombus shaped defect with a transposition flap²⁰. It is a series of communicating equilateral triangles with all angles meeting at 60°. It flattens the natal cleft with a wide and well vascularized pedicle that can be sutured without tension. This study was carried out to evaluate the usefulness of Limberg flap technique in the treatment of Pilonidal sinus in our setup.

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PATINTS AND METHODS

This prospective study was carried out in the department of surgery, unit-I, at Ghurki Trust Teaching Hospital, Lahore from July, 2011 to June, 2013. We performed this procedure on 62 consecutive patients having primary (simple and complex) and recurrent Pilonidal sinus disease. Patients presenting with acute Pilonidal abscess were excluded from the study. These patients had incision and drainage first before the definite treatment.

Surgery was performed under general or spinal anesthesia. Patient was placed in jack knife position with buttocks aparted with adhesive tape for wide exposure. After adequate shaving and skin preparation, methylene blue dye was injected into the external opening to have a guideline about the tract and its branching. Rhomboid ABCD with C marked in such a way that all the sinuses were incorporated into it (figure-1). The length of BD was kept 60% of AC. The axis BD was extended to DE and then EF. The length of DE was equal to AD (Fig.1&2). The area ABCD was excised in a rhomboid fashion down to the pre-sacral fascia including the sinus tract and its branches (Fig. 3). The flap was constructed by extending the incision laterally, on he previously marked lines, down to the fascia of the gluteus maximus muscle and transposed into the rhombic defect without tension (Fig. 4). Suction drain was placed beneath the flap through a separate stab incision. Subcutaneous tissue was approximated with interrupted sutures using 3/0 Vicryl, while the skin was closed with interrupted mattress stitches using Prolene 3/0 (Fig. 5). Antibiotics were continued for five days postoperatively. Suction drain was removed when output was reduced to less than 5 ml/24 hours. The patients were discharged on 3rd to 5th postoperative days and re-viewed on the 7th and 14th postoperative days for wound examination and removal of stitches respectively. Patients were advised to shave the buttocks regularly and maintain good hygiene. The follow-up schedule included a monthly follow-up for 03 months, then quarterly for a period of 12 months.

RESULTS

Sixty two patients underwent this procedure. Among them 60 (96.7%) were male and 2 (03.3%) were females. The mean age was 26 years (Range: 18-45 years) (Table-1). Five patients (8%) in this study presented with recurrent sinus. They had previous surgery in the form of simple excision and secondary healing. Fifty five patients (88.8%) had full primary healing without any complication. The overall

complication rate was 11.2% (Table 2). Three patients (4.8%) developed superficial wound infection. Two patients (3.2%) had minimal epidermolysis of flap corners. One had slight gaping of wound edges due to early removal of stitches. Seroma formation occurred in one patient which was drained after removing few stitches. However, all these patients completely recovered with conservative treatment. Recurrence was seen in one patient (1.6%) that occurred about 06 months after surgery. He developed a new sinus at the lowermost corner. Later on, it was excised and wound was allowed to granulate. The mean duration of hospital stay was 04 days (Range: 3-5 days) and the most of the patients returned to work within 03 weeks (Range: 15-21 days).

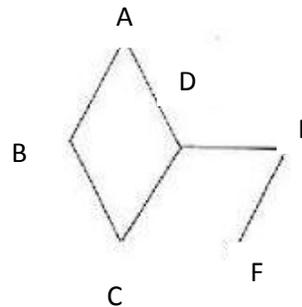


Fig. 1: Geometric diagram of a rhomboid flap



Fig. 2: Rhomboid of a rhomboid flap



Fig. 3: Rhombic defect after excision of the affected area



Fig. 4: Limberg fasciocutaneous flap transposed to cover the defect



Fig.5: Final image after completion of procedure

Table 1 Limberg flap for pilonidal sinus characteristics (n=62)

Male	60
Female	02
Primary Pilonidal Sinus	57
Recurrent disease with previous treatment	05
Hospital stay (Days)	3-5 (mean 04)
Days to return to work	15-21 (mean 18)

Table 2: Limberg flap for pilonidal sinus complications

Complications	n.	%age
Superficial wound infection	3	4.8
Epidermal necrosis of Flap Corner	02	3.2
Seroma formation	1	1.6
Wound dehiscence	1	1.6
Recurrence of disease	1	1.6

Table-3: Summary of results with limberg flap technique in various studies

Author	n	Mean Hospital Stay	Complications	Recurrence
Akin M et al 2008 ²⁴	411	3.2 days	15.7%	2.9%
Katsoulis IE et al 2006 ²³	25	4 days	16%	4%
Mentes BB et al 2004 ²²	238	2-3	2%	1.2%
Urhan MK et al 2002 ¹⁶	102	3.7 days	7%	4.9%
Raza MW et al 2012 ²⁶	57	5 days	19%	4.4%
Aslam MN et al 2009 ²⁵	110	3 days	5%	1%
Mentes O et al 2008 ²⁸	353	4.5 days	15%	3.1%
Rabbani S et al 2014 (Present Study)	62	4 days	11.2%	1.6%

DISCUSSION

The etiology and pathogenesis of Sacrococcygeal Pilonidal sinus is still a matter of debate. Karydakos¹³ (1992) suggested three risk factors related to the development of Pilonidal sinus namely, 1) "The invader" consisting of loose hair, 2) "Some force", the depth and the narrowness of the natal cleft together with friction movement between the sides of the cleft, which causes hair to insert and 3) "the vulnerability of the skin" to hair insertion in natal cleft. The surgical treatment should intend towards removing all the sinus tracts as well as the predisposing factors that continue in the formation of Pilonidal sinus. Many surgical procedures have been performed from simply excising the sinus and laying the wound open to complex flap reconstruction. The main objective of an ideal surgical procedure for the treatment of this disease is to provide a high chance for cure with minimal discomfort as well as low complication and recurrence rates. The surgery should also avoid prolonged hospital stay and ensure a short duration of inability to work.²¹ Middleton²⁷ postulated in 1966 that surgical treatment should include primary wound closure off the midline and flattening of natal cleft. Bascom¹⁴ in 1998 also reported that pilonidal sinus

never begins on a convex surface and reducing the depth of the natal cleft is associated with high chance of permanent cure. On the basis of these principles different flaps techniques are evolved in the current surgical treatment of Pilonidal sinus. The Limberg flap is one of the transposition flaps used after the excision of Pilonidal sinus to reconstruct the defect. This reconstruction is easy to design and perform. It flattens the natal cleft with a large well vascularized pedicle that can be sutured without tension thus avoiding the midline suture line. This eventually helps in maintaining local hygiene, avoids hair insertion by minimizing the friction between buttocks reducing humidity, maceration, erosions and scar formation at the natal cleft. Limberg transposition flap technique is particularly useful for complex sinuses with multiple openings and branching tracts, where radical excision leaves a large defect¹⁶. Several studies have recently been reported using this flap technique with minimal wound complications and low recurrence rate (Table 3). Our results with rhomboid excision and Limberg flap are comparable with other series that have shown wound complication rates of 0-19% and recurrence rates of 0-5%.^{16,22,23,24} One recognized problem associated with flap construction is early development of seroma and haematoma

formation. This predisposes to wound infection and flap failure. Insertion of suction drainage has been advocated by many centers to prevent this complication. We also believe that use of suction drain and prophylactic antibiotics decrease the incidence of infective complications and seroma formation. Different series have reported wound infection rates of 1.5 – 7%.^{21,24,29} In the present study the infection rate was 4.8%. the mean duration of hospital stay was 4 days and mean time to return to work was 18 days, in keeping with the findings of Urhan et al and Bozkurt and Tezel who have reported the mean length of the hospital stay as 3.7 and 4.1 days and the mean time to return to the normal activity as 7 and 17.5 days respectively.^{16,30} If the disease recurs, it commonly presents in first 2-3 years. In our study, the recurrence rate observed was 1.6%. Other authors have reported recurrence rates of 0-5% with Limberg transposition flap.

CONCLUSION

Rhomboid excision with Limberg fasciocutaneous transposition flap technique is a reasonably good, safe and reliable treatment modality for both, primary and recurrent as well as simple and complex Sacrococcygeal Pilonidal sinus with less post operative wound complications, short hospital stay and acceptably low recurrence rate.

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