Original Article

Outcome of Limberg Flap Procedure for the Treatment of Primary and Recurrent Sacrococcygeal Pilonidal Sinus

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Abstract

Background and aim: Pilonidal sinus, especially the sacrococcygeal variety, is an acquired condition most commonly seen in young adult males. Different surgical treatment of sacrococcygeal pilonidal disease has been described with variable morbidity and recurrence rate. Aim of this study is to evaluate the outcome of Limberg procedure in treatment of both primary and recurrent sacrococcygeal pilonidal sinus. **Methods:** This prospective study was conducted in the Department of Colorectal Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka from March, 2020 to February, 2022. During this period, 30 patients of sacrococcygeal pilonidal sinus were included. All the patients successfully underwent rhomboid excision with Limberg flap transposition. Duration of operation, postoperative pain, duration of hospital stays, time to return to work and postoperative complications including recurrence were noted. A mean follow-up of 18 months was performed on all patients an out-patient basis. **Results:** There were 28 males (93.75%) and 2 females (6.25%), with a mean age of 28 years. Among them, 12 patients had recurrent disease. Mean operative time was about 50 minutes. Mean pain score (VAS scale) was 3.65. The mean length of hospital stay was 4 days and mean time to return to work was 18 days. Four patients (13.33%) presented with post-operative complications of which one patient had recurrence (3.33%). **Conclusion:** Limberg flap technique is an effective procedure for the treatment of sacrococcygeal pilonidal sinus disease, both in primary and recurrent cases; and is associated with few complications and even fewer recurrences.

Keywords: Sacrococcygeal pilonidal sinus, rhomboid excision, Limberg flap.

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Introduction

Pilonidal sinus is characteristically a blind epithelial tract which is most commonly seen in the sacrococcygeal region and also been described in the axilla, suprapubic area, peri-umblical zone and between the fingers of the hand1. The name pilonidal is taken from Latin meaning “nest of hairs.” The estimated incidence is 26 per 1, 00,000 people [1, 2]. It generally presents as a cyst, abscess, or sinus tracts with or without discharge [2]. Men affected more often than women, rare both before puberty and after the age of 40 years [3]. Rarely may it present in the fourth decade [3].

The etiology and pathogenesis of pilonidal sinus is still a matter of debate. The current consensus holds that loose hairs trapped in the

natal cleft traumatize and penetrate the skin, creating a foreign body reaction that may ultimately lead to formation of midline pits and, in some cases, secondary infection [4]. Risk factors associated with pilonidal disease include obesity, a sedentary lifestyle, repetitive trauma or irritation to the gluteal cleft skin, familial history of pilonidal disease, and a hirsute body habitus [4, 5]. Karydakis proposed three main causative factors, namely high quantity of hair, extreme force, and vulnerability to infection [6].

Numerous treatment options are available like gluteal cleft hair removal, tract ablation by fibrin glue or laser, simple excision with or without primary closure, and wide excision with flap reconstruction [4]. The main complication is recurrence; the literature review suggested that it ranges from 20–40% regardless of the technique used [5].

Literature study shows that Limberg flap reconstruction following rhomboid excision of the sinus area designed by Limberg [7] in 1946 is superior to primary closure and other flap procedures8,9 and a safe and reliable method for both primary and recurrent sacrococcygeal pilonidal sinus disease with low complication and recurrence rates.

In this study, we present our experience of Limberg flap for the treatment of both primary and recurrent sacrococcygeal pilonidal sinus disease.

Aims and Objective

To evaluate the outcome of Limberg flap procedure for primary and recurrent sacrococcygeal pilonidal sinus in terms of postoperative pain, duration of hospital stay, time to return to work, postoperative complications and recurrence.

Materials and Methods

This is a prospective observational study carried out at the Department of Colorectal Surgery, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh from March, 2020 to February, 2022. Ethical clearance was taken from Institutional Review Board (IRB), BSMMU.

Inclusion criteria: Patients having sacrococcygeal pilonidal sinus, either primary or recurrent (having history of previous definitive surgery) or having history of incision and drainage for previous pilonidal abscess.

Exclusion criteria: Patients having active abscess and patient having diagnostic dilemma (e.g.: Crohn's disease, fistula-in-ano, tuberculosis).

Operative procedure: Under spinal anesthesia, patient was placed in jackknife position with buttocks strapped. Area to be excised and the flap lines were mapped on the skin (Fig. 1). The rhomboid incision including the sinus and its extensions was made down to the presacral fascia. The diseased area was removed en bloc (Fig. 2). A rhombic shaped fasciocutaneous flap was developed and transposed into the rhombic defect without tension (Figure-3). Suction drain was placed, subcutaneous tissue was approximated and skin was closed (Figure-4). Antibiotics were given for 7 days. The suction drain removed usually on 4th POD and sutures removed on 10th POD. The patients were advised not to put pressure on the flap for 3 weeks and were followed up for at least 6 months in the Colorectal OPD. The importance of anal hygiene and hair removal from the area was stressed and patients were encouraged to return to normal activity.

Results

The present study consisted of 28 males (93.33%) and 2 females (6.67%), with a mean age of 28 years (range 18–38 years). Of the 30 patients, 18(60%) had primary disease, 8(26.67%) had recurrent disease (history of



Figure 1: Marking with letters.



Figure 3: Transposition of mobilized flap.

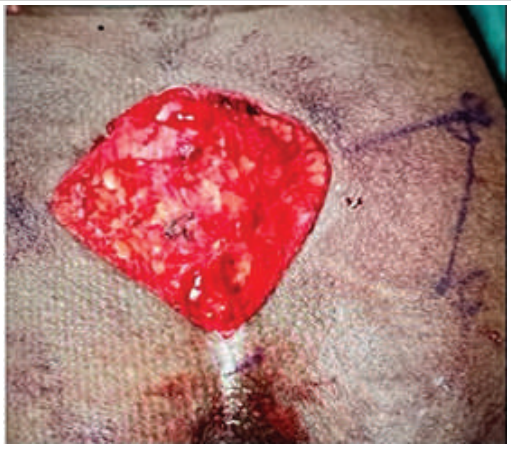


Figure 2: Excision till deep fascia.



Figure 4: Final outcome.

wide excision with primary closure), and 4(13.33%) came up after having previous incision and drainage for pilonidal abscess.

Mean operative time was about 50 minutes (range 40-60 minutes). Pain score, as calculated by VAS (visual analogue scale), had a mean of 3.65 (range 3-7). The mean length of hospital stay was 4 days (range 3-7 days), and the mean time to return to work was 18 days (range 11-31 day). The mean time to drain removal and suture removal were 4 days (range 2-15 days) and 10 days (range 10-21 days), respectively. 26 patients (86.67%) including both the females had full primary healing without any complication.

Four patients (13.33%), all male, had complications. One patient had flap tip necrosis, requiring diligent dressing and antibiotic coverage for 3 weeks to heal by secondary intension. Another patient had complete wound dehiscence after removal of sutures on 10th POD and managed by re-suturing under local anesthesia. There was prolonged hospital stay (7 days) for one patient owing to pain and protracted drain output which was caused probably due to seroma formation beneath the flap. Finally, we had one case of recurrence (3.33%). The case presented initially as a large hematoma followed by evacuation, infection and flap failure. Although the wound healed by secondary intension after long conservative treatment, the patient presented with recurrent abscess in the operated area 3 months after the surgery. The abscess was laid open, drained and secondary wound healing allowed for final recovery of the patient.

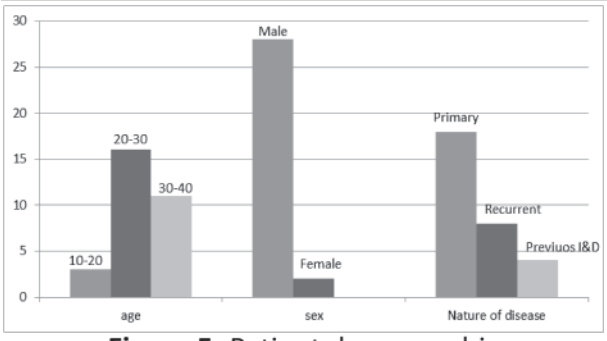


Figure 5: Patient demographics.

Table I. Operative data (n=30).

Variable	Range (Mean)
Operating time (minute)	40-60 (50)
Pain score (VAS scale)	3-7 (3.65)
Hospital stay (days)	3-7 (4)
Drain removal (days)	2-15 (4)
Suture removal (days)	10-21 (10)
Return to work (days)	11-31 (18)

Table II. Postoperative complications.

Name of complication	Number of patients (%)
Flap tip necrosis	1 (3.33%)
Complete wound dehiscence	1 (3.33%)
Seroma formation with delayed healing	1 (3.33%)
Recurrence	1 (3.33%)
Overall	4 (13.33%)

Discussion

Surgical treatment of pilonidal sinus is challenging due to the high rates of wound infection, impaired healing and recurrence. The surgical treatment should intend towards removing all the sinus tracts as well as the predisposing factors that contribute in the formation of pilonidal sinus. The goals of the ideal procedure for the treatment should be reliable wound healing, a low risk of recurrence, a short hospital stay and early return to normal daily activity.

Recurrence is the main problem associated with all surgeries described, which ranges from 21-100% for incision and drainage, 5.5–33% for excision and open packing, 8% for marsupialization, 3.3–11% for Z-plasty [5, 8, 9]. The advantage of Limberg flap reconstruction is that it flattens the natal cleft with a large, well vascularized pedicle that can be sutured without tension [7]. Any midline dead space is eliminated and midline scar avoided. It is a particularly useful technique for complex primary sinuses with multiple pits and also for recurrent cases. Finally, it is relatively easier to design and perform than other flap transposition techniques.

Most studies [10-14] have reported mean operating time 45 minutes, mean VAS pain score 3.5, mean hospital stay 3 days, mean time to drain and suture removal 2 and 10 days, and mean time to return to work 15 days; which is similar to our results. In our study the overall complication rate was 13.33% with one recurrence (3.33%) which are comparable with other series that have shown wound complication of 0-16% and recurrence rates of 0–5% [5, 8, 9, 11-14].

One recognized complication of flap reconstruction is seroma or hematoma formation under the flap, sometimes resulting in wound dehiscence. Use of suction drain has been advocated to mitigate this problem [12, 14], and we agree to it as we had experienced two similar complications.

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 by shaving the edges of the wound is recommended and maintenance of perianal hygiene is mandatory.

Conclusion

Limberg flap reconstruction after excision of the pilonidal sinus is an easy technique to perform in quick time, useful in both primary and recurrent diseases, with very low complication and recurrence rates. Other advantages are quick healing time, short hospital stay, and early return to daily life. However, preopera-

tive counseling with the patient is a must as the procedure is not without complications and may result in prolonged morbidity and/or a second procedure in a few cases.

Reference

1. Hull TL, Wu J. Pilonidal disease. Surg Clin North Am. 2002; 82:1169–1185.

2. Clothier PR, Haywood IR. The natural history of the post anal pilonidal sinus. Ann R College Surg England. 2002;66(3):201–203

3. Berger A, Frileux P. Pilonidal sinus. Ann Chir. 1995;49:889–901.

4. Steele SR, Hull TL, Read TE, et al. The ASCRS Textbook of Colon and Rectal Surgery, 3rd ed. New York, NY: Springer; 2016.

5. Karydakis GE. Easy and successful treatment of pilonidal sinus after explanation of its causative process. Aust NZJ Surg.1992;62:385–389.

6. Wolfe SA, Limberg AA, M.D. Plastic and reconstructive surgery. 1975; 56(2):239–240.

7. Altintoprak F, Dikicier E, Arslan Y, Ozkececi T, Akbulut G, Dilek ON. Comparison of the Limberg flap with the V-Y flap technique in the treatment of pilonidal disease. J Korean Surg Soc. 2013 Aug; 85(2):63-7.

8. Ersoy E, Onder Devay A, Aktimur R, Doganay B, Ozdogan M, Gundogdu RH. Comparison of the short-term results after Limberg and Karydakis procedures for pilonidal disease: Randomized prospective analysis of 100 patients. Colorectal Dis. 2008; 11: 705–10.

9. Farquharson EL, Rintoul RF. Farquharson's Textbook of operative general surgery. 9th edn. London. Hodder Arnold Publication, 2005; p 457–458.

10. Akca T, Colak T. Primary closure with Limberg flap in treatment of pilonidal sinus-randomized clinical trial. BJS.2005; 5074:1081–1084.

11. Kapan M, Kapan S, Pekmezci S, Dugun V. Sacrococcygeal pilonidal sinus disease with Limberg flap repair. Tech Coloproctol. 2002; 190:388–392.

12. Urhan MK, Kucukel F, Topgul K, Ozer I, Sari S. Rhomboid excision and Limberg flap for managing pilonidal sinus: results of 102 cases. Dis Colon Rectum. 2002; 45: 656–9.

13. Sabet AM, El Shaer WMH, El Amary MK. Definitive treatment of recurrent pilonidal sinus disease using rhomboid excision and Limberg flap. Egypt J Surg. 2004 Oct; 23(4): 324–7.

14. Mentes O, Bagci M, Bilgin T, Ozgul O, Ozdemir M. Limberg flap procedure for pilonidal sinus disease: results of 353 patients. Langenbecks Arch Surg. 2008 Mar; 393(2): 185-9. Epub 2007 Sep 22.