

Comparison of Primary Simple Closure and Limberg Flap Technique in treatment of Pilonidal Sinus

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Abstract

Introduction: Pilonidal sinus is a disease affecting the intergluteal region. Many surgical techniques have been described for the treatment of this condition. The objective of this study was to compare Limberg flap technique and primary simple closure in terms of postoperative discharge.

Materials and Methods: It was a randomized prospective study conducted at the Department of Surgery from December 2018 to June 2021. Sixty male patients aged 15-30 years presenting with pilonidal sinus for the first time were included in the study. Patients with comorbidities and the American Society of Anesthesiologists (ASA) class three and above were excluded from the study. Patients were divided into two groups by lottery method. Data was entered and analyzed using Statistical Package for Social Sciences (SPSS) version 23.0. Chi-square tests were applied. A p-value of ≤ 0.05 was considered significant.

Results: The postoperative discharge was found in just five (16.3%) of the patients in group A (Limberg flap technique), while the discharge was present in 12 (40%) of the patients in group B (primary simple closure; $p = 0.045$).

Conclusion: Limberg flap technique is superior to primary simple closure in terms of postoperative discharge.

Keywords: Limberg Flap, Pilonidal sinus, primary simple closure.

Introduction

In 1847, Anderson firstly described the disease "Pilonidal sinus" which is usually a pathology of the intergluteal region. Although considered a chronic disease, it is still characterized by an acute flare of the disease [1]. Most commonly, it arises in the hair follicles of the natal cleft in the sacrococcygeal area. Males are twice more affected as females and the incidence of the disease is reported as 26 per 100,000 population [2].

Several surgical interventions are described in the literature despite conservative management, but the problem of treatment failure and disease recurrence is quite significant, which leads to morbidity in these otherwise healthy patients and hence interventions have variable success rates [3,4]. As compared to simple excision, primary closure is the preferred technique as it is associated with a lower risk of postoperative infection and wound dehiscence, rapid healing by primary intention, and less number of postoperative visits, less pain, and earlier hospital discharge, and social mobility [5]. Besides, it is also concerning that the incision tends to be situated in a deep midline cleft where there is tension and also the propensity to accumulate hair hence the dilemma exists [6]. Other studies suggest that the excision with a modified Limberg transposition flap reconstruction is an effective and a good operative alternative for uncomplicated pilonidal sinus. This procedure is also associated with a low complication rate, short hospitalization, low risk of disability, early return to work life, and a low recurrence [7,8]. This study will help us compare two methods of pilonidal sinus treatment that may be of paramount significance in terms of improved patient care and future progress in the field of pilonidal sinus treatment.

This study aimed to compare the effect of primary simple closure versus Limberg flap rotation in the treatment of pilonidal sinus at our setups as there is variability in outcomes of both procedures even in recent studies and literature recommended further comparative studies to decrease the recurrence rate [9,10].

Materials and Methods

This study was a prospective randomized study conducted at the Department of Surgery from December 2018 to June 2021. It consisted of 60

diagnosed cases of pilonidal sinus randomized into two groups by lottery method. Patients, including males of age 15-50 years and those who were presenting for the first time, were included in the study, while the patients with co-morbid (diabetes, hypertension, etc.), anesthesiologically unfit (American Society of Anesthesiologists (ASA) class ≥ 3) and having pilonidal sinus of other areas were excluded. Group A ($n = 30$) included patients who underwent closure by Limberg flap technique, and Group B ($n = 30$) included patients who underwent primary simple closure.

After approval from the ethical committee and informed consent from patients, complete history was taken and a clinical examination of the patients was done including general physical examination and local and systemic examination. They were then randomized into their respective groups. All patients either undergoing primary simple closure or Limberg flap closure were given a single dose of intravenous injection of Augmentin 1.2 grams per operatively. The same dose was continued for three days postoperatively. Analgesic used was intravenous Ketorolac injection of 30 mg postoperatively which was then repeated eight hourly. Primary simple closure is to excise the whole tract of the sinus up to the sacrum and close the wound primarily through sutures in the midline. In patients undergoing Limberg flap technique, the wound was excised and it was covered by a rhombus-shaped transposition flap with off midline closure. Each patient was followed up after the completion of the procedure. Follow-up was ensured by taking the contact numbers of the patients. Patients who presented with any type of fluid coming out of the wound within 14 days of the procedure were considered patients with postoperative discharge. All this information was recorded on a structured proforma.

The collected data was entered and analyzed in computer software Statistical Package for Social Sciences (SPSS) software (version 23.0). Qualitative variables such as postoperative discharge, ASA grade, and duration of the problem (up-to 3 months and greater than 3 months) were measured as frequency and percentage. Quantitative variables such as age were measured as mean and standard deviation. A Chi-square test was used to compare postoperative discharge in both study groups. Effect modifiers, such as age, ASA grade, and duration of the problem, were controlled by stratification. Post-stratification chi-

square tests were applied. A P-value of ≤ 0.05 was considered significant.

Results

Out of the 60 male patients, 30 were included in Limberg flap closure group (Group A), while the other 30 were included in the primary simple closure group (Group B). The mean age in Group A and B was 34.5 years \pm 9.7 years and 36.4 years \pm 9.1 years, respectively. The demographic profile of the patients is shown in Table 1.

Table 1: Demographic profile of the patients undergoing Limberg flap closure and primary simple closure (ASA, American College of Anesthesiologists)

Variables	Groups	Limberg flap closure (n=30)	Primary simple closure (n=30)
Age	15-35 years	13 (43.3%)	14 (46.7%)
	36-50 years	17 (56.7%)	16 (53.3%)
ASA groups	ASA-I	17 (56.7%)	16 (53.3%)
	ASA-II	13 (43.3%)	14 (46.7%)
Duration of symptoms	Up to three months	18 (60.0%)	17 (56.7%)
	More than three	12 (40.0%)	13 (43.3%)

Table 3: Stratification of the patients based on age, ASA class, and duration of complaints between primary simple closure group and Limberg flap group (ASA, American College of Anesthesiologists)

Variables	Groups	Limberg flap closure (n = 30)		Primary simple closure (n = 30)		p-value
		Postoperative discharge present (n = 5)	Postoperative discharge absent (n= 25)	Postoperative discharge present (n = 12)	Postoperative discharge absent (n = 18)	
Age (years)	15-35	2 (15.4%)	11 (84.6%)	6 (42.9%)	8 (57.1%)	0.118
	36-50	3 (17.6%)	14 (82.4%)	6 (37.5%)	10 (62.5%)	0.201
ASA	ASA-I	3 (17.6%)	14 (82.4%)	6 (37.5%)	10 (62.5%)	0.201
	ASA-II	2 (15.4%)	11 (84.6%)	6 (42.9%)	8 (57.1%)	0.118
Duration of complaints	Up to three months	4 (22.2%)	14 (77.8%)	5 (29.4%)	12 (70.6%)	0.711
	>3 months	1 (8.3%)	11 (91.7%)	7 (53.8%)	6 (46.2%)	0.015

Discussion

Pilonidal sinus causes considerable morbidity and loss of workdays, especially in the younger population [11]. Pilonidal sinus has a spectrum of presentation

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The postoperative discharge was found in just five (16.3%) of the patients in group A, while the discharge was present in 12 (40%) of the patients in group B (p = 0.045; Table 2).

Table 2: Postoperative discharge on the fifth, tenth, and fourteenth day of the procedure in both groups (primary simple closure group and Limberg flap group)

Postoperative day	Limberg flap closure (n=5)	Primary simple closure (n=12)
Fifth	3 (60%)	7 (58.3%)
Tenth	2 (40%)	3 (25%)
Fourteenth	0	2 (16.7%)

The stratification of the patients in both treatment groups based on age, ASA class, and duration of complaints is shown in Table 3. In the age group between 15-35 only 2 (15.4%) patients were presented with discharge in Limberg flap group as compared to 6 (42.9%) patients in primary simple closure group. Similarly, the same pattern was observed between age group 36-50 when two treatment groups were compared. In the same way, up to 3 months only 4 patients were presented with post-operative discharge in Limberg flap group and 5 (29.4%) patients were with post-operative discharge in primary simple closure group.

from asymptomatic pits at one end to painful sinuses at the other end [12,13].

In our study, postoperative discharge was found in only 16.3% of patients who underwent Limberg flap closure, while postoperative discharge was found in 40% of the patients who underwent simple primary

closure. This difference was only slightly significant. A study by Youssef et al. also showed that modified Limberg technique was significantly superior to simple primary closure in terms of time to drain removal. However, there was no significant difference concerning postoperative pain after the first, second, and fourth weeks. The time taken to walk free of pain was also statistically insignificant between the two groups [14]. Another study by Shabbir et al. also depicted that Limberg technique was associated with lesser recurrence rates (3.3%) as compared to primary closure (13.3%).

Rate of infections was also lower in Limberg technique (6.6%) as compared to primary closure (26.6%). Limberg technique was also superior to primary closure in terms of mean length of hospitalization and mean time to return to work [15]. According to a study by Muzi et al., the rate of surgical wound infections was significantly higher in the primary closure group as compared to the group undergoing Limberg technique [16]. Another study by Abdelraheem et al. showed that wound infection was more frequent in the primary closure group (20%) as compared to Limberg flap group (6.7%). There was no statistical difference between the two groups concerning wound dehiscence, hematoma formation, and seroma formation. Recurrence was significantly more frequent in the primary closure technique (20%) as compared to the Limberg closure group (3.3%) [17].

Thus, the efficiency of the procedure depends upon how effectively it controls the risk factors that lead to the formation of pilonidal sinus. These factors are the forces that act on the midline, friction between the buttocks, the vacuum between the buttocks that attracts the foreign material, bad hygiene, and hirsuteness [5,18-23].

Conclusion

Pilonidal sinus is more common in middle-aged men. Our study shows that both techniques are almost comparable in terms of postoperative discharge. However, Limberg flap technique is slightly better than the primary simple closure for the treatment of pilonidal in terms of postoperative discharge. Other factors such as infections, treatment outcomes, and postoperative pain may affect the decision regarding the selection of appropriate procedures.

References

1. Boshnaq M, Phan YC, Martini I, Harilingam M, Akhtar M, Tsavellas G. Limberg flap in management of pilonidal sinus disease: systematic review and a local experience. *Acta Chirurgica Belgica*. 2018 Mar 4;118(2):78-84.
2. Romaniszyn M, Swirta JS, Walega PJ. Long-term results of endoscopic pilonidal sinus treatment vs Limberg flap for treatment of difficult cases of complicated pilonidal disease: a prospective, nonrandomized study. *Colorectal Disease*. 2020 Mar;22(3):319-24.
3. Destek S, Bektaşoğlu HK, Kunduz E, Akyüz MN. Comparison of postoperative quality of life of Limberg flap and Karydakias flap in pilonidal sinus operations. *Turkish Journal of Surgery*. 2020 Mar;36(1):59.
4. Kanlioz M, Ekici U. Analysis of the relapse rates of the primary closure and Limberg flap techniques in pilonidal sinus surgery. *Cureus*. 2019 Sep 23;11(9).
5. Prassas D, Rolfs TM, Schumacher FJ, Krieg A. Karydakias flap reconstruction versus Limberg flap transposition for pilonidal sinus disease: a meta-analysis of randomized controlled trials. *Langenbeck's archives of surgery*. 2018 Aug;403(5):547-54.
6. Wadhawan G, Sharma D, Vyas KC. A comparative study of different treatment outcomes in cases of pilonidal disease. *Int J Surg*. 2020;4(2):292-7.
7. Bi S, Sun K, Chen S, Gu J. Surgical procedures in the pilonidal sinus disease: a systematic review and network meta-analysis. *Scientific reports*. 2020 Aug 13;10(1):1-1.
8. Gezer HÖ, Ezer SS, İnce E, Temiz A. Treatment of young patients with pilonidal sinus disease with the original (unmodified) Limberg flap standardized for the first time. *Pediatrics International*. 2020 Oct;62(10):1171-6.
9. Singh M, Dalal S, Raman S. Management of pilonidal sinus disease with Limberg flap: our experience. *International Surgery Journal*. 2020 Apr 23;7(5):1575-9.
10. Dudhwala MF, Singh V. Limberg flap versus primary closure in the treatment of sacrococcygeal pilonidal sinus. *International Journal of Surgery*. 2020;4(3):16-8.
11. Ozcan R, Hüseyinov M, Bakır AC, Emre S, Tütüncü C, Celayir S, Tekant GT. Which treatment modality for pediatric pilonidal sinus: Primary repair or secondary healing?. *Asian journal of surgery*. 2018 Sep 1;41(5):506-10.
12. Devaprashanth M, Srinivas NM, Akhildandeshwari N. Limberg flap versus primary closure in the treatment of pilonidal sinus: a randomised clinical study. *International Surgery Journal*. 2021 Jul 28;8(8):2388-91.
13. Ozturk H, Yoldas H, Karagoz I. Surgical treatment with rhomboid excision and Limberg flap technique under spinal anesthesia of 23 young with pilonidal sinus disease. *Experimental Biomedical Research*. 2018 Jan 8;1(1):25-31.
14. Youssef T, El-Awady S, Farid M: Tension-free primary closure compared with modified Limberg flap for pilonidal sinus disease: a prospective balanced randomized study. *Egypt J Surg*. 2015; 34(2):85-9.
15. Shabbir F, Ayyaz M, Farooka MW, Toor AA, Sarwar H, Malik AA. Modified Limberg's flap versus primary closure for treatment of pilonidal sinus disease: a comparative study. *J Pak Med Assoc*. 2014 Nov;64(11):1270-3.
16. Muzi MG, Milito G, Cadeddu F, Nigro C, Andreoli F, Amabile D, Farinon AM. Randomized comparison of Limberg flap versus modified primary closure for the treatment of pilonidal disease. *Am J Surg*. 2010 Jul;200(1):9-14.
17. Abdelraheem O, Khalil M. Comparative study between excision with primary closure versus Limberg flap for treatment of primary sacrococcygeal pilonidal sinus. *International Surgery Journal*. 2017 Oct 27;4(11):3581-5.
18. Bascom JU. Repeat pilonidal operations. *The American journal of surgery*. 1987 Jul 1;154(1):118-22.

19. Menten O, Bagci M, Bilgin T, Ozgul O, Ozdemir M. Limberg flap procedure for pilonidal sinus disease: results of 353 patients. *Langenbeck's Archives of Surgery*. 2008 Mar;393(2):185-9.
20. Lee HC, Ho YH, Seow CF, Eu KW, Nyam D. Pilonidal disease in Singapore: clinical features and management. *Australian and New Zealand Journal of Surgery*. 2000 Mar 11;70(3):196-8.
21. Akinci ÖF, Bozer M, Uzunköy A, Düzgün ŞA, Coşkun A. Incidence and aetiological factors in pilonidal sinus among Turkish soldiers. *The European journal of surgery*. 1999 Jan 1;165(4):339-42.
22. Harlak A, Menten O, Kilic S, Coskun K, Duman K, Yilmaz F. Sacrococcygeal pilonidal disease: analysis of previously proposed risk factors. *Clinics*. 2010;65(2):125-31.
23. Tavassoli A, Noorshafiee S, Nazarzadeh R. Comparison of excision with primary repair versus Limberg flap. *International journal of surgery*. 2011 Jan 1;9(4):343-6.