

LIMBERG FLAP VERSUS EXCISION WITH PRIMARY CLOSURE IN PILONIDAL SINUS

By

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ABSTRACT

Background: Pilonidal sinus disease (PNS) is a potentially debilitating condition. It was first described by Anderson in 1847 and is often seen in the intergluteal region and can cause loss of work time. Several procedures have been advocated for treatment and the fact that no single procedure is superior in all respect.

Objective: This study aimed to compare the outcomes of excision and primary closure versus Limberg-flap (LF) techniques.

Patients and methods: This randomized, prospective observational study was carried out at the Department of surgery, Al-Zahraa University Hospital, Al-Azhar University, Cairo, Egypt over 2 years (January 2018 to January 2020) on 60 patients out of which 30 underwent rhomboid excision with Limberg flap reconstruction (group A) and 30 underwent excision with primary closure (group B). Post-operative follow up was done till 12 months and complications were recorded.

Results: There was no statistical difference between the two groups as regards demographic data, partial wound dehiscence, and time to complete healing. There was a statistically significant difference between the two groups as regards wound complications (3.3% in group A versus 20.0% in group B) and the recurrence rate (13.3% in group B versus 0% in group A).

Conclusions: Limberg flap method for the pilonidal sinus is a better choice than midline closure after elliptical excision in terms of postoperative wound complications and recurrence.

Key Words: Pilonidal sinus; Limberg flap; Primary closure.

INTRODUCTION

Pilonidal sinus disease (PNS) is a common and often debilitating infectious and inflammatory condition of the gluteal cleft and sacrococcygeal region. It is characterized by sinus and abscess formation, typically in association with midline openings that entrap hair and debris (*Kumar et al., 2017*).

Patients may have significant pain, drainage, and bleeding. Chronicity and recurrence are common. The disease process can range in severity from small,

asymptomatic pits to multiple tracts and fistulization away from the midline (*Grabowski et al., 2019*).

The disease carries high postoperative morbidity and patient discomfort Karydakis suggested three main factors interacting to produce disease namely hair, force, and vulnerability like obesity and family history (*Singh et al., 2017*). Some researchers have proposed that pilonidal sinus may be the result of a congenital pilonidal dimple. A deep natal cleft is a favorable environment for

sweating, maceration, bacterial contamination, and penetration of hairs. Thus, for treatment and prevention, these causative factors must be eliminated (Meena *et al.*, 2019).

Although PNS can be treated using several defined conservative and surgical methods, recurrence rates remain high. Complete removal of the pilonidal sinus or sinuses and appropriate reconstruction can lead to successful recovery (Yildiz *et al.*, 2013).

For decades, standard definitive care has consisted of excision with either secondary healing or primary closure of the wound; these approaches were originally derived largely from military hospital experience with Jeep riders' disease (Fitzpatrick *et al.*, 2013).

Although numerous surgical techniques have been reported in the literature, there is still no consensus for the ideal method for the treatment of PNS from abscess drainage to complex advanced off-midline flap mobilizations (Arslan *et al.*, 2016).

Modification of the midline and positioning of the incision scar to the cleft is the most important factor in wound healing; also, a recent Cochrane study reported that off-midline closure techniques should be the standard treatment method in PNS disease (Agcaoglu *et al.*, 2019).

Among these flap techniques, the LF technique has gained popularity and favor of many surgeons because they excise the underlying disease, provide healthy tissue coverage of the cavity without tension and are associated with low recurrence (by flattening and lateralizing the gluteal cleft,

respectively) and complication rates (Can *et al.*, 2010).

Our aim in this study was to prospectively compare early results in patients with pilonidal sinus treated with either Limberg flap rotation (LF) or excision with primary closure.

PATIENTS AND METHODS

This randomized, prospective double-blind clinical study was carried out at the Department of Surgery, Al-Zahra University Hospital, Al-Azhar University, Cairo, Egypt over 2 years (January 2018 to January 2020). Our institutional review board approved this study under the Helsinki Declaration.

Written informed consents were obtained from patients who were scheduled for elective PNS surgery (informing about the procedure, its complications, and the incidence of recurrence), both sexes patients were aged between 18 and 60 years, with ASA I or II.

Exclusion criteria:

Patients who refused to participate in the study, local infection at the site of operation, patients with a psychiatric disease or poor hygiene, (ASA) physical status ≥ 3 e.g. cardiac disease, pregnant woman, history of drug abuse, uncontrolled diabetes mellitus, patients with the unstable cardiorespiratory disorder, patients with hepatic and renal insufficiency.

Patients were classified randomly into two equal groups:

Group A: Underwent pilonidal surgery by excision and closure using the Limberg flap technique.

Group B: Underwent pilonidal sinus surgery by excision with primary closure only.

All were subjected to detailed personal data, risk factors, history of present illness, general and local examination, and laboratory investigations (preoperative preparation).

Surgical technique:

Excision and primary closure: The excision site was marked 1 cm away from the sinus. Then an elliptical incision was made that extended to the post sacral fascia. The tissue was resected, and proper hemostasis was done using minimum electrocautery. Then the wound was closed in layers and a vacuum drain (Redivac) was placed in a subcutaneous plane.

Limberg flap technique: We followed the surgical technique which was discussed by *Singh et al. (2017)*.

Statistical analysis:

Data were collected, revised, coded, and entered into the Statistical Package for the Social Science (IBM SPSS) version 23 (IBM Corp., Armonk, New York, USA). The quantitative data were presented as mean, standard deviations, and ranges and were compared by independent t-test. Qualitative data were presented as numbers and percentages and were compared by the Chi-square test (χ^2) or Fisher's exact test. So, the p-value was considered significant at $p < 0.05$.

RESULTS

Sixty patients were included in this study, 30 patients underwent excision with Limberg flap (group A) and 30 patients underwent excision with primary closure (group B). Patients were followed up for one year.

There was no statistical difference between the two groups as regards demographic data, partial wound dehiscence, and time to complete healing (**Table 1**).

Operative time, wound infection and recurrence showed a statistically significant difference between the two groups. Recurrence occurred in 4 patients in group B (13.3%) and nil in group A. Total wound dehiscence and flap necrosis did not occur in any patient. Wound infection occurred in one patient in group A (3.3%) and 6 patients in group B (20.0%) (**Table 1**).

Table (1): Comparison between the two groups (Mean \pm SD)

Parameters	Group A (no. = 30)	Group B (no. = 30)	P-value
Age			
Mean \pm SD	32.51 \pm 6.72	33.29 \pm 7.43	> 0.05
Range	16 - 43	18 - 40	
Sex			
Males	23 (76.7%)	24 (80.0%)	> 0.05
Females	7 (23.3%)	6 (20.0%)	
Wound infection	1 (3.3%)	6 (20.0%)	0.044
Partial wound dehiscence	0 (0.0%)	2 (6.7%)	> 0.05
Mean operative time			
Mean \pm SD	36.3 \pm 3.24	24.93 \pm 3.06	<0.001
Range (minutes)	40 - 52	20 - 30	
Time to healing			
Mean \pm SD	22.32 \pm 2.35	23.51 \pm 2.87	> 0.05
Range (days)	18-27	20 - 30	
Recurrence	0 (0.0%)	4 (13.3%)	0.038

DISCUSSION

This study compared between primary midline closure technique and the Limberg flap in pilonidal sinus disease in which there was no significance between two groups related to age.

This study showed high significance between two groups in operative time and this is because excision with reconstruction procedures is more technically demanding.

Kumar et al. (2017) have published a median operative time of 124.2 min. for the Limberg flap group against 38.7 min. for the primary midline closure group and the difference has been found to be significant. They reported the important advantages of the LF procedure as quick healing time, a short length of hospital stays, early return to normal activities, and low complication and recurrence rates.

Recurrence is the main problem in the treatment of pilonidal sinus. In our study, the recurrence rate in primary closure was

13.3% while no recurrence was reported in the Limberg flap group.

Several flap techniques have been described with recurrence rates ranging between zero and 6–8% (*Spycha and Murawa, 2014*).

Meena et al. (2019) determined a recurrence rate of 3.33% in the Limberg flap method and 26.67% in the primary closure method (P-value <0.05) and recommended the Limberg flap method for primary pilonidal disease with low morbidity rates as compared to primary closure.

A retrospective study was done by *Akin et al. (2010)* has shown that the recurrence rate was statistically higher in the classical group than in the modified Limberg flap group.

A recent meta-analysis demonstrating a higher recurrence rate in those with primary midline closure versus off-midline closure (*Stauffer et al., 2018*).

Karaca et al. (2012) reported that the Limberg Flap group provided better

postoperative pain score (visual analogue scale: VAS), complication rate, time to discontinuation of analgesics, and painless sitting.

In our study, wound infection was 3.3% for the Limberg flap group, and 20% for the primary closure group which was statistically significant.

Singh et al. (2017) reported, in his study for LF repair, that seroma development to be 6.2 % and superficial surgical site infection 3.1 %.

CONCLUSION

- Limberg flap method for pilonidal disease is a better choice than primary closure in terms of postoperative wound complications and recurrence. Post-surgical counseling for hair removal was very important to prevent a recurrence.
- Further studies are necessary with a larger volume sample and longer follow up period.

Conflict of Interest: No conflict of interest was declared by the authors.

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رفرف ليمبرغ مقابل الاستئصال مع الإغلاق الأولي فى الجيب الشعري

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خلفية البحث: مرض الجيب الشعري (الناصور العصعصى) هو حالة مرتقبة الوهن وغالباً ما يتم رؤيته فى المنطقة بين الإليتين، ويمكن أن يسبب فقدان العمل وتوجد طرق عديدة للعلاج (جراحية وغير جراحية)، ولا يوجد إجراء علاجى واحد أفضل من جميع النواحي.

الهدف من البحث: مقارنة نتائج الاستئصال مع الإغلاق الأولي مقابل تقنية رفرغ ليمبرغ.

المرضى وطرق البحث: أجريت هذه الدراسة العشوائية المستقبلية بقسم الجراحة بمستشفى الزهراء الجامعى بجامعة الأزهر بالقاهرة على مدى عامين (يناير 2014 إلى يناير 2020) على 60 مريضاً من بينهم 30 خضعوا لعملية إستئصال معينى الشكل مع عمل رفرغ ليمبرج (المجموعة أ)، وخضع 30 لإستئصال مع الإغلاق الأولي (المجموعة ب)، وتمت متابعة ما بعد الجراحة حتى 12 شهر.

نتائج البحث: لم يكن هناك فرق إحصائى بين المجموعتين فيما يتعلق بالبيانات الديموغرافية، وتفكك الجرح الجزئى ووقت الشفاء التام، بينما كانت هناك فروقا ذات دلالة إحصائية بين المجموعتين فيما يتعلق بمضاعفات الجرح (303% فى المجموعة أ مقابل 20% فى المجموعة ب) ومعدل ارتجاع المرض (3.13% فى المجموعة ب مقابل 0% فى المجموعة أ).

الإستنتاج: تميز الإستئصال المعينى مع عمل رفرغ ليمبرج بانخفاض معدل مضاعفات الجرح بعد الجراحة، وأيضاً نسبة إرتجاع المرض مقارنة بالاستئصال مع الإغلاق الأولي.