Tension-free Primary Closure, Secondary Intention, and Limberg Flap, Which Is More Effective in Treatment of Uncomplicated Pilonidal Sinus Disease?

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Abstract

Background: This study was performed to compare the efficacy and long-term outcomes of three surgical treatments for uncomplicated pilonidal sinus disease, tension-free primary closure, Limberg flap, and secondary intention (wide excision and packing).

Methods: In this randomized clinical trial study, 66 patients with uncomplicated pilonidal sinus disease were randomly assigned to be surgically treated using tension-free primary closure, Limberg flap, or secondary intention methods. The outcomes including pain, healing time, recurrence, complications, disability, reoperation, and patient satisfaction were compared between three groups after two years of follow-up.

Results: In Limberg flap group, the healing time and disability were significantly less than the two other groups; besides, the pain was significantly less than secondary intention group and more than the primary closure group ($P < 0.0001$ for all). There were no significant differences between the groups regarding recurrence, complications, reoperation, and patient satisfaction ($P > 0.05$ for all).

Conclusions: Totally, according to our findings and comparison with other studies, it may be concluded that Limberg flap is relatively better than primary and secondary intention in patients with uncomplicated pilonidal sinus disease.

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Introduction

Pilonidal sinus disease is the most common illness that eventually leads to surgery for its treatment (1). This disease is one of the most common causes for debilitating the patients in everyday activities. The most common age for this illness is between 15-30 years and there is no certain surgical procedure for its treatment. Due to the high recurrence of the disease, there is the need for a surgical procedure that reduces complications and has a shorter recovery time to return to work (2-4).

There is unanimity regarding the need to remove the sinus and surrounding tissues. But regarding wound healing methods (early repair, secondary intention, simple closure or using flap), there is controversy (1-7). Therefore, the need to evaluate and compare different methods of wound closure to determine a safe and simple method seems logical.

Accordingly, this study was designed to compare the long-term outcomes of three different surgical treatments for uncomplicated pilonidal sinus disease, tension-free primary closure, secondary intention, and Limberg flap.

Materials and Methods

This was a randomized clinical trial study on patients with uncomplicated pilonidal sinus disease. The study was confirmed by the Ethics Committee of Shahid Beheshti University of Medical Sciences, Iran, and it was registered in Iranian National Registry of Clinical Trials (IRCT) center. An informed consent was obtained from each patient and the contents of the Declaration of Helsinki were taken into consideration.

A researcher-made checklist was used to record the variables including recovery duration, pain, disability, recurrence, reoperation, complications, and patient

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satisfaction. Pain was evaluated using visual analog scale (VAS); the disability was assessed via checking the days of absence from work; and the patient satisfaction was evaluated via asking the patients in follow-up visits in the clinic. Patients were followed for two years.

Sixty six patients who were referred for repair surgery of uncomplicated pilonidal sinus disease with the age of 15 to 50 years, were entered the study using convenient sampling method and were randomly assigned to one of the three surgical repair groups of tension-free primary closure, Limberg flap, and secondary intention (wide excision and packing).

Data were analyzed using SPSS software version 21 (SPSS Inc., Chicago, IL, USA). For the quantitative variables, frequency and relative frequency were used, and for quantitative variables, the means and standard deviations were calculated. To test the hypothesis, chi-square, Fisher's exact, and analysis of variances (ANOVA) tests were used, and the significance level was considered as $P < 0.05$.

Results

Table 1 shows the assessed variables in three study groups. In general, among all the four studied items, there were significant differences between the three groups ($P < 0.0001$ for all). In Limberg flap surgery, the recorded time of the operating room was more, whereas the duration of pain, the duration of the recovery and disability (Figure 1) was lower than the other two groups; and the pain was less than the secondary intention and more than the tension-free primary closure methods.

Medical complications in the three groups showed no significant difference ($P > 0.05$). The recurrence was observed in one case, one case, and two cases in the Limberg flap, tension-free primary closure and secondary intention groups, respectively, with no significant difference ($P > 0.05$). One case, three cases and four cases needed reoperation in the Limberg flap, tension-free primary closure and secondary intention groups, respectively. There were no significant differences among the three groups ($P > 0.05$).

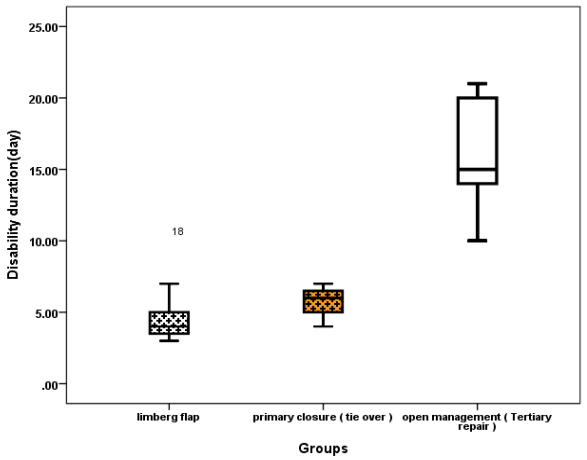

Figure 1. Comparison of the disability duration in three surgical treatments of uncomplicated pilonidal sinus disease

Patient satisfaction showed no significant difference between the Limberg flap (96%), tension-free primary closure (85%) and secondary intention (82%) groups, too ($P > 0.05$).

Discussion

In treatment of pilonidal sinus disease, despite unanimity regarding the need to remove the sinus and surrounding tissues, there is controversy about the best wound healing method which should be safe and simple. We aimed to compare the outcomes of three surgical treatments of uncomplicated pilonidal sinus disease, tension-free primary closure, secondary intention, and Limberg flap.

Table 1. Comparison of studied parameters in three surgical treatments of uncomplicated pilonidal sinus disease

Parameter	Group	Number	Mean ± Standard deviation	Minimum-Maximum	P-value
Healing time (Day)	Limberg flap	24	7.9 ± 4.8	5-30	< 0.0001
	Primary closure	20	17.0 ± 4.2	14-30	
	Secondary intention	22	29.7 ± 6.7	20-50	
Pain score (VAS)	Limberg flap	24	3.2 ± 1.6	1-7	< 0.0001
	Primary closure	20	4.4 ± 1.3	2-6	
	Secondary intention	22	5.5 ± 1.9	1-8	
Disability score	Limberg flap	24	4.4 ± 1.6	3-10	< 0.0001
	Primary closure	20	5.8 ± 1.0	4-7	
	Secondary intention	22	15.0 ± 3.7	3-21	
Pain duration (Day)	Limberg flap	24	3.5 ± 1.6	2-10	< 0.0001
	Primary closure	20	5.2 ± 1.0	3-7	
	Secondary intention	22	10.2 ± 3.3	6-15	
Operation duration (Minute)	Limberg flap	24	16.1 ± 3.4	11-25	< 0.0001
	Primary closure	20	14.9 ± 3.4	10-20	
	Secondary intention	22	6.7 ± 1.7	4-10	

VAS: Visual analog scale

Our findings indicated that in the Limberg flap surgery group, the pain was less than the secondary intention surgery and more than the tension-free primary closure surgery, and disability and duration of the recovery was less than the other two methods; these differences were statistically significant. The recurrence rate, need for reoperation, complications and patient satisfaction showed no significant difference among the three groups.

In a 6-year study on 93 patients in Turkey, there were no difference regarding the recurrence and wound infection between the two methods of tension-free primary wound closure and Limberg flap (8). Their findings were consistent with the present study.

In a 4-year research on 120 patients in Egypt, the duration of surgery was less and postoperative pain was more in the primary closure group (9); that confirms the results of the present study. In addition, postoperative complications were lower in the Limberg flap group (9); there were no statistically significant differences in the present study in this field. Besides, the rate of recurrence had no significant difference in their study (9) which is similar to our findings.

In another study on 200 patients in the military in Turkey, they compared the results of Karydakis flap and primary midline closure procedures. The duration of the flap surgery was longer; the recurrence rate in primary closure and patient satisfaction with the procedure in flap method was more (10). In the present study, the duration of surgery regarding the flap method was longer, too. But, there were no significant difference regarding the recurrence rate and patient satisfaction in the three groups of the present study.

In a study on 90 patients in Shiraz University of Medical Sciences, Iran, the duration of hospital admission and time to return to work was shorter in the Limberg flap method than the primary closure method (11). In the present study, the disability in the Limberg flap group was less than the other two groups. In Shiraz study, the rate of recurrence in the primary closure method was 6 cases against 1 case in the flap group that was not significantly different (11) and was consistent with our findings.

Other studies (12-15) were conducted on comparison of other flap methods and primary and secondary intention methods, treatment methods of complicated pilonidal sinuses, and use of skin adhesives on wound healing. The obtained results were similar to the present study findings, and overall, there was a comparative advantage of uncomplicated pilonidal sinus over the Limberg flap method.

In conclusion, based on the results of this study and comparison with other studies in this area, it can be concluded that Limberg flap method has a relatively higher efficiency in comparison with tension-free primary closure and secondary intention methods. Therefore, its use for patients with uncomplicated pilonidal sinus is recommended. Further studies are also suggested with larger sample sizes to confirm the findings of this study.

Conflict of Interests

Authors have no conflict of interests.

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