Research Article / Araştırma Makalesi

Is Adipopfascial Flap Superior to Limberg Flap in Surgical Treatment of Pilonidal Sinus? A Prospective Randomized Clinical Study

Pilonidal Sinüs Cerrahi Tedavisinde Adipofasyal Flep Tekniği Limberg Flep Tekniğine Üstün müdür? Randomize Prospektif Çalışma

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Abstract

Background: Pilonidal sinus disease (PSD) encompasses inflammation localized to the intergluteal cleft, ranging from minor cyst to extensive sinus formation. The most important parameters in the treatment of the disease are early return to work, low recurrence rate, low postoperative pain, high comfort, low complication rate, and low cost. In the surgical treatment of pilonidal sinus disease, there are methods such as flap methods, primary closure, and unroofing and curettage.
Materials and Methods: This study was planned as a prospective randomized clinical trial with patients who were operated with the diagnosis of chronic pilonidal sinus. A total of 104 chronic pilonidal sinus patients were randomized into two groups. The first group underwent Limberg flap procedure for treatment. The second group underwent adipofascial flap procedure for treatment. The two groups were compared in terms of demographic characteristics, duration of surgery, early and late complications, recurrence, and follow-up time.
Results: The operation time was shorter in Group 2 than in Group 1. The difference was statistically significant. Wound dehiscence was significantly less common in Group 2. The aesthetic satisfaction was significantly higher in Group 2. Recurrence rates were not different between the Limberg and adipofascial groups (49/4 and 55/4, 8% and 7%, respectively).
Conclusions: Our study showed that the adipofascial flap can be easily applied in the surgical treatment of pilonidal sinus disease and has no difference from other flap methods. To minimize regret for surgical decisions, people with PSD need better information on the burden of wound care and the risks of recurrence associated with different surgical approaches.

Keywords: Pilonidal Sinus Disease, Limberg Flap, Adipofascial Flap

Öz

Amaç: Pilonidal sinüs hastalığı (PSH), küçük kistten yaygın sinüs formasyonuna uzanan aralıkta, intergluteal kıvrımda lokalize inflamasyonu kapsar. Hastalığın tedavisinde en önemli parametreler: işe erken dönüş, düşük tekrarlama oranı, düşük postoperatif ağrı, iyi konfor, düşük komplikasyon ve maliyet oranıdır. PSH'nin cerrahi tedavisinde; flep metodları, primer kapatma, unroofing ve küretaj vardır.
Materyal ve Metod: Bu çalışma PSH tanısı ile opere edilen hastalar ile prospektif randomize kontrollü çalışma olarak planlandı. Toplam 104 kronik pilonidal sinüs hastası iki gruba randomize edildi. Birinci gruba tedavi için limberg flep rotasyon prosedürü uygulandı. İkinci gruba tedavi için adipofasyal flep rotasyon prosedürü uygulandı. İki grup; demografik karakteristikler, operasyon süresi, erken ve geç komplikasyonlar, rekürrens ve takip süresi açısından karşılaştırıldı.
Bulgular: Operasyon süresi grup 2'de grup 1'den daha kısa idi. Burada önemli istatistiksel fark vardı. Yara iyileşmesi grup 2'de önemli derecede daha az idi. Estetik memnuniyet grup 2'de önemli olarak daha yüksekti. Rekürrens oranları açısından iki grup arasında fark yoktu (49/4 ve 55/4, 8% ve 7% sırasıyla).
Sonuç: Bizim çalışmamız adipofasyal flep tekniğinin pilonidal sinüs hastalığının cerrahi tedavisinde daha kolay uygulanabilir olduğunu gösterdi. Aynı zamanda limberg flep metodundan farkı yoktu. Cerrahi karar vermede hayıflanmayı azaltmak için PSH olan hastalar için, farklı cerrahi yaklaşımlar ile ilişkili rekürrens riskleri ve yara bakım yükü hakkında daha iyi bilgi gereklidir.

Anahtar Kelimeler: Pilonidal Sinüs Hastalığı, Limberg Flep, Adipofasyal Flep

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Introduction

Pilonidal sinus disease (PSD) encompasses inflammation localized to the intergluteal cleft, ranging from minor cyst to extensive sinus formation. It exerts its symptoms at an average age of 20 years and the incidence rate is 25/100,000 (1). PSD is a treatable disease that adversely affects a person's life and is common especially among young men (2). It is acquired secondary to hair follicles collecting debris that becomes embedded in the natal cleft and invades the skin, eventually forming the pathognomonic midline pits of PSD (3).

The most important parameters in the treatment of the disease are early return to work, low recurrence rate, low postoperative pain, high comfort, low complication rate, and low cost. It was reported that hair control and better hygiene in the congenital cleft area would reduce the need for surgery and thus lead to an early return to work (4). However, the disease is not rare, especially in young men, and may adversely affect the quality of life. The main principle in the treatment is to return the patient to normal life and working life as soon as possible and to reduce the possibility of recurrence as much as possible.

In the surgical treatment of pilonidal sinus disease, there are methods such as flap methods, primary closure, and unroofing and curettage (5). Chronic pilonidal sinus disease is defined as recurrent symptoms or persistence in the disease state observed for more than a few months without signs of spontaneous wound healing, and these patients are candidates for flap procedures (6,7). Flap techniques include Z-plasty, W-plasty, V-Y advancement flap, adipofascial flap, Limberg flap, Karydakis flap, gluteus maximus myocutaneous flap, and fasciocutaneous rotational flaps (8-10). Traditionally knowledge, gained in more than 20 years of use, posits that off-midline closures (such as Limberg or other flap procedures) have the lowest recurrence rates over time. We aimed to compare adipofascial and Limberg flap techniques in a randomized study.

Materials and Methods

This study was planned as a prospective randomized clinical trial with patients who were operated with the diagnosis of chronic pilonidal sinus in the surgical clinic of our hospital between 2006-2008. All patients who were operated during the study were given detailed information about the study before the operation and their written consent was obtained. For patients younger than 18 years of age, written consent was obtained from their parents. The study was carried out in accordance with the principles of the Declaration of Helsinki.

Recurrent cases, patients who had previously undergone any non-surgical treatment, patients presenting with acute abscess and complicated pilonidal sinus cases were excluded from the study. All primary pilonidal sinus patients within these 2 years were included in the study.

A total of 104 chronic pilonidal sinus patients were randomized into two groups. The first group included 49 patients and they underwent Limberg flap procedure for treatment. The second group included 55 patients who underwent adipofascial flap procedure for treatment. The two groups were compared in terms of demographic characteristics (age, sex), duration of surgery, early (seroma, wound dehiscence) and late complications (numbness, itching, and pain in the healing area), recurrence, and follow-up time.

Both flap-based Limberg and adipofascial approaches aim to achieve off-midline closure of the surgical defect to flatten the natal cleft. In both techniques, methylene blue injection in the pilonidal sinuses is used to guide the excision. The Limberg flap method was performed as described by Limberg et al. (10). In the adipofascial flap technique, a wedge incision was made to the skin in a way to include the sinus. The sinus was completely excised. In terms of the viability of the flap, the rectangular aspect ratio was kept below the 2:1 ratio. Proceeding between the intermediate fat layers of subcutaneous adipose tissue, the fascia of the gluteus maximus muscle was reached. The flap was separated from the muscle in a way to include the fascia. Then, both lateral edges of the flap were released. The flap was rotated upside down and the anterior face was placed at the base of the defect and the sacral fascia was fixed with sutures. The hospital stay was one day for all patients in both groups.

Statistical Analyses

Statistical analyses were performed with SPSS software (version 22.0). Variable distributions were evaluated using Wilcoxon WZ, Asymp. Sig. (two-tailed). The Mann-Whitney U test was used for the analyses of independent quantitative variables. For qualitative data, the chi-square test was used when appropriate. When the conditions for the chi-square test were not met, Fisher's test was used for the same purpose.

Results

Demographic and clinical-pathological features are shown in Table 1. There were 45 males and 4 females in Group 1. The age range was 19-39 years and the mean age was 25.3 years. Group 2 had 48 males and 7 females. The age range was 16-46 years and the mean age was 27.5 years.

There was no difference between the two groups in terms of age and sex. The duration of the complaint ranged from one month to four years (mean 24.5 months). While a single sinus orifice was detected in the midline in 45 cases (43.3%), two or more sinus orifices were detected in the midline in 59 cases (49.7%). The operation time was shorter in Group 2 than in Group 1. The difference was

statistically significant. While there was no significant difference between the groups in terms of seroma as a complication, wound dehiscence was significantly less common in Group 2. In terms of recurrence and aesthetic satisfaction, aesthetic satisfaction was significantly higher in Group 2. Recurrence rates were not different between the Limberg and adipofascial groups (49/4 and 55/4, 8% and 7%, respectively).

Table 1. Demographics and Clinical-pathological characteristics

		Group 1			Group 2			p-value	Test type
		n	%	Median	n	%	Median		
Age				25.3			27.5	0.100	M
Sex	Female	4	8.00		7	13.00		0.530	X^2
	Male	45	92.00		48	87.00			
Sinus number	1	22	49.00		23	51.00		0.840	X^2
	≥2	27	46.00		32	54.00			
Operation Time (min)	60	26	53.00		23	47.00		0.044	X^2
	60-90	40	72.00		15	28.00			
Seroma	no	32	71.10		42	76.30		0.270	X^2
(Postoperative)	yes	17	28.90		13	63.70			
Pain	no	45	91.80		52	94.50		0.700	X^2
(Postoperative)	yes	4	8.20		3	5.50			
Wound dehiscence	no	44	89.80		55	100.00		0.021	X^2
	yes	5	10.20		0	0.00			
Aesthetic satisfaction	yes	40	81.60		53	96.30		0.023	X^2
	no	9	18.40		2	3.70			
Complication (early)	yes	17	34.60		14	25.50		0.390	X^2
	no	32	65.40		41	74.50			
Complication (late)	yes	6	12.30		3	5.40		0.310	X^2
	no	43	87.70		52	94.60			

M: Mann-whitney u test, X^2: Chi-square test

Discussion

Many conservative and surgical methods have been described in the treatment of pilonidal sinus disease, but none of them has been able to eliminate the risk of recurrent disease (9,11). Despite the prevalence of the disease, there is no consensus on the type of intervention for optimal cure, and the use of numerous surgical approaches points to the lack of a reliable intervention (12). Even when the primary cause is eliminated, there are long-term difficulties with wound healing (13).

While still controversial, minimal approaches in the treatment of chronic pilonidal sinus disease are finding more adherents. Those who support minimal treatments without surgery point out that regardless of which treatment is applied, Pilonidal sinus disease usually regresses and disappears by the age of 40. The authors that support these methods advocate the transition from the concept of complete eradication of the disease, i.e. treatment by surgery and control, to clinical treatment.

The narrow groove, the moist environment, and the bacterial burden near the anus create unfavorable conditions for wound healing. Recurrences and advanced wounds that do not heal are difficult to treat and often need to be treated with extensive excision and flap methods. In conservative methods, since wound healing is completed in an average of 40-50 days, the return to working life is delayed. Curing rates were reported to be approximately 70% (14). In a study with 11 patients, Blumberg et al. reported that 7 of the patients treated with conservative methods had recurrence. Patients were followed up for periods ranging from seven weeks to six years, and recovery was achieved between 5 and 16 weeks (15).

This method of treatment has its drawbacks. When the factors considered as the etiology of pilonidal sinus disease are examined, the insufficiency of minimally invasive methods is clear. This is because the destruction of the cavity does not widen the gluteal cleft. In patients with a deep gluteal cleft, the probability of recurrence will be high, since the anatomy is preserved as it is. Recurrence rates after resection vary widely from 0 to 46% (16).

Treatment of pilonidal sinus disease should mainly aim the elimination of the three main causes whose etiology was described by Karydakis. Many conservative and surgical treatments have been planned for the treatment of this disease in the literature, but none of them have been able to eliminate the risk of recurrent disease. In one study, Limberg and Karydakis procedures did not show significant differences for wound healing, hematoma, recurrences, length of hospital stay and patient satisfaction. Here, a difference was observed for only the seroma and the duration of operation. Previous authors based the difference in operation time on the fact that the Karydakis flap does not require excessive mobilization and fixation

to the sacral fascia (17,18).

In our study, we also observed a difference between the two groups for the operation time in favor of the adipofascial flap. Although the adipofascial flap did not have extensive mobilization, it required fixation to the sacral fascia. While Arslan et al. reported a high difference between Limberg and Karydakis procedures for seroma formation (5 and 20%, respectively), there was no significant difference in the present study between adipofascial flap and Limberg flap for the seroma formation (23% and 34%, respectively) (19). However, the data abovementioned study on drain removal was not complete, which was confusing.

Limberg flap technique also has disadvantage. In a study with 63 patients, it was stated that 63% of patients were not satisfied with the cosmetic outcomes (20). In another study comparing Limberg flap and primary closure, it was found that Limberg flap had a lower recurrence rate compared to the primary repair (21). While studies reported varying recurrence rates of 0.8-2.7% for Limberg flap and 0-4.6% for Karydakis flap, complication rates (wound infection, wound dehiscence, hematoma, recurrence, length of hospital stay and patient satisfaction) were similar for both techniques (22). In another study, the rates of recurrence in Karydakis flap, endoscopic sinus treatment (EPSIT), and open excision were reported as 1.4, 5.0 and 4.5%, respectively. In another study which argued minimal invasive technical reported four patients experienced recurrence (11.1%) after EPSIT, while there were three recurrences (8.1%) after sinus laser therapy (SiLaT) (23).

Recurrence rates in the present study were consistent with previous publications (24). There were no differences between the Limberg and adipofascial groups (8% and 7%, respectively). Although the effect of routine drain use on recurrence is controversial, drains were used in all patients in our study. There were no differences between the two groups of the patients' hospital stay, but the operative time was found to be significantly shorter in the adipofascial group than in the group with Limberg flaps. In our study, which had a mean follow-up period of 25 months, late complications (numbness, pain, pruritus) were significantly less in the adipofascial flap group than in the Limberg group.

In our study, pain assessment was not performed through the pain scoring system. On the other hand, in most of the studies on minimally invasive applications with laser ablation, where pain was expected to be less, the reports were not uniform. Therefore, statistical analysis was not sufficient. Besides, the time of pain assessment was not specific in those studies (25). In contrast, the pain was moderate and short-lived in the present study. Again, compared to excisional procedures, deep tracts and abscesses are overlooked in laser ablation technique and adequate pathological specimens cannot be provided. In this case, though rare, malignant degeneration can be overlooked.

The groups were compared in terms of aesthetic satisfaction, and it was found that satisfaction was significantly higher in the adipofascial flap group. Early complications were also compared between the groups, and while there was no significant difference in terms of seroma and infection, wound dehiscence was significantly less in the adipofascial flap group.

Conclusion

Traditionally, medicine and surgery have been based on conservative approaches. A recent therapy is adopted when it has proven its superiority compared to the existing “old” therapies in use. This has changed in recent years, and recent therapeutic approaches with allegedly better results have been introduced to the community earlier.

Pilonidal sinus disease is one of the most common and operated disease groups in surgical clinics. Although the treatment of this disease had a considerable variation, the preference for flap methods has been increasing. Our study showed that adipofascial flap, which can be easily applied in the surgical treatment of pilonidal sinus disease and has no difference from other flap methods, is a method that can be applied safely in the treatment of this disease. To minimize regret about surgical decisions, people with PSD need better information about the burden of wound care and the risks of recurrence associated with different surgical approaches.

Limitations of the Study

Relatively small number of patients, single-centered nature of the study, short follow-up period, and lack of data regarding the drain stay time were among the limitations of the study. Besides, the results were not stratified according to sex or disease severity.

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Research data before 2020 was used and this is a study produced from master’s/doctoral studies. The study was presented as an oral presentation at the national surgery congress in 2010.

Ethical Approval: *The present study was conducted in strict accordance with the principles outlined in the Declaration of Helsinki. The study was produced from thesis data published before 2020. This research was produced from master’s/doctoral studies (ref no: 10677924/2009).*

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Concept: U.T., O.Y.
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