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Comparison of Limberg Flaps and Karydakis Flaps in The Treatment of Pilonidal Sinus Disease: A Single Physician Experience

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Abstract

Objective: Pilonidal sinus disease (PSD) is a chronic inflammatory disease that impacts quality of life. Many conservative and surgical approaches for treating PSD have been described, but the best surgical method is still up for debate. Our aim is to see whether there is a difference between Limberg flap (LF) and Karydakis flap (KF) procedures in patients with (PSD).

Methods: The study was designed retrospectively. Our research includes a comparison of two patient groups who had PSD surgery performed by a single physician between March 2016 and October 2020. The patients who underwent LF proceure were determined as Group 1, and the patients who underwent KF as Group 2 and the clinical and practical differences between these two techniques were analyzed.

Results: The mean age, duration of surgery and hospitalization were shorter in Group 2 (p=0.019, p=0.0001, p=0.0001, respectively). There was no significant difference between the two groups in terms of the remaining variables.

Conclusion: There was no significant difference between LF and KF procedures in terms of quality of life, recurrence and complications. However, the fact that KF procedure can be completed in a shorter time and patients can be discharged earlier makes this group one step ahead.

Key words: pilonidal sinus, recurrence, Karydakis flap, Limberg Flap.

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INTRODUCTION

Pilonidal sinus disease (PSD) is a chronic inflammatory disease that impacts quality of life and is more common in young males with pain and abscess, especially in the intergluteal region (1,2). It can be detected in people of all ages, but it is most common between the ages of 15 and 25. Although the etiology of the disease is uncertain, the most widely accepted theory is that it is caused by chronic irritation, foreign body reaction, and inflammation caused by body hair shedding in the intergluteal area. Obesity, excessive body hair, a history of smoking, a sedentary lifestyle, poor self-care, and a deep intergluteal groove are all risk factors for PSD (3-5). Many conservative and surgical approaches for treating PSD have been documented, but the best surgical method is still up for debate (6). Simple medical treatments such as local curettage, phenol injection, silver nitrate applications or electrocauterization can be applied in the cavity. In addition, several surgical procedures such as excision and primary repair, excision-marsupialization, secondary healing following excision, Karydakis operation (KF), V-Y-Z flap repair, and Limberg flap (LF) repair are commonly employed (7). In our study, we aimed to determine the clinical and practical differences between these two techniques.

METHODS

Our study was carried out retrospectively with the approval of the ethics committee of Recep Tayyip Erdogan University Faculty of Medicine. (Number:2022/14, date:20/01/2022).

The research comprises a comparison of two patient groups who underwent LF or KF procedures between March 2016 and October 2020 and were operated on by a single physician for PSD. Patients underwent LF procedure were assigned to Group 1, whereas those underwent KF procedure were assigned to Group 2.

Age, gender, Body Mass Index (BMI), American Society of Anesthesia (ASA) score, operation time, hospitalization time, postoperative complications (seroma, hematoma, wound infection, wound dehiscence, flap necrosis), postoperative pain and loss of sensation, duration of return to daily life and whether it recurred were recorded. Our study was retrospective, all patients included in the study were contacted by telephone. It was questioned whether they experienced pain and loss of sensation in the postoperative period, their return to daily life, and whether the disease recurred.

The patients were asked whether there was a decrease in the amount of sensation when the operation area was touched. It was accepted that loss of sensation developed in those who stated that there was a decrease. The duration of return to daily life was defined by asking how long after the operation the patients returned to their daily activities unaided and comfortable as in the preoperative period.

Patients who were operated for PSD and used other surgical techniques, patients who were re-operated for PSD recurrence, and patients whose telephone numbers could not be reached were excluded from the study.

Surgical Technique

First generation cephalosporin antibiotic prophylaxis is performed 30 minutes before surgery. After spinal anesthesia, prone Jack-knife position is maintained. Methylene blue was injected through the sinus orifice.

LF: A rhombic incision was made by performing clean surgical margins around the sinus before excision. The subcutaneous tissues were excised up to the presacral fascia and the sinus was completely excised. Then, an incision was made for the flap in the gluteal area, similar to the side lengths of the sinus tissue excised from the presacral area. After subcutaneous tissues were cut up to the gluteal muscle fascia, a flap was created by releasing it over the fascia. An absorbent drain was placed in the operation lodge. Subcutaneous tissues were approximated using 2/0 vicryl and the skin using 2/0 polypropylene sutures (Figure 1).

KF: The procedure was initiated with an asymmetric ellipsoid incision. If there was another orifis and/or a palpable cyst on the lateral line of the midline, the incision edge was shifted to the lesion. If there was no lesion observed, the incision side was randomly selected. The tissue was removed until the presacral fascia after the incision. Then, a flap extending through the entire incision, 1 cm below the edge of the midline, 2 cm inward, was prepared using cautery. The prepared flap was fixed to the other wound edge by the skin and subcutaneous sutures so that the midline was shifted (Figure 2).

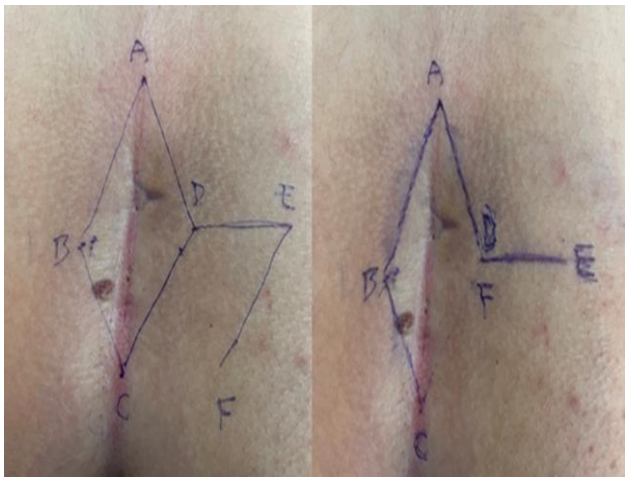

Figure 1. Limberg Flap

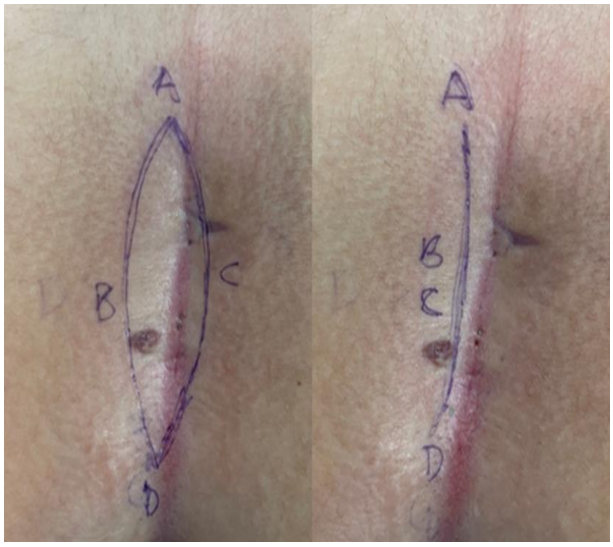

Figure 2. Karydakis Flap

Statistical Analysis

All analyzes were made using the SPSS 25 statistical package program. Descriptive statistics were given using mean ± standard

deviation for continuous variables and n (%) for categorical variables. The Mann-Whitney U test was used to determine the difference between the groups in the variables that did not show normal distribution, and the chi-square test was used to determine whether there was a difference between the categorical variables in terms of ratios. Statistically, $p<0.05$ values were considered significant.

RESULTS

Group 1 included 103 patients and Group 2 included 64. 126 (75.5%) were male and 41 (24.5%) were female. There was no significant difference between the groups in terms of gender (p=0.398). Mean age was lower in patients in Group 2 (p=0.019). No difference was observed in both groups according to BMI and ASA scores (p=0.754, p=0.057, respectively). While the mean operation time was 39±6 min in Group 1, it was 28±6 min in Group 2. The operation time was significantly shorter in the KF group (p=0.0001). The mean hospital stay was 2±1.3 days in Group 1, it was 1.4±1.1 days in Group 2. The duration of hospitalization was significantly shorter in the KF group (p=0.0001). (Table 1)

Postoperative complications developed in 21 (20.3%) patients in Group 1; in Group 2, 10 (15.6%) patients developed early postoperative complications. There was no significant difference between the two groups in terms of postoperative complications.

Recurrence was observed in 5 (4.9%) patients in Group 1, in 2 (3.1%) patients in Group 2. There was no significant difference between the two groups in terms of recurrence (p=0.455).

All patients were called by phone and asked about pain status, loss of sensation in the operation area, and when they returned to work and their normal lives. There was no difference between the two groups in terms of postoperative pain and sensory loss (p=0.422, p=0.258, respectively)

Table 1. Demographic features

	Limberg Flap n=103	Karydakis Flap n=64	P
Gender ,n(%)			
Male	80 (%77,7)	46 (%71.9)	0.398**
Female	23(%22.3)	18(%28.1)	
Age, (Mean±Sd)	27.87±10.23	23.78±7.07	**0.019***
BMI,n(%)			
Normal	47(%44.7)	27(%42.2)	0.754**
Overweight	57(%55.3)	37(%57.8)	
ASA,n(%)			
ASA1	64(%62.1)	51(%79.7)	
ASA2	35(%34)	12(%18.8)	0,057**
ASA3	4(%3.9)	1(%1.6)	
Duration of operation,(min) (Mean±Sd)	39.85±6.66	28.52±6.53	**0.0001***
Hospitalization Time (day)((Mean±Sd)	2.03±1.38	1.42±1.12	**0.0001***

*: Mann Whitney U test, **: Pearson Chi-Square test
ASA: American Society of Anesthesia, BMI: Body Mass Index.

There was no difference between the two groups in terms of returning to work and daily lives (p=0.622, p=0.200). (Table 2)

Table 2. Postoperative features

	Limberg Flap n=103	Karydakis Flap n=64	P
Seroma, n(%)			
No	91 (%88.3)	58 (%90.6)	0.645**
Yes	12 (%11.7)	6 (%9.4)	
Hematoma, n(%)			
No	100 (%97.1)	62 (%96.9)	0.636**
Yes	3 (%2.9)	2 (%3.1)	
Wound infection,n(%)			
No	100 (%97.1)	62 (%96.9)	0.636**
Yes	3 (%2.9)	2 (%3.1)	
Wound dehiscence, n(%)			
No	102 (%99)	64 (%100)	0.617**
Yes	1 (%0.6)	0 (%0)	
Flap necrosis, n(%)			
No	101 (%98.1)	64 (%100)	0.379**
Yes	2 (%1.9)	0 (%0)	
Recurrence, n(%)			
No			
Yes	98 (%95.1)	62 (%96.9)	0.455**
	5 (%4.9)	2 (%3.1)	
Postoperative pain, n(%)			
No	96 (%93.2)	62 (%96.9)	0.258**
Yes	7 (%6.8)	2 (%3.1)	
Sensory loss, n(%)		6	
No	96 (%93.2)	1 (%95.3)	0.422**
Yes	7 (%6.8)	3 (%4.7)	
Return to work, (day) (Mean±Sd)	8.49±3.45	8.14±2.69	0.622*
Return to normal life,(day) (Mean±Sd)	11.71±5.37	10.72±4.79	0.200*

*: Mann Whitney U test, **: Chi-Square (Fisher's Exact Test).

DISCUSSION

The incidence of PSD, which is one of the most common surgical diseases that general surgeons encounter, is 26/100.000, and the disease mostly affects young men (8). If the disease is not treated or treated inadequately, it causes morbidity by disrupting the comfort of life. Although the etiology of the disease is still controversial, it is a generally accepted hypothesis that it is an acquired disease and that the hair shedding from the body causes inflammation in the intergluteal area (9-11). The reason for the general acceptance of this theory may be the high recurrence rates of the disease, up to 30%, even after radical local excisions (12-14). In our study, most of the patients consisted of men in the ASA 1-2 group, consistent with the literature. The mean age of the patients participating in our study was young, in line with the literature, and the mean age was significantly lower in Group 2. Apart from male gender and excessive body hair, factors such as sedentary life, long-term sitting, family history, obesity, local trauma history, inadequate hygiene are also effective in the etiology of the disease (15). In our study, overweight patients were more common in both groups, in line with the literature, but it was not statistically significant. This may be due to the fact that overweight or obese patients are more prone to a sedentary lifestyle, have difficulties in hygiene, and the intergluteal space is deeper. Ates et al. reported shorter mean operative time and hospital stay in KF procedure than LF procedure (16). In our study, the mean operative time and hospital stay were shorter in Group 2. In the LF procedure, a separate flap is prepared over the gluteal muscle, and a larger surgical area is created. The longer duration of operation and hospital stay may be related to this.

After the acquired nature of the disease was explained, it was started to be investigated what should be considered for the ideal operation selection. The ideal operation should be simple

and include low complication rates. At the same time, midline flattening should be achieved with minimal surgical wound and therefore recurrence rates should be low (17,18). In recent years, LF and KF techniques have come to the fore with low complication and recurrence rates compared to other flap procedures (19). Ersoy et al. reported a randomized trial of 100 patients with short-term results of LF and KF (20). In their study, they revealed that a higher rate of wound infection developed in the KF group. In the study of Ates et al., on the contrary, it was reported that postoperative complications such as hematoma, seroma, wound infection and wound dehiscence were significantly lower in the KF group (16). Wound infection may be an inducer for recurrence. Factors causing infection include increased bacterial colonization, proximity of the wound to the anal canal, and moist wound site (9). In addition, seroma, hematoma and wound dehiscence accelerate the formation of wound infection (21). In our study, seroma, flap necrosis and wound dehiscence were observed more frequently in Group 1, and hematoma and wound infection were observed more frequently in Group 2, among the early postoperative complications. However, none of these data was statistically significant. Larger area surgery resulting in a larger potential space may be the cause of more seromas. In addition, the deterioration of arterial microcirculation at the ends of sharp-angle flaps and the decrease in regional blood circulation in patients undergoing LF may have predisposed to flap necrosis and wound dehiscence. In their study, Mentes et al. showed that the weakest region of the LF was the lower end of the flap in the intergluteal sulcus, and the most recurrences were from this region. In this study, they used a modified method and applied the rhombohedral excision asymmetrically and shifted the lower end of the flap to the lateral of the intergluteal sulcus (22). On the other hand, Can et al. compared the patients who underwent modified LF with KF and found that there was no difference between the groups in terms of early postoperative complication and recurrence rates (23). In our study, recurrence was observed in 5 (4.9%) patients in Group 1 and in 2 (3.1%) patients in Group 2, which was not statistically significant. In Group 1, the recurrence rate was slightly higher and recurrence developed from the lower end of the flap close to the anal canal and this was consistent with the literature. This may be due to the fact that the lower pole of the flap remains in the intergluteal sulcus during surgery and the suture line is macerated in a humid environment.

The development of pain and sensory loss that will affect the quality of life in the postoperative period is crucial in determining the effectiveness of the surgical technique used. Büyükakıncak et al. reported less loss of sensation in patients who underwent KF, and in

another study, postoperative pain was less in the KF group (7,16). In our study, we found less postoperative pain and loss of sensation in the KF procedure, but there was no significant difference between groups. In patients who underwent KF procedure, the injury was less because they were studied in a smaller surgical area, and therefore pain and loss of sensation may have developed less frequently. In determining the effect of the surgical procedures applied on the quality of life, the return period of the patients to their work and normal life has an important place. Ertan et al. evaluated the quality of life after surgical treatment of PSD in their study. They demonstrated that the quality of life was better in patients who underwent LF compared to other surgical procedures (24). In our study, no significant difference was found between the two groups.

Our research has some advantages and disadvantages. The fact that the operations were performed by a single surgeon in the study ensured that the technique was standard. This has contributed to minimizing the changes that may arise from technical differences. The retrospective nature of the study, the small number of patients and the lack of randomization may have negatively affected the results of the study.

Limitations

This study has several limitations. We may not have been able to detect early postoperative complications properly, as most of the patients we operated for PSD were discharged within one or two days. All patients were contacted by phone and inquired about pain after discharge, time to return to work and normal life, and recurrence. However, patients who had surgery a long time ago may have given incorrect information. In addition, even if the disease has recurred, patients may not be aware of it in the early period.

CONCLUSION

It was understood that there was no difference between the two methods in terms of quality of life, recurrence and complications. However, the fact that KF procedure can be completed in a shorter time and patients can be discharged earlier makes this group one step ahead. However, we think that deciding according to the patient and the characteristics of the disease is the most appropriate option in determining the surgical method to be applied.

Ethics Committee Approval: Approval was obtained from the ethics committee of our institution. Approval number:2022/14.

Peer-review: Externally peer-reviewed.

Author Contributions: Idea, Design, Control, Data collection and analyzes, Analyses and Interpretation, Interpretation: M.U, T.A

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

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REFERENCES

1. Okus A, Karahan O, Eryilmaz MA, Ay AS, Sevinc B, Aksoy N, et al. Prevelance of Pilonidal Disease in Society, by Age and Sex Distrubution (Early Results). Selcuk Med J.2013;29 (3):120-122.
2. Søndenaa K, Andersen E, Nesvik I, Søreide JA. Patient characteristics and symptoms in chronic pilonidal sinus disease. Int. J. Colorectal Dis.1995;10(1):39-42.
3. 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;393(2):185-9.
4. Ucar AD, Cartı EB, Oymacı E, Sarı E, Yakan S, Yıldırım M, et al. N.Recurrents pilonidal sinus disease surgery: Is it second primary or reoperative surgery? National Journal of Surgery. 2015;32(3):162-7.
5. Vedder NB. Flap physiology. Mathes Plastic Surgery, 2nd edition. Philadelphia: Saunders Elsevier Inc.2006. p.483-506.
6. Humphries AE, Duncan JE. Evaluation and management of pilonidal disease. Surg Clin North Am.2010;90:113-24.
7. Büyükakıncak S, Tarım IA, Karapolat B, Ates G. Comparison of different surgical techniques of sacrococcygeal pilonidal sinus disease. J Exp Clin Med.2021;38(3):283-7.
8. 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;10(1):1-11.
9. Duman K, Ozdemir Y, Dandin O. Pilonidal sinus disease Etiological factors, pathogenesis and clinical features. Arch Clin Exp Surg.2016;5:228-232.
10. 10- Surrell JA. Pilonidal disease. Surg Clin North Am.1994;74:1309-15.
11. da Silva JH. Pilonidal cyst: cause and treatment. Dis Colon Rectum.2000;43:1146-56.
12. Karydakis GE. Easy and successful treatment of pilonidal sinus after explanation of its causative process. Aust N Z J Surg.1992;62:385-9.
13. Urhan MK, Kucukel F, Topgul K, Ozer I, Sarı S. Rhomboid excision and Limberg flap for managing pilonidal sinus: results of 102 cases. Dis Colon Rectum.2002;45:656-9.
14. Tekin A. A simple modification with the Limberg flap for chronic pilonidal disease. Surgery.2005;138:951-3.
15. Kuvvetli A, Cetinkunar S, Parlakgümüs A. Evaluation of etiological risk factors in the development of adult chronic pilonidal disease. Turk J Colorectal Dis.2019;29:75-77.
16. Ates M, Dirican A, Sarac M, Aslan A, Colak C. Short and long-term results of the Karydakis flap versus the Limberg flap for treating pilonidal sinus disease: a prospective randomized study. Am J Surg.2011;202(5):568-73.
17. Allen-Mersh TG. Pilonidal sinus: finding the right track for treatment. Br J Surg. 1990;77:123–32.
18. Al-Jaberi TM. Excision and simple primary closure of chronic pilonidal sinus. Eur J Surg. 2001;167:133–5.
19. Akinci OF, Coskun A, Uzunkoy A. Simple and effective surgical treatment of pilonidal sinus: asymmetric excision and primary closure using suction drain and subcuticular skin closure. Dis Colon Rectum.2000;43:701-7.
20. 2Ersoy E, Devay AO, Aktimur R, Doganay B,

Ozdoğan 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.2009;11:705–10.

21. Arslan S, Karadeniz E, Ozturk G, Aydinli B, Bayraktutan MC, Atamanalp SS. Modified Primary Closure Method for the Treatment of Pilonidal Sinus. Eurasian J Med. 2016;48(2):84-9.
22. Mentes BB, Leventoglu S, Cihan A, Tatlicioglu E, Akin M, Oguz M. Modified Limberg transposition flap for sacrococcygeal pilonidal sinus. Surg Today.2004;34:419-23.
23. Can MF, Sevinc MM, Hancerliogullari O, Yilmaz M, Yagci G. Multicenter prospective randomized trial comparing modified Limberg flap transposition and Karydakis flap reconstruction in patients with sacrococcygeal pilonidal disease. Am J Surg. 2010;200(3):318-27.
24. Ertan T, Koc M, Gocmen E, Aslar AK, Keskek M, Kilic M. Does technique alter quality of life after pilonidal sinus surgery?. Am J Surg.2005;190(3):388-392.