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COMPARISON OF EARLY OUTCOMES BETWEEN KARYDAKIS FLAP AND LIMBERG FLAP PROCEDURE IN PATIENTS WITH SACROCOCCYGEAL PILONIDAL SINUS DISEASE

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Abstract

Objective: To compare the early outcomes between karydakis flap versus limberg flap procedure in patients with sacrococcygeal pilonidal sinus disease.

Methodology: Prospective cohort study was conducted from 30th July 2024 to 29th January 2025 in Chaudhry Muhammad Akram Teaching Hospital Lahore. Ethical approval was obtained and written informed consent from each patient. 180 patients were enrolled undergoing either Karydakis or Limberg procedure. Patients of either gender aged 18-60 years with a diagnosis within 6 months preceding surgery included. Exclusion was done if diabetic or immunosuppressed; those with active local infection and with known coagulopathy. Follow up was done on post-op day 7 and 14 and early outcomes i.e length of stay, mean operating time, wound infection and seroma formation recorded. All data was entered and anlaysed using SPSS V 25.0. Quantitative variables were assessed using student t-test and qualitative variables using chi-square analysis with p-value≤0.05 as significant.

Results: There was significant difference observed between groups for wound infection (p=0.003) and seroma formation (p=0.001). There was no difference observed for length of stay and mean operating time. Younger patients, aged less than 40 years had significantly lower wound infections and seroma formation with Limberg flap as compared to Karydakis. Overweight patients had significantly lower wound infections with Limberg flap however this difference was not observed in obese patients.

Conclusion: Limberg flap procedure was found superior to Karydakis flap procedure in patients with sacrococcygeal pilonidal sinus disease in terms of significantly lower frequency of wound infection and seroma formation.

Keywords: Pilonidal Sinus Disease; Karydakis Flap; Limberg Flap; Outcomes

Introduction

Sacrococcygeal pilonidal sinus disease (PSD) is a blind epithelial tract situated in the skin of the natal cleft, a short distance behind the anus and generally containing hair. It is a commonly encountered condition in adults, and causes significant morbidity[1]. PSD might occur in different parts of the body such as umbilicus, finger pulp, axilla, nipple areola but it is often formed in sacrococcygeal area in young men[2]. There are two local flap procedures for pilonidal sinus disease the limberg flap and the karydakis flap. Both aim to achieve complete excision of the sinus along with closure off the midline to prevent recurrecnce[2].

Bostanoglu et al. reported that karydakis flap was superior to limberg flap procedure in pilonidal sinus disease in terms of significantly shorter mean operating time (43±10.5 vs. 55±12.5 minutes), mean length of hospital stay (3.0±1.5 vs. 4.3±1.5 days) and lower frequency of wound infection (2.7% vs. 8.3%) and seroma formation (1.4% vs. 5.0%)[3]. Ates et al. also observed similar superiority of karydakis flap over limberg flap procedure in terms of significantly shorter mean operating time (42.32±8.64 vs. 50.14±6.96 minutes) and mean length of hospital stay (3.43±0.94 vs. 3.80±1.19 days)[4].

Khan et al. observed significantly lower frequency of wound infection (12.22% vs. 33.33%) and seroma formation (6.67% vs. 22.22%) with limberg flap procedure as compared to karydakis flap[5]. Similar significant difference was reported by Karaca et al. in terms of frequency of seroma formation (4.2% vs. 17.1%;)[6] and Ersoy et al. in terms of wound infection (8.0% vs. 26.0%) between limberg and karydakis flap procedures for pilonidal disease[7]. The evidence in the literature becomes more vague as Tokac et al. didn't observe any significant difference between karydakis flap and limberg flap procedures in terms of mean operating time (42.9±6.2 vs. 44.5±6.6 minutes), mean length of hospital stay (1.03±0.17 vs. 1.06±0.3 days;) and frequency of wound infection (6.5% vs. 6.6%)[8].

There are various results in the literature which hinders adopting any single procedure as the gold standard surgical technique for pilonidal sinus disease. This study aimed to compare the outcomes of both procedures to generate local evidence for Pakistani population so that local guidelines may be worked towards based on evidence as to how best pilonidal sinus disease may be surgically treated with local flaps.

Methodology

This prospective cohort study was conducted from 30th July 2024 to 29th January 2025 in the Chaudhry Muhammad Akram Teaching Hospital Lahore. Ethical approval was obtained from institution and written informed consent obtained from each patient prior to data collection.

180 patients were enrolled using simple convenience sampling who were undergoing either Karydakis procedure or Limberg procedure for pilonidal sinus disease in the department. Sample size was calculated using previous literature[5] with 95% significance and 80% power of study. Patients of either gender aged 18-60 years who had a diagnosis preceding surgery within 6 months were included. Patients were excluded if they were diabetic or immunosuppressed for any known reason; those with active local infection and with known coagulation disorders.

After anesthesia, patients in both the groups were placed in the prone, jack-knife position, with the buttocks strapped apart using wide adhesive tape. Probing of the sinus was carried out, followed by injection of methylene blue. In Group-A, Karydakis flap was created after elliptical asymmetrical biconcave excision while in Group-B, the excision was carried down to the fascia overlying the sacrum and a limberg flap was prepared from the right or left gluteal region. A suction drain was placed through a separate incision 2 cm lateral from the initial incision and maintained in place until the drainage decreases to less than 30 ml/day. During surgery, operating time was calculated. Patients

were discharged home when discharge criteria were met and length of hospital stay was recorded. Follow up was done on post op day 7 and 14.

All data was entered and anlaysed using SPSS V 25.0. Quantitative variables were presented using mean and standard deviation and assessed using student t-test with p-value less than or equal to 0.05 as significant. Qualitative variables were presented using percentages and frequencies and assessed using chi-square analysis with p-value less than or equal to 0.05 as significant.

Results

The age of the patients ranged from 18 years to 60 years with a mean of 26.7±8.9 years. There were 173 (96.1%) male and 7 (3.8%) female patients. The BMI of these patients ranged from 21.7 Kg/m^2 to 33.7 Kg/m^2 with a mean of 26.7±3.0 Kg/m^2. 85 (47.2%) patients were overweight while 39 (21.7%) patients were obese. The duration of disease ranged from 1 month to 6 months with a mean of 3.7±1.7 months.

There was significant difference observed between the groups for wound infection and seroma formation shown in table 1.

Table 1. Comparison of Various Outcome Measures between the Study Groups

n=180

Outcome Measure	Karydakis Flap n=90	Limberg Flap n=90	P-value
Mean Operating Time (minutes)	48.33±5.30	49.50±6.12	0.173
Mean Length of Hospital Stay (days)	1.79±0.76	1.87±0.80	0.503
Wound Infection (n, %)	26 (28.9%)	10 (11.1%)	0.003*
Seroma Formation (n ,%)	18 (20.0%)	7 (7.8%)	0.018*

Effect modifiers were identified as age, BMI and duration of disease and these were evaluated for each outcome as shown in table 2 and 3.

Table 2. Evaluation of confounding variables for Mean operating time and Length of Hospital Stay

Subgroups	Mean Operating Time (minutes)		P-value
	Karydakis Flap n=90	Limberg Flap n=90	
Age			
● **18-39 years**	48.36±5.39	49.48±6.14	0.219
● **40-60 years**	48.11±4.70	49.75±6.27	0.548
BMI			
● **20-25 Kg/m^2**	47.89±6.09	48.68±5.67	0.619
● **25-30 Kg/m^2**	48.38±4.97	50.33±6.52	0.126
● **30-35 Kg/m^2**	48.85±5.01	48.84±5.88	0.996
Duration of Disease			
● **1-3 months**	48.68±4.96	49.00±6.16	0.803
● **4-6 months**	48.09±5.57	49.87±6.12	0.124
Subgroups	**Mean Length of Hospital Stay (days)**		**P-value**
	Karydakis Flap n=90	**Limberg Flap n=90**	
Age			
● **18-39 years**	1.78±0.76	1.84±0.79	0.601

● **40-60 years**	1.89±0.78	2.13±0.84	0.556
BMI			
● **20-25 Kg/m²**	1.79±0.79	1.89±0.74	0.601
● **25-30 Kg/m²**	1.83±0.73	1.86±0.83	0.874
● **30-35 Kg/m²**	1.70±0.80	1.84±0.83	0.591
Duration of Disease			
● **1-3 months**	1.81±0.74	1.84±0.82	0.863
● **4-6 months**	1.77±0.78	1.88±0.78	0.467

Subgroups	**Wound Infection (%)**		**P-value**
	Karydakis Flap n=90	**Limberg Flap n=90**	
Age			
● **18-39 years**	23/81 (28.4%)	9/82 (11.0%)	0.005*
● **40-60 years**	3/9 (33.3%)	1/8 (12.5%)	0.312
BMI			
● **20-25 Kg/m²**	8/28 (28.6%)	2/28 (7.1%)	0.036*
● **25-30 Kg/m²**	12/42 (28.6%)	5/43 (11.6%)	0.051*
● **30-35 Kg/m²**	6/20 (30.0%)	3/19 (15.8%)	0.292
Duration of Disease			
● **1-3 months**	11/37 (29.7%)	4/38 (10.5%)	0.038*
● **4-6 months**	15/53 (28.3%)	6/52 (11.5%)	0.032*
Subgroups	**Seroma Formation (%)**		**P-value**
	Karydakis Flap n=90	**Limberg Flap n=90**	
Age			
● **18-39 years**	16/81 (19.8%)	6/82 (7.3%)	0.020*
● **40-60 years**	2/9 (22.2%)	1/8 (12.5%)	0.600
BMI			
● **20-25 Kg/m²**	4/28 (14.3%)	1/28 (3.6%)	0.160
● **25-30 Kg/m²**	9/42 (21.4%)	3/43 (7.0%)	0.056
● **30-35 Kg/m²**	5/20 (25.0%)	3/19 (15.8%)	0.476
Duration of Disease			
● **1-3 months**	7/37 (18.9%)	3/38 (7.9%)	0.160
● **4-6 months**	11/53 (20.8%)	4/52 (7.7%)	0.056

Discussion

Various surgical and non-surgical modalities have been described for the management of pilonidal disease from a simple phenol injection to a complex flap mobilization, but an ideal treatment has not been determined because of substantial complications and high rate of recurrence[3]. Among the surgical techniques, Karydakis flap and limberg flap procedures are routinely performed[1]. Recently, some studies showed that Karydakis flap was superior to limberg flap procedures due to decreased frequency of complications[3,4] while still some other studies reported it vice versa[5-7].

In the present study, the mean age of the patients was 26.7±8.9 years. Our observation is in line with that of previous literature where mean ages have been reported of 27.0±7.4 years among patients presenting with pilonidal sinus disease at Liaquat University of Medical & Health Sciences[9] mean age of 26.8±3.7 years among Indian patients[10]; amongst other studies that have reported similar mean age of 26±4.8 years, 26.9±6 years, 26.2±6.5 years and 25.8±7.2 years respectively among patients in

Turkey[3,6,7,11]. We observed that the mean BMI of these patients was 26.7±3.0 Kg/m^2 and 39 (21.7%) patients were obese. A similar mean BMI of 26.60±3.76 Kg/m^2 has been reported by Dandin et al. (2018) among such patients in Turkey[12]. Our results are similar to those of Bali et al. who reported that 22.0% of Turkish such patients were obese[11].

The frequency of wound infection (11.1% vs. 28.9%) and seroma formation (7.8% vs. 20.0%) was significantly lower in patients undergoing Limberg flap as compared to Karydakis flap procedure. Our observation is line with that of Khan et al. (2016) who observed significantly lower frequency of wound infection (12.22% vs. 33.33%) and seroma formation (6.67% vs. 22.22%) with limberg flap procedure as compared to karydakis flap[5]. Similar significant difference was reported by Karaca et al. (2016)[6] in terms of frequency of seroma formation (4.2% vs. 17.1) and Ersoy et al. (2009)[7] in terms of wound infection (8.0% vs. 26.0) between limberg and karydakis flap procedures for pilonidal sinus disease.

We observed only insignificant difference between Limberg and Karydakis flap in terms of mean operating and length of hospital stay. Our observation is in line with that of Al-Salah et al. (2016)[13] who also reported insignificant difference in terms of mean operating and Tokac et al. (2015)[8] too didn't observe any significant difference between karydakis flap and limberg flap procedures in terms of mean operating time and mean length of hospital stay.

A very important limitation to the present study was that we didn't consider the various long-term outcome measures among such patients particularly recurrence; which should be considered before adopting any technique as preferred in routine practice. However, in terms of early outcome measures the Limberg flap may be a better option when considering a local flap procedure for Pilonidal sinus disease especially in the local context.

Conclusion

Limberg flap procedure was found superior to Karydakis flap procedure in patients with sacrococcygeal pilonidal sinus disease in terms of significantly lower frequency of wound infection and seroma formation with only insignificant difference in mean operating time and length of hospital stay which advocates its preferred use.

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