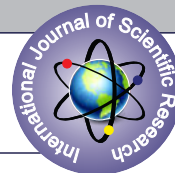


EFFECTIVENESS OF LIMBERG FLAP AND KARYDAKIS PROCEDURE IN PILONIDAL SINUS DISEASE – A COMPARATIVE INTERVENTIONAL STUDY IN A TERTIARY CARE CENTRE OF EASTERN INDIA.



Surgery

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ABSTRACT

Objective: Pilonidal sinus disease (PSD) is a common disease of natal cleft in Sacro- coccygeal region. It is more common in young male and may recur over time with surgery. We compared the effectiveness, outcomes and recurrence rates of Limberg flap and Karydak procedure techniques in PSD. **Materials And Methods:** This is a comparative interventional study among 32 enrolled patients with pilonidal sinus disease. Patients were divided into two groups 16 patients (group KD) were treated with Karydak procedure and 16 patients (group LF) were treated with Limberg flap technique. Seroma collection, wound infection, flap edema, hematoma, partial wound separation, pain score, return to normal activities, complete healing time, painless seating and patient satisfaction were compared between 2 groups (group KD and LF). **Results:** the development rates of seroma collection, wound infection, flap edema, hematoma, partial wound separation were 12.5%, 18.75%, 6.25%, 18.75%, 18.75% in KD group as compared to 25%, 12.5%, 12.5%, 0%, 0% in LF group respectively. Total flap necrosis was not observed in any patient ($p < 0.001$). During the average follow up period of 12 months, 2 (12.5%) of KD pts developed recurrence. **Conclusion:** In this study, the use of Limberg flap was associated with lower complication rates, shorter length of hospital stays, early return to work, low pain score, high patient satisfaction, better complete healing. Therefore, we recommend Limberg flap for treatment of pilonidal sinus

KEYWORDS

KD - karydak LF - Limberg flap PSD - pilonidal sinus disease

INTRODUCTION

Pilonidal sinus disease (PSD) has a spectrum of clinical presentation ranging from asymptomatic hair containing cysts and sinus to large symptomatic abscess of sacro- coccygeal region (includes pilonidal abscess/sinus/cyst & fistula). It is more commonly found in the natal cleft overlying the coccyx. It may consist of one or more midline sinus opening, usually non-infected, which communicates with a fibrous tract lined by granulation tissue containing hair lying loosely within the lumen. The incidence of PSD is approximately 7/10,000 with male: female ratio 3:1 and more predominantly in white/Caucasians with average of 21 yrs (male) and 19 yrs (female).

The etiology and pathogenesis of PSD are not clear, although it is thought to be weak hair follicles in intergluteal region which later becomes disturbed with keratin resulting in folliculitis and gets infected.

Infected follicles extend & rupture into subcutaneous tissue forming an abscess which in ultimatum results in sinus tract formation.

Obesity, trauma, local irritation, sedentary lifestyle are associated with PSD. Three factors are instrumental in this process-

- 1) Invaded hair
- 2) Force causing hair penetration
- 3) Vulnerability of the skin

Although PSD can be treated with several defined conservative and surgical methods, recurrence rates remain high. Complete removal of pilonidal sinus tract with appropriate reconstruction can lead to successful recovery.

Our aim in this study was to prospectively compare the effectiveness, outcomes & recurrence rates with pilonidal sinus disease with KD group and LF group.

MATERIALS AND METHODS:

This study was conducted at SCB MCH, Cuttack, Odisha, India from March 2021-March 2023. 32 patients with pilonidal sinus disease were eligible for study. Patients were divided into 2 groups

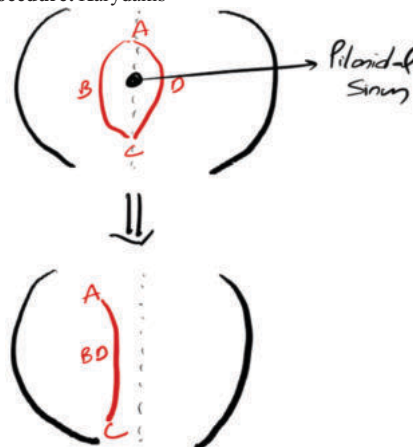
1. 16 patients (group KD) were treated with Karydak procedure
2. 16 patients (group LF) were treated with Limberg flap.

All patients were prospectively evaluated for gender, age, weight, location of sinus pit, period of hospital stay, post operative complications-

1. Seroma
2. Wound infection
3. Flap edema
4. Hematoma
5. Partial wound separation
6. Pain score

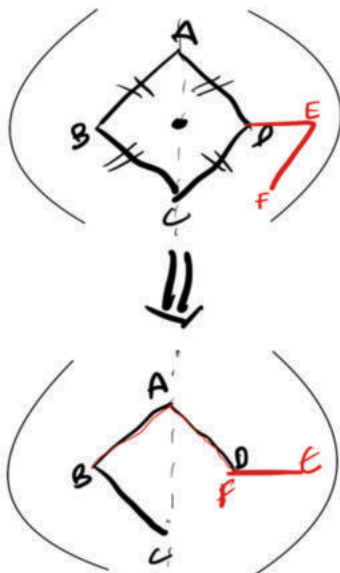
The ethical committee of our centre approved the study protocol.

Surgical Procedure: Karydak





Limberg Flap

**Inclusion Criteria:**

- 1) Informed consent
- 2) Presence of psd
- 3) INR<1.5, PT<15sec, aPTT within normal limits, platelets >50,000cells/m3
- 4) Age>16years

Exclusion Criteria:

- 1) Not willing to consent
- 2) Age<16yrs.

Patient Selection:

Patients were randomly selected among 2 groups KD group and LF group each of 16 patients.

RESULTS:

In this study 32 patients were selected, 16 of them were treated by Limberg Flap (LF) technique and the other 16 were treated by Karydakis Procedure (KD). The two groups did not differ in terms of Age, Sinus pit location or Number of sinuses. The Duration of Hospital stay was significantly longer in KD group (Avg of 3-6 days) as compared to LF group (Avg of 1-3 days). Patients who have underwent the Limberg Flap had early ambulation as compared to those who underwent Karydakis procedure. Patients of LF group had started their routine activities significantly earlier than those of KD group. Overall, the time taken for complete healing was earlier in LF group (16.05 $\pm$ 4.8 days) as compared to KD group (20.08 $\pm$ 5.02 days). The pain score was lower in LF group than KD group. Patient Satisfaction at the end of follow up was significantly better in those who underwent Limberg Flap than Karydakis procedure.

The Seroma formation was seen in 4 patients of LF group and in 2 patients of KD group. Wound infection was seen in 3 patients of KD group and 2 patients of LF group. Flap edema was seen in 2 patients of LF group and in only one patient of KD group. Hematoma formation was significantly higher in LF group 3/16 pts as compared to zero in KD group.

Partial Wound Dehiscence was seen in 2 pts of KD group and None among LF group.

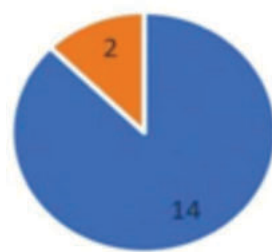
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Partial Wound Dehiscence was seen in 2 pts of KD group and None among LF group.

KD GROUP



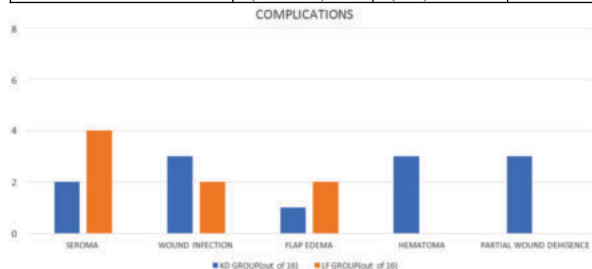
MALE FEMALE

LF GROUP



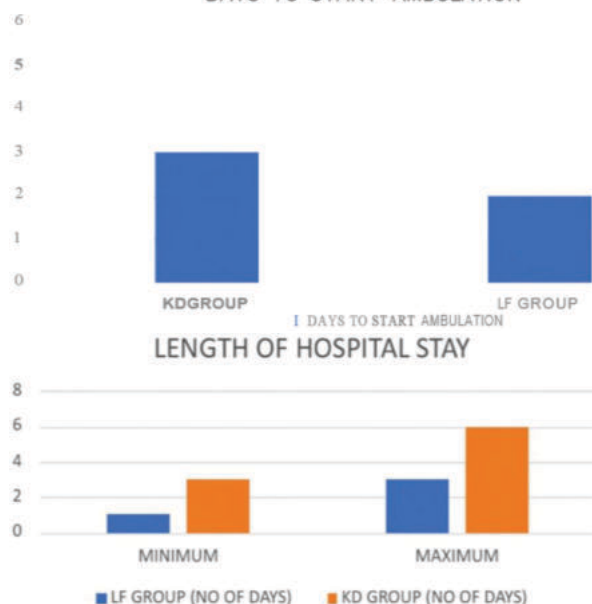
MALE FEMALE

Complications	Kd Group (16)	Lf Group (16)	P Value
Seroma	2(12.5%)	4(25%)	0.079
Wound Infection	3(18.75%)	2(12.5%)	0.058
Flap Edema	1(6.25%)	2(12.5%)	0.042
Hematoma	3(18.75%)	0(0%)	0.025
Partial Wound Dehiscence	3(18.75%)	0(0%)	0.052



POST OP ASSESSMENT		KD GROUP(out of 16)	LF GROUP(out of 16)
DURATION OF HOSPITAL STAY	3.6 DAYS	1.3 DAYS	
AMBULATION	3 DAY	2 DAY	
PAIN SCOR	5(2-6)	2(1-3)	
COMPLICATIONS TIME	20.08+/- 5.02 DAY	16.05+/-4.8 DAY	
PATIENT SATISFACTION	2.12+/-0.44	1.98+/-0.15	

DAYS TO START AMBULATION



DISCUSSION:

PSD reportedly has an incidence rate of 26 per 100,000 people and predominately affects young males. Presenting symptoms vary from acute to chronic, with one or more non-inflamed pits in the natal cleft as the most common manifestation. Due to the location, constant pressure and exposure to microbes the Recurrence rate is an important parameter for evaluating the Outcome of Treatment. Surgeons have various options in treating PSD e.g., Limberg Flap (LF) and Karydakias Flap (KF). LF is considered to be an effective treatment because of its low recurrence and short healing time and Hospital stay. Reports have also shown that LF has better cosmetic satisfaction.

The off-midline approach to treat PSD was first published by George Karydakias as a simple lateral advancement flap. The pathogenesis starts as a chronic process involving the accumulation of subcutaneous hair deposition in the intergluteal region that leads to inflammation and infection. The goals of the treatment include reliable wound healing, low recurrence rate, short hospitalization, and early recovery to routine work. Wound infection, fluid collection, edema, hematoma and wound separation can occur. The Limberg Flap group had a lower mean time for Hospital Discharge and lower occurrence of Hematoma formation than KF group.

The Limberg flap procedure is thus a safe choice for surgical treatment of Pilonidal Sinus Disease due to its low complication rate, short length

of hospital stays, early return to work and good patient satisfaction. Henceforth, we recommend Limberg Flap Procedure for the treatment of Pilonidal Sinus Disease (PSD).

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