



LIMBERG FLAP- OUR EXPERIENCE

Surgery

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ABSTRACT

Background : Pilonidal sinus disease has been treated over the years through various surgical procedures which mainly aim at removal of diseased tissue as well as reducing post operative morbidity by adequate closure and less recurrence. In this study we share our experiences with the Limberg flap closure used in pilonidal sinus disease. **Methods:** This observational study included 55 consenting patients with primary or recurrent PSD being admitted between from January 2017 to February 2019. These patients underwent Limberg flap closure following excision of the disease area. The primary outcomes included post operative pain, early complications such as seroma, infection and wound dehiscence and recurrence of PSD at 3rd and 6th month. The secondary outcomes measured were early return to work and cosmetic satisfaction. **Results :** 32 males (58.3%) and 23 females (41.81%) between age 17-34 enrolled in the study. The main presenting complaint was discharge at natal cleft among 46 patients (83.63%). The mean operation time was 50+/-10 minutes. The pain free walk for patients was seen on POD 3. The drain was removal was done of 4.7 days. 3 patients complained of severe chest pain (musculoskeletal) , seroma was noted among 2 patients following drain removal and 2 patients had minimal wound dehiscence at the inferior aspect of the flap. The mean return to work was 6.64 days. The cosmetic VAS score was 3.8 at 2 weeks and 4.6 at 6 weeks. No recurrence was noted among the patients after 3 months and 6 months follow up. **Conclusion :** Limbergs flap is a safe procedure with better patient cosmetic acceptability ,low morbidity , early return to work and a lower recurrence rate

KEYWORDS

PSD, pilonidal sinus disease, Limberg Flap, Rhomboid flap

INTRODUCTION

Sacrococcygeal pilonidal sinus disease (PSD) is an inflammatory condition essentially occurring in the natal cleft with weak hair accumulating in the hair follicles [1,2,3]. The term pilonidal is taken from Latin meaning "nest of hair". It usually is an acquired condition occurring more commonly in young males [1,4]. Other sites are the umbilicus, finger webs and intermammary folds [1,4]. The clinical presentations vary from simple pit to complex sinuses with purulent discharge [1]. The main aim in the treatment of PSD is to give a early return to normal life at the earliest to the patient .Management varies from clipping of hairs with good hygiene, wide excision of the area, excision and primary repair by various flap techniques like Limberg flap, Karydakies operation etc.

The etiology of pilonidal sinus was first described by Mayo in 1833, who suggested it to be congenital origin due to a remnant of epithelial tract from post coccygeal epidermal cell nests. The present acquired theory is based on the fact that congenital tracts do not contain hair and are lined by cuboidal epithelium. Karydakies proposed three factors contributing to the disease namely high quantity hair, extreme force, and vulnerability to infection [1,2].

Limberg rhomboid flap for PSD was designed by Prof. A. A. Limberg in 1946. This flap is easy to perform and has suture lines away from midline giving rise to unscarred skin in the midline, thereby reducing skin maceration, erosions and scar formation [2].

Our study was performed to evaluate the efficacy and usefulness of Limberg flap procedure in PSD in terms of patient comfort, early return to work, complications and recurrence rate.

MATERIALS AND METHODS

This observational study included 55 patients with PSD visiting the outpatient department of Father Muller Medical College Hospital, Mangalore, Karnataka, from January 2017 to February 2019. All patients were included in the study after a detailed written informed consent, and were managed by the same surgical team.

• Inclusion Criteria

1. All patients in the age group 17-70 years
2. Primary or recurrent pilonidal sinus disease

• Exclusion criteria

1. Acute presentation as abscess
2. Pregnancy
3. Those refusing to be a part of the study

• Pre-operative preparation

All patients were subjected to thorough pre-operative evaluation

including a detailed history, general and local examination and routine pre operative blood tests like complete blood counts, blood sugars, coagulation profile and renal function tests.

- Local examination of natal cleft was done and PSD was staged according to an established scoring system [4]

Stage 1: Single pit in midline, no lateral extension

Stage 2: More than one pit in the midline, no lateral extension

Stage 3: Midline pits plus lateral extension in one direction

Stage 4: Midline pits plus lateral extension in both directions

Stage R: Recurrent PSD after any treatment

- Surgical procedure

All surgeries were performed under spinal anesthesia. Patients were placed in jack knife position with wide adhesive tapes placed to separate the buttocks. Third generation cephalosporin antibiotic was given before incision. Methylene blue was injected into the sinus tract.

- Procedure

A rhomboid area of skin and subcutaneous fat is excised which includes both the midline pits and any lateral sinus extensions. The long axis of the rhomboid is in the midline and its shape determined by angles of 60 degree at A and C and 120 degrees at B and D. Rhomboid of the tissue was excised and flap measured and marked with pen at the start of surgery.

First the line A C is drawn and its length measured. C should be adjacent to the perianal skin and A is placed so that all diseased tissue can be included in the excision. The line B D transects the midpoint of AC at right angles and is 60% of length. It is this ratio of length which determines the correct shape to be Rhomboid. The flap is planned so that D E is the direct continuation of the line B D and is of equal length to the incision BA to which it will be sutured after rotation. EF is parallel to DC and of equal length. After rotation, it will be sutured to AD. The skin and subcutaneous fat is excised down to deep fascia but not including it. The flap is raised so that includes skin subcutaneous fat and the fascia overlying gluteal maximus. It is then rotated to cover the midline defect. Deep absorbable sutures to include fascia and fat are placed over a vacuum drain and then finally skin closed with interrupted sutures. This operation produced tension free flap of unscarred skin in midline.

- Post operative care

Standard post operative care included prone or lateral position for 24 hours, early ambulation and return to normal diet on the same day. Patients were discharged with drain between POD 2-4. They were followed up and drain was removed when less than 20 ml. Early return

to work was encouraged. Sutures were removed between POD 10-15, depending on the wound healing. Patients were further followed up after 3 months and 6 months of the procedure to look for recurrence.

• Outcomes measured

The primary outcomes included post operative pain, early complications such as seroma, infection and wound dehiscence and recurrence of PSD at 3rd and 6th month. The secondary outcomes measured were early return to work and cosmetic satisfaction.

RESULTS

Patient characteristics: 55 patients were included in this study, out of which 32 were males (58.3%) and 23 were females (41.81%) and were in the age group between 17-34 years. The main presenting complaint was discharge at natal cleft among 46 patients (83.63%). Other complaints were previous history of abscess drainage within last one year at the same site among 42 patients (76.36%), recurrent abscess among 9 patients (16.36%) and 4 patients (7.2%) had recurrent disease following flap (Karydakis and Limberg) surgery done elsewhere.

Size of the flap varied from 4cm to 16cm depending on the extent of pits.

Post operative period: The mean operation time was 50+/-10 minutes. All patients were ambulated on the same day of the procedure. The pain free walk for patients was seen on POD 3. The drain was removed once the collection was less than 20 ml on OPD basis with a mean of 4.7 days. 3 patients complained of severe chest pain (musculoskeletal) due to the positioning over the bolster pillow and were relieved with muscle relaxants. Seroma was noted among 2 patients following drain removal and 2 patients had minimal wound dehiscence at the inferior aspect of the flap which healed with regular dressings. Suture removal was done between POD 11-15 depending on the wound healing and complications. The mean return to work was 6.64 days.

Cosmetic outcome: The cosmetic VAS score was 3.8 at 2 weeks and 4.6 at 6 weeks.

Recurrence: No recurrence was noted among the patients after 3 months and 6 months follow up.

DISCUSSION

The surgical treatment for PSD is excision of the diseased tissue inclusive of all pits those tracts down to the sacrococcygeal fascia. But the concern remains about the closure of the defect. An ideal surgical procedure for the management of PSD should have minimum morbidity, lesser hospital stay, early return to work and better cosmetic satisfaction. Several methods have been used with each having its own advantages and disadvantages.

Reconstruction of the post excision defect with Limberg flap is easy to design and it flattens the natal cleft with a large vascularized pedicle and also have less complications [2,4].

It is suggested that PSD is more in young and middle aged males due to the association with male hormones [4]. We also found a higher incidence of PSD in males (58.3%). Majority of our patients being in the second and third decade also follows the natural history of the disease as described [2,4].

The main factor affecting the choice of treatment is the post operative pain, early return to work and the cosmetic satisfaction. We report an early return to work with the Limberg flap with a mean of 6.64 days. This is also comparable to various other studies [1,3,4,5].

Seroma formation is reported to be slightly higher in the Limberg flap group in earlier studies [4], though not statistically significant. We found seroma formation in 2 patients. Most flaps used in PSD are physiologically dependent on the macro and micro circulation. The arteriolar, capillary and arteriovenous anastomosis occurs at the microcirculation level where the cellular metabolism occurs and perfusion is controlled. This is partially disturbed in Limberg flap due to sharp angulations at the edges. We slightly rounded the edges of the flap to minimize this, thereby resulting in lesser chances of flap necrosis at the edges and hence reduced the incidence of seroma formation.

Wound infection is another common complication encountered in PSD flap surgeries due to the proximity of anal verge, obesity and poor

personal hygiene. Infection can endanger the vitality of the flap leading to re-surgeries and longer post operative pain. Though we did not encounter infection in any of our patients, we noticed wound dehiscence at the inferior most part of the flap close to the anal verge among 2 patients. This could be probably due to the microcirculation problems, humidity at that area and also due to the increased bacterial load at that region. It also can be explained due to the tension in that area during the use of the toilet.

With regard to patient centered outcomes like patient satisfaction, early mobilization and early return to work, we had comparable results [4,5]. The cosmetic satisfaction of the patients was also good in our study.

Table 1: Patient characteristics

Total number (n= 55)	Male -32 (58.3%) Female = 23(41.81%)
Age	17- 34years
Common complaint – discharge in natal cleft	N=46 (83.63%)
Recurrent abscess	N= 9 (16.36%)
Pain	N= 3(5.45%)
Recurrent flap	N=4 (7.2%)
Abscess drainage in past 1 year	N= 42(76.36%)
Mean operation time	50 min± 10min
Hospital stay	2 days post operatively

Table 2: Complications

Immediate – chest pain (musculoskeletal)	3
Seroma following drain removal	2
Wound Dehiscence	2

Table 3 :Post op management

antibiotics	One preop and one dose post operative
Drain removal	4.7DAYS
Stitch removal	10-15 days
To walk pain free	4DAYS
Return to work	6.64
Cosmetic satisfaction – VAS	3.8 AT 2 WEEKS 4.6 AT 4 WEEKS
Recurrence	
3 mths	0
6 mths	0

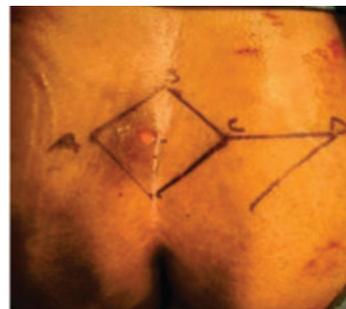


Fig 2 A: intra op marking of the proposed excision and Limberg flap



Fig 2 b: excision of the pits and disease tissue upto the deep fascia



Fig 2 c: post excision



Fig 3a: mobilization of the flap with the deep fascia



Fig 4: final outcome

Limitations

Our study included a small study group, absence of a control group and did not compare with other types of flaps. The patients were also followed up only for 6 months due to the change of institutions of the authors while recurrences have been noted to occur even after many years.

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