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Long Term Follow Up of Limberg's Flap Repair for Primary Pilonidal Sinus

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ABSTRACT:

BACKGROUND: Surgical treatment for pilonidal sinus disease is associated with significant morbidity and some recurrence rates. The rhomboid flap of Limberg is a transposition flap which has been advocated since the year 1946 for the surgical treatment of this condition. The gold standard treatment of recurrent pilonidal disease still remains elusive. As far as the patient is concerned the main concern for surgical treatment of this disease is recurrence. An old article (1995) mentions it to range from 20–40 % regardless of the technique used. The main aim of this long term follow up is specifically that.

METHODS: This is a retrospective , observational, single centre study carried out at a tertiary care centre, with the study period extending from January 2015 to January 2021 with a sample size of 103 patients.

AIMS:

1. Long term follow up (mean of 3.75 yrs) of patients who underwent Limberg's flap repair for primary pilonidal sinus and primary with secondary tracts to estimate recurrence rates.
2. To assess the complication rate following Limberg's flap for the above condition.

RESULTS: After a mean follow up of 3.75 years , a recurrence rate of 16.5% was noted in patients undergoing Limberg's flap. The total complication rate excluding recurrence was 29.1%.which include - 12.6% of infected collection, 8.7% of seroma formation, 1.9% of hematoma, 3.8% of wound dehiscence and 1.9% of flap necrosis occurrence. In the final analysis, the following reasons for recurrence were observed. 64.7% was due to secondary infection and in 17.6% no root cause was found. In the approach for treatment of complications , three different methods were employed.

1. The debridement with or without Vacuum-Assisted Closure (VAC) device followed by secondary suturing utilized in 7 patients (41.1%).
2. Excision with Z-plasty was performed in 6 patients (35.2%),
3. Alternative medicine was opted by 4 patients (26.6%).

CONCLUSION: In the light of these results in the retrospective analysis, Limberg flap as a surgical technique for pilonidal sinus disease may not be a gold standard.

INTRODUCTION:

Pilonidal sinus (PS) is a common disease of the sacrococcygeal region. There are many treatment options, but there is no consensus on the ideal surgical treatment method[1]. The following have been described :

a. Excision and healing by secondary intention.

b. Excision and primary closure,
c. Advancement flaps like Karydakis procedure, Z flap and V–Y flap
d. Rotational flaps such as the Limberg flap (LF) techniques
e. FiLac – laser ablation of the sinus tract

Surgical treatment of pilonidal sinus disease is associated with significant morbidity and recurrence rate. The Limberg's flap as a method of treating this condition was described in the year 1946 [2] and has been favoured by many surgeons due to it's low recurrence rate.[3]

The Limberg's flap is a rotation flap creating a tension-free tissue flap that flattens the gluteal cleft[4]. The Limberg flap has many advantages that it is easy to design, perform and flattens the natal cleft with a large vascularized pedicle when sutured without tension into the gap. This reduces the friction between the two buttocks, prevents maceration, and avoids a scar in the midline[5].

In 1995 Berger A et al reported a recurrence rate of 20–40 % for any surgical modality used for treatment of pilonidal sinus disease regardless of the technique [6]. Reasons attributed to recurrences were: leaving behind some tracts, sutures in midline causing more trauma with repeated infection accumulation of perspiration, and friction with tendency of the hair getting incorporated into the wound [7].

MATERIALS AND METHODS:

This is a retrospective , observational, single centre study with a study period of January 2015 to January 2021with a sample size of 103 patients, carried out in a tertiary care centre (Ramaiah medical college hospital, Bangalore).

AIMS

1. Long term follow up (mean of 3.75 yrs) of patients who underwent Limberg's flap repair for primary pilonidal sinus and primary with secondary tracts to estimate recurrence rates.
2. To assess the complication rate of Limberg's flap.

➢ **Inclusion criteria:**

- Patients who underwent Limberg's flap repair
- Patients with primary pilonidal sinus or primary with secondary tracts.
- Patients in whom either clinically hair was demonstrated or excised specimen showed hair in histopathological examination.
- Age ranging from 18-75 years

Exclusion criteria:

- Patients with history of recurrent pilonidal disease.
- And those with no hair clinically or in histopathological excised specimen
- Those patients with age less than 18 or more than 75 were excluded.

Total of 103 patients that were included in the study, out of which 65 cases were of primary pilonidal sinus (central, single opening) and 38 cases were primary pilonidal sinus with secondary tracts.

Patients with recurrent pilonidal sinus (26) were excluded from the study.

All patients were either confirmed to have hair in the sinus by ultrasound examination (64- 62.1%) or by final histopathological examination (103-100%).

103 patients underwent Excision followed by Limberg's flap repair.

Recurrence is called persistance of sinus or ulcer with majority of them occurring within the first year after surgery. It has been observed that more than 80 percent of recurrences appeared in the first postoperative year[7]

Inspite of treatment of morbidity or after healing of the surgical wound . failure is also called recurrence. All the patients had suction drainage tubes postoperatively which was removed between POD3 to POD7 with a median of POD5.Patients were followed up via OPD visits or phone calls to assess complications and recurrences. Sutures were removed on POD14 to POD 23. All patients were advised to shave back hair once a month. Patients were diagnosed to have recurrence if the sinus with or without discharge recurred within one year of Limberg's flap or persisted for more than 1 month of Limberg's flap.

RESULTS:

The demographic characteristics of the study group was as follows:

The age ranged from 18 to 74 with a mean age of (21years)

Sex ratio of 3.1:1 was noted (78 males and 25 females).

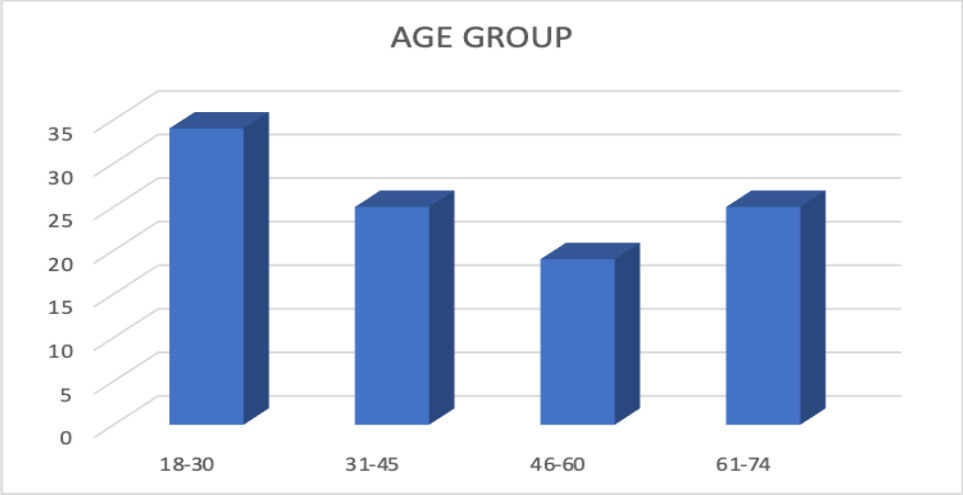

Figure 1: Age group

DEMOGRAPHIC CHARACTERISTICS	PERECNTAGE
Male	78
Female	25
T2DM	7
Hypertension	9
CRF	2
Primary pilonidal sinus	65
Pilonidal sinus with secondary tracts	38
Suction drainage	103

Figure 2 : Demographics

The duration of symptoms ranged from 10 to 210 days, with an average of 45 +/- 40.5 days.
17.4% of the patients had comorbidities with 7 (6.7%) patients having type 2 diabetes mellitus, 9 (8.7%) patients having hypertension and 2 (1.9%) patients having renal disease. BMI ranged from 20.4 to 44.6; mean BMI of 32.5.
The hospital stay ranged from 3 to 38 days, with an average of 20.5 +/- 8.75 days.
The healing time for non-recurrent (86 patients following Limberg's flap) cases ranged from 7 to 90 days, with an average of 48.5 +/- 20.75 days.
A total of 30 patients (29.1%) were found to have postoperative complications and were as follows:

1. infected collection -13 (12.62%)
2. seroma formation - 9 (8.73%)
3. hematoma – 2 (1.94%)
4. wound dehiscence – 4 (3.88%)
5. flap necrosis – 2 (1.94%)

17 patients had recurrence contributing to 16.5% in a mean follow up period of 3.75 years.

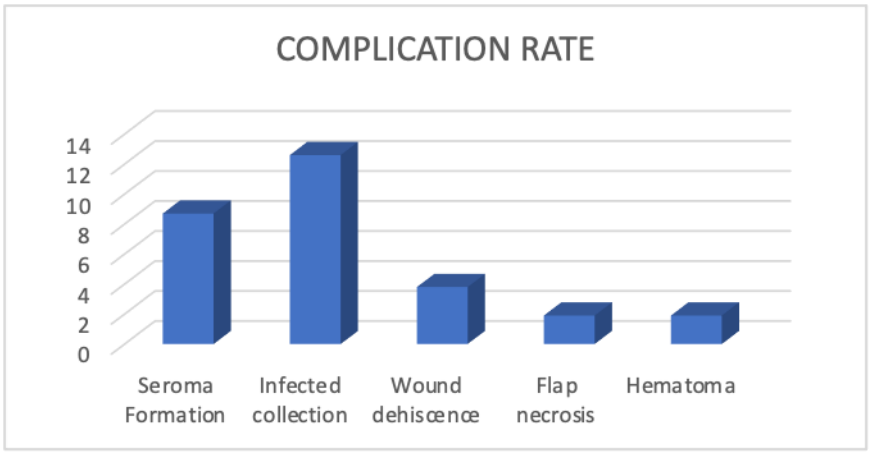

Figure 3: Complication rate

In the follow-up analysis, recurrence rates were examined based on the duration post-treatment. Among 17 cases, 6 (35.29%) experienced recurrence within or equal to 6 months after treatment, while 11 (64.70%) had recurrence after more than 6 months upto 4 years post-treatment. They were classified as early recurrence if they were observed to have recurrence within 6 months of primary surgery and late if observed to have recurrence more than 6 months of primary surgery.

Figure 4- Primary pilonidal sinus

Figure 5- Pilonidal sinus with secondary tracts.

Figure 6- POD 0 of Limberg's flap repair

Figure 7- POD11 of Limberg's flap with secondary suturing following seroma collection.

Figure 8- Intra op Limberg's flap

Figure 9- Minor flap necrosis

Figure 10- 1 month post Limberg's flap repair

Figure 11- 4 months post Limberg's flap repair

Figure 12- 18 months post Limberg's flap repair

Figure 13- 3 years post Limberg's flap repair

Amongst 65 patients with primary tract, only 4 (6.15%) recurred. However in those with secondary tracts, 13 out of 37 cases (35.13%) exhibited recurrence, contributing to a larger proportion of recurrence.

In the root cause analysis, the following observations were made:

76.47%(13) of recurrences were due to complications and breakdown is as follows:

1. 58.82% (10) had infected collection during follow up that was managed on OPD basis by sterile dressings and antibiotic coverage.
2. 11.76% (2)had flap necrosis noted.
3. 5.88% (1) had hematoma formation.

In 23.52%(4) no cause could be determined.

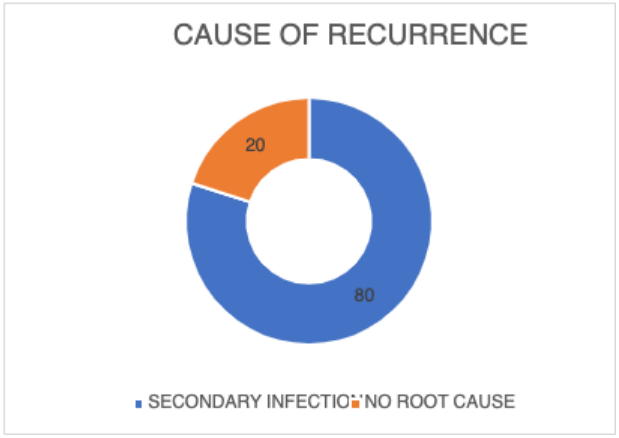

Figure 14- Cause of recurrence

Among 17 cases that had recurrence, the following complications observed during follow up were seen to attribute towards their recurrence.

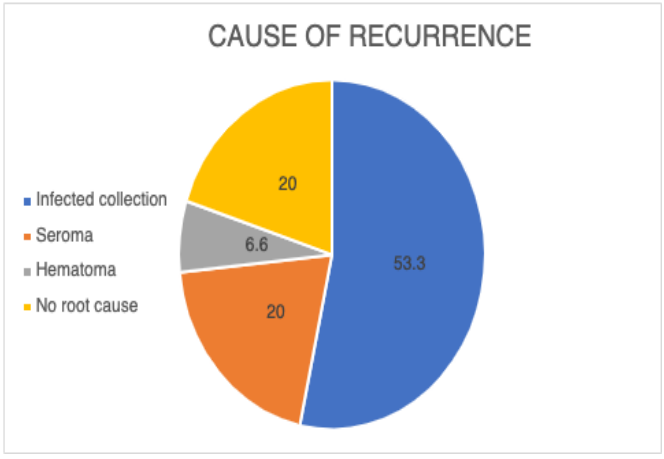

Figure 15- Causes of recurring sinus

In the treatment plan for complications , three different successful methods were employed :

1. Debridement with or without Vacuum-Assisted Closure (VAC) followed by secondary suturing: 7 (41.17%).
2. Excision with Z-Plasty : 6 (35.29%),

3. Alternative medicine was opted by in 4 patients (23.52%) out of which 1 recurred and he did not seek our advice.

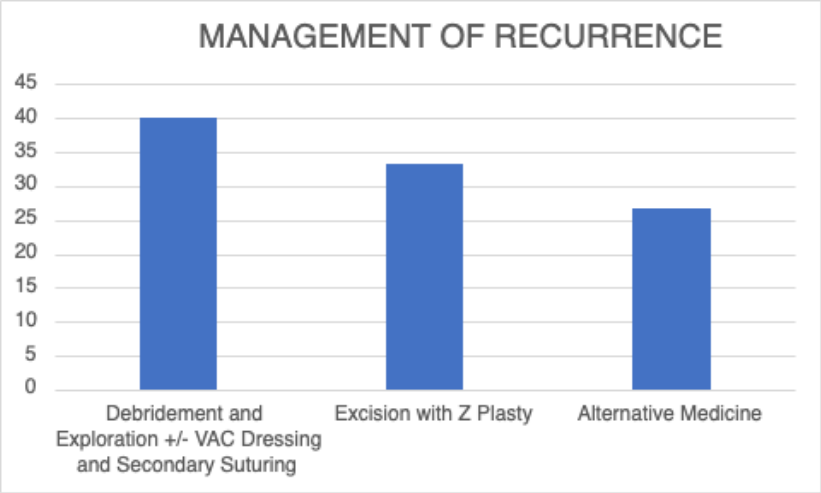

Figure 16- Management of recurrence

Figure 17- 4 months post Limberg's flap repair

Figure 18- Debridement and exploration

Figure 19- 4 weeks post Debridement+ Excision + VAC and secondary suturing

DISCUSSION:

Our retrospective study with long term follow up (mean of 3.75 years) has shown total complication rate of 29.1% for Limberg's flap as surgical modality for non-recurrent pilonidal sinus.

The breakdown of complications is as follows:

Hematoma -1.94%.

Seroma - 8.73%

Wound infection - 12.62%

Wound dehiscence - 3.88%

flap necrosis – 1.94%

On comparison of these results with those in the meta analysis published in 2022 from two different geographical area (China and Egypt) seems to be almost similar, except with hematoma and flap necrosis. However, the incidence of wound infection is lesser by half in results from Egypt.

However in the study published in Italy by Milito et.al.[9], the complication rates are considerably lower. The incidence of seroma and wound infection are considerably lower. Wound dehiscence seems to be higher (8.3 vs 3.88%). Incidence of flap necrosis is comparable.

The incidence of wound infection and wound dehiscence is comparable with the study done by sk aithal [5]

In a study conducted with 87 patients :

Minimal flap necrosis occurred in 5 patients (2.3%), postoperative infection in 2 patients (0.9%), 4 patients (1.8%) had a seroma, 18 patients (8.3%) anaesthesia or hypoesthesia on the upper portion of the flap. The mean hospitalization was 3.1 ± 0.30 days and return to work was 10.8 ± 2,4 days. Recurrences occurred in 5 patients (7.4%)[9].

In an other study of long term follow up :

The most common complication was wound infection, and it was detected in 12 (26.2%) subjects, together with other morbidities and treatment protocols. No patients developed a complication that required surgical intervention. Recurrence occurred in 19 (13.2%) patients during the median follow-up period of 27.5 months[10].

In a meta-analysis published in the Medical Journal of Cairo University in 2022[11], the complication rates for various postoperative complications were as follows:

Hematoma occurred in 12 out of 249 cases, accounting for approximately 4.8% of the cases.

Wound infection was observed in 74 out of 1098 cases, representing about 6.7% of the cases.

Seroma occurred in 65 out of 991 cases, making up approximately 6.5% of the cases.
Wound dehiscence was noted in 86 out of 1067 cases, constituting approximately 8.05% of the cases.
In a meta-analysis published in the Medical Chinese Journal in 2022[12], with a complication rate of 29%, the incidence of postoperative complications was reported as follows:
Hematoma occurred in approximately 3.71% of cases.
Wound infection was observed in around 12.03% of cases.
Seroma was noted in approximately 5.49% of cases.
Wound dehiscence was reported in about 5.98% of cases.
Recurrence rate in a study by D Doll et.al. (2007) showed a recurrence rate of 22% for a follow up period of upto 20 years.[8] This shows a wide variation of recurrence rates compared to the other studies in literature.
The recurrence rate in our study is 16.5% which is higher than the studies done and published in Cureus (2019) , The surgeon (2018), Sci Rep (2018)
Reasons for higher recurrence can be possibly due to several surgeons with various levels of experience had operated or unreported spillage during excision of pilonidal sinus. Loss to long term follow upo could be another factor in this.

CONCLUSION:

In the light of this study results, Limberg flap surgical technique may not be an ideal operation for pilonidal sinus disease.
On comparing and referring with other studies, our study has shown a high rate of recurrence(16.5%) and complications(29.1%). Limberg's flap is indeed a morbid or radical procedure to be followed in this day and age. Other techniques need to be thoroughly researched upon so as to find a gold standard treatment for pilonidal sinus disease.

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