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ORIGINAL ARTICLE

The short-term Results of Modified limberg Flap in Treatment of Pilonidal Sinus Disease

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ABSTRACT

Background: Pilonidal sinus disease is a chronic disease of the sacrococcygeal region, which commonly occurs in young adults. The male population is affected more than the female one. Many surgical techniques have been described in the literature for the treatment of this disease. This study aimed to assess the effectiveness and short-term results of the modified Limberg flap technique in the treatment of pilonidal sinus disease.

Methods: This randomized clinical trial study was carried out in Zagazig university hospital. It included eighteen patients with pilonidal sinus disease who attended GIT Unit, General Surgery Department, during the period from January 2020 to August 2020. The 18 patients underwent the modified limberg flap procedure. All patients were subjected to Demographic data taking, complete clinical examination and Laboratory investigations.

Results: The mean operative time was 63.056±6.673 min. The healing time and duration of work-off were 15.833 ± 2.256 and 16.833 ± 2.256 days respectively. Two patients were complicated. Combined hematoma and dehiscense occurred in one patient (5.6%) and seroma occurred in one patient (5.6%). No patients had a recurrence.

Conclusions: Modified Limberg flap technique showed early healing, short duration of work-off, and a low rate of complications and recurrence.

Keywords: Modified Limberg flap; Open method; Pilonidal sinus disease.

INTRODUCTION

Pilonidal disease is an acute or chronic infection in the subcutaneous fatty tissue, mainly in the natal (inter-gluteal) cleft. The term "pilonidal" means "nest of hair" **[1].** The exact etiology of pilonidal sinus disease is unclear; however, it is thought to be related to hormone changes leading to enlargement of hair follicles with resultant blockage of the pilosebaceous glands in the sacrococcygeal area **[2].** The movement of the buttock and the shape of the natal cleft facilitate the burial of the barbed shaped hairs into these sinuses, which in turn exacerbates the infection acting as a foreign body **[2].**Sacrococcygeal pilonidal sinus disease is a common and debilitating condition, with 26 cases per 100,000 patients occurring annually. Young, hirsute males are typically affected by this condition. The pilonidal disease was originally thought to be a congenital condition caused by abnormal skin in the gluteal cleft; however, it is now believed to be an acquired condition caused by the presence of hair in the gluteal cleft **[3].** The Principles of Surgical strategies require eradication of the sinus tract, complete healing of the overlying skin, and prevention of recurrence. Many methods are available for surgical management of Pilonidal Sinus Disease (PSD) which is treated by wide excision. After excision, the wound may be left open to heal with granulation tissue or may be immediately closed with a midline closure or by using a flap (Z-plasty, karydakis, Bascom, or Rhomboid flaps). However, there is not yet a consensus on optimal treatment **[4].** This study aimed to assess the effectiveness and short-term results of the modified Limberg flap technique in the treatment of pilonidal sinus disease.

METHODS

This study was approved by the local institutional review board of the Faculty of Medicine, Zagazig University after having written consent from included patients in the study.

A total of 18 patients from 20-45 years (16 male and 2 female) attending the GIT Unit, General Surgery Department, Zagazig University Hospitals from January 2020 to August 2020 were included in this prospective randomized clinical study. They were undergoing the modified limberg flap

procedure. The study was done according to The Code of Ethics of the World Medical Association (Declaration of Helsinki) for studies involving humans.

Inclusion criteria: Age > 18 years, all patients with uncomplicated sacrococcygeal pilonidal sinus and recurrent pilonidal sinus after open method technique.

Exclusion Criteria: Pilonidal abscess, diabetes mellitus, patients unfit for operation, patients refuse to share in the study and loss of patient follow up.

Sample size: sample size was calculated by OpenEpi program to be 18 cases with confidence level 95 % and power of test 80%.

All patients were subjected to Demographic data taking, complete clinical examination of the sinus for the number of openings or discharge, Laboratory investigations including CBC, Coagulation profile, liver and kidney functions, random blood sugar and viral markers and ECG and ECHO in cardiac patients or in patients > 40 years old.

Operative technique: The procedure was done under spinal anesthesia and prophylactic antibiotics (1 gm. ceftriaxone IV) were given half an hour before anesthesia. In the prone position, buttocks were separated with strips of adhesive tape. The skin of the back and buttocks was disinfected with 10% povidone-iodine solution. Methylene blue dye was injected into the sinus orifices to assess the extent of the sinus so that the whole sinus and its ramification could be fully excised without inadvertent contamination of the wound by opening the track **(Figure 1).**

The extent of excision and flaps were determined by drawing on the glutei. The pathological area to be excised was mapped on the skin. It was enclosed by a rhombus-shaped design (ABCD) **(Figure 2)** . The inferior apex of the excised rhomboid area was placed 1.5-2 cm lateral to the midline on the side opposite to the donor area (C). All diseased tissues were included in the excision. A right or left fascio-cutaneous Limberg flap was planned so that (DE) was a direct continuation of the line (BD) and was of equal length to the line (BA) to which it was sutured after rotation. (EF) was parallel to (DC) and was of equal length and after rotation, it was sutured to (AD). The flap was elevated off the gluteal fascia contralateral to the asymmetric lower corner with careful dissection to avoid damaging the feeding arteries located in the inferior aspect of the flap. Then the flap was transported medially to fill the defect without tension **(Figure 3)**. The defect in the gluteal region was closed primarily. The subcutaneous layers were approximated with 2-0 vicryl interrupted over a vacuum drain, and the skin was closed with 2-0 proline interrupted sutures, which were removed on postoperative day 14 **(Figure 4)**.

Postoperative care: The short-term results of the technique followed up for 6 months postoperatively. Patients were seen routinely on postoperative days 3, 6, 9, and 14 for wound inspection and removal of sutures. Any wound complications were recorded. At 3 and 6 months after surgery, patients were invited to follow-up. Time to return to work and time until complete healing was recorded. Patients were advised to shave inter-gluteal cleft and adjacent buttocks and always keep the operative area clean and dry.

STATISTICAL ANALYSIS

Data analysis was performed using the software SPSS (Statistical Package for the Social Sciences) version 20. Quantitative variables were described using their means and standard deviations. Categorical variables were described using their absolute frequencies and were compared using Chi-square test when appropriate. Kolmogorov-Smirnov (distribution-type) and Levene (homogeneity of variances) tests were used to verify assumptions for use in parametric tests. To compare quantitative variables between two groups sample t-test (for normally distributed data) and Mann Whitney test (for discrete and not normally distributed data) were used. To assess the correlation between two continuous variables, (which are not normally distributed data), the spearman rank correlation coefficient was used. Percent change was calculated by subtracting postoperative value from preoperative value then divided it by preoperative value*100, The level statistical significance was set at 5% (P<0.05). A highly significant difference was present if p≤0.001.

RESULTS

A total of 18 patients were included in our study, 16 male and 2 female. The age of patients was range from 20 - 45 years with a mean ± SD of (32.778±7.019).The mean operation time was 63.056 ± 6.673(range, 55 – 75) minutes. The healing time and duration of work-off were 15.833 ± 2.256 and 16.833 ± 2.256 days respectively. **[Table 1]**Drains had been removed from 3 to 9 days postoperative when it contain less than 10ml / 24 hours with mean 5.889 days. **[Table 1]**

The post-operative pain Visual Analogue Scale (VAS) was range from 2-4 with a mean of (2.667 ± 0.767) **[Table 1]**Two patients were complicated. Combined hematoma and dehiscence occurred in one patient (5.6%) and seroma occurred in one patient (5.6%). **[Table 2]**Two thirds of patients (12) reported excellent satisfaction. **[Table 3]**

Table 1: Operative and postoperative follow up

	Mean ± SD	Range
Operative time (minutes)	63.056 ± 6.673	55 – 75
Healing time (days)	15.833 ± 2.256	14 – 22
Time off work (days)	16.833 ± 2.256	15 – 23
Drain removal (days)	5.889 ± 1.53	3 – 9
Pain score (VAS)	2.667 ± 0.767	2 – 4

Table 2: Complications

Complications	N=18 (%)
Non-complicated	16 (88.9%)
Seroma	1 (5.6%)
Hematoma and dehiscence	1 (5.6%)
Infection	0
Ischemia	0

Table 3: Patients satisfaction

Patient satisfaction	N=18 (%)
Fair	3 (16.7)
Good	3 (16.7)
Excellent	12 (66.7)

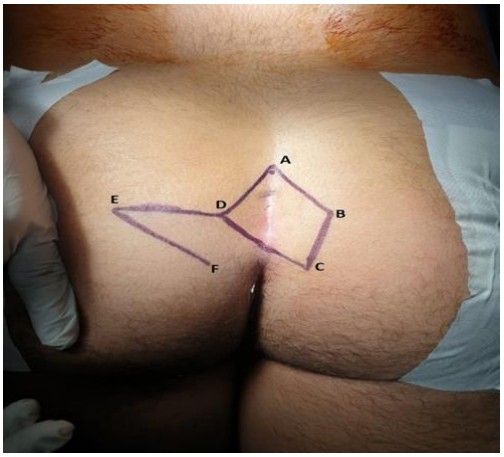

Figure 1: Incision marking

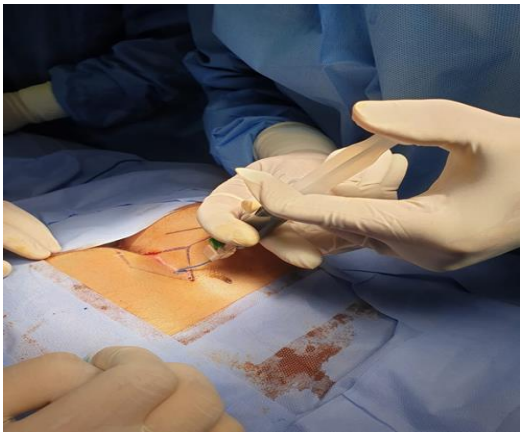

Figure 2: Methyline blue injection :

Figure 3: Rotation of the flap

Figure 4: Closure of the wound with suction drain :

DISCUSSION

In this study, there was a male predominance (88.9%) and the age of patients range from 20 - 45 years with a mean ± SD of (32.778±7.019) which was similar to the studies reported by **Ahmed et al. [4] and Bali et al. [6].**All our patients were discharged on the day of operation (all of our cases were performed as day-case surgeries), similar to **Bessa. [7] and Varnalidis et al. [8]** studies.

In our study, the operative time ranged from 55 – 75 minutes with a mean ± SD of (63.056± 6.673) minutes and this is similar to the studies by **Can et al. [9]** and **Ekici et al. [5]**.

Regarding postoperative complications, in our study, none of the patients presented with postoperative wound ischemia of the flaps or infection. One patient presented with seroma (5.6%) due to accidental dislodgment of the suction drain on the third post-operative day and managed by repeated aspiration 3 times. Another patient (5.6%) presented with hematoma, so we had to remove the drain and 2 sutures to evacuate it on the fourth postoperative day and the wound was managed conservatively. About 88.9% of patients had been non-complicated. Our study is in line with the studies done **Karaca et al. [10], Jabbar et al. [11], Käser et al. [12].**In the current study, we recorded the post-operative pain Visual Analogue Scale (VAS) and it was range from 2-4 with a mean of (2.667 ± 0.767). This goes with the findings of **Colak et al. [18]**

In our study, the drain removal time range from 3 – 9 days with the mean ± SD of (5.889 ± 1.53). The drain removed when it contains less than 10ml / 24 hours and this is similar to the study by **Sarhan et al. [17]**The time off work ranged from 15 - 23 days with a mean ± SD of (16.833 ± 2.256) days off work. This is like **Tokac et al. [13].**This current study showed that the mean healing time was (15.833 ± 2.256) days with a range of (14 - 22) days. This opposed the findings of **Arslan et al. [14].**Regarding the early post-operative recurrence, in our study, patients had no recurrence (0%). These findings go with many studies like **[Karaca et al. [10], Jabbar et al. [11], Yildiz et al. [15], Kicka et al. [16]**.The degree of patient's satisfaction was 66.7% excellent, 16.7% good, and 16.7% fair. So, about 84% of patients recommended the Modified Limberg Flap (MLF) operation and this is like the study by **Sarhan et al. [17].Limitation of the study:** Poor local hygiene of some patients. Some patients did not obey post-operative instructions.

CONCLUSIONS

The modified Limberg flap technique showed early healing time, short duration of work-off, and a low rate of complications and recurrence.

We recommend that a larger study group with long term follow up for up to 2 years for a better evaluation of patient satisfaction, complication, and recurrence rates.

Declaration of interest None.

Funding information none.

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