

Modified Limberg transposition flap in the treatment of pilonidal sinus disease

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Abstract

Background Pilonidal sinus disease (PSD) is a common problem in surgical practice. Different non-surgical and surgical methods have been used for treating PSD. Flap techniques including the Limberg flap have become more popular in recent years. A modified Limberg flap was used to reduce the problems of skin maceration and recurrence associated with the conventional Limberg flap technique. The aim of this retrospective study was to assess the effectiveness of the modified Limberg flap technique for PSD.

Methods Medical records of 94 patients with PSD who had been treated with a modified Limberg flap between December 2006 and 2009 were evaluated. The patients' age, sex, duration of preoperative symptoms, operative time, mean hospital stay, postoperative complications, wound infection rate, maceration rate and recurrence rate, time until return to work, time until sitting on the toilet without pain, hypoesthesia in the gluteal region, and satisfaction score were recorded during follow-up or at the last interview. Clinical data were obtained at the end of the 5th postoperative day and at 1, 3, 6, and 12 months following surgery.

Results There were 83 male and 11 female patients. The mean operative time was 38.95 ± 6.77 min (range

30–67 min). All patients were followed up longer than 12 months, and the mean follow-up period was 30.97 ± 12.7 months (range 12–54 months). While wound dehiscence was observed in only one patient, we did not detect any case of flap necrosis. Two cases of seroma were observed. Wound infection was detected in 5 patients (5.3%). Surgical drainage was performed in 2 cases. Another 3 patients were treated with oral antibiotics. Maceration of the surgical incision site was detected in 8 patients (8.5%) who were all successfully treated with conservative measures. There were 4 patients (4.2%) with recurrence in this series.

Conclusions When compared with the available data on use of the conventional Limberg flap for PSD, our results suggest that use of the modified Limberg flap is associated with a lower maceration and recurrence rate, and greater patient satisfaction.

Keywords Pilonidal sinus · Limberg flap

Introduction

Pilonidal sinus disease (PSD) is a common condition usually affecting young adults. The incidence of disease is 26/100,000 in population [1]. It is caused by penetration of free hair into the skin and associated with a foreign body reaction. PSD is accepted as an acquired pathology in recent years [2]. Although the disease has been reported in different parts of the body [3, 4], the most common site is the intergluteal cleft. Various surgical and non-surgical procedures have been used for the treatment of PSD.

There is no ideal treatment modality currently available. The main problem after PSD surgery is recurrence, and recurrence rates that range from 3 to 46% depending upon the technique used are reported in the literature [5]. The

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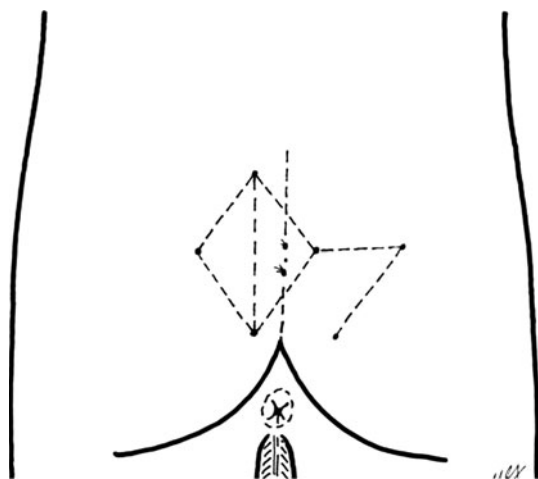


Fig. 1 The rhomboid-shaped excision of pilonidal sinus, lower pole is shifted from the intergluteal cleft

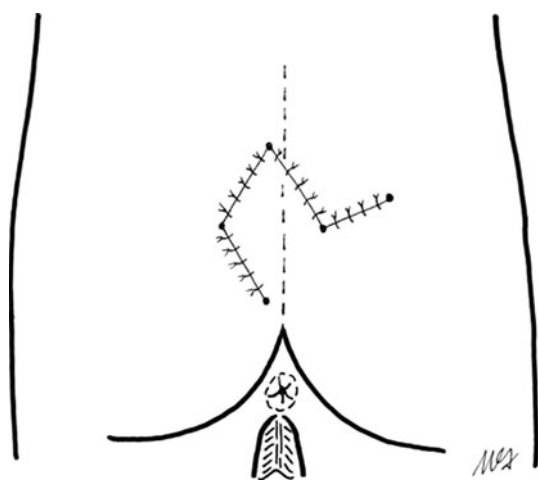


Fig. 2 The appearance of the gluteal region after the modified Limberg flap procedure

lowest recurrence rates have been reported with local flap reconstructions including the Limberg flap [6]. Although the Limberg flap has become a popular surgical choice in recent years, it appears to be associated with some problems which include undesirable cosmetic results and incision site skin maceration. A modified Limberg flap (MLF) has been designed to eliminate midline maceration and recurrence. For this procedure, the lower part of the suture line is placed laterally (Figs. 1, 2). In this study, we report our clinical results with the MLF technique, performed on 94 patients presenting with PSD.

Materials and methods

The medical records of 110 patients who had been operated upon for PSD between December 2006 and December

2009 were analyzed. Sixteen of these patients were excluded due to insufficient medical records or problems in follow-up so that a total of 94 patients were included for analysis in this retrospective study. All patients with PSD who had been admitted to our clinic during this period were operated upon using the MLF technique without any specific selection criteria. Infected sinuses were treated with antibiotics prior to surgery and abscesses were managed with surgical drainage combined with antibiotic therapy. Patients whose infection totally subsided were operated on after an interval of about 4–6 weeks. Informed consent was obtained from all patients and all operations were performed by the same two surgeons. To establish a patient satisfaction score, a standard question was asked of patients; namely “Are you satisfied with the outcome of your surgical treatment?” The answers were scored on a discrete ordinal scale from 1 to 4, with 4 being “excellent,” 3 “good,” 2 “fair,” and 1 “poor.” The patient’s age, sex, duration of preoperative symptoms, operation time, mean hospital stay, postoperative complications, wound infection, maceration rate and recurrence rate, time until return to work, time until sitting on the toilet without pain, hypoesthesia in the gluteal region, and satisfaction score (as defined) were recorded during follow-up or at the last interview. Clinical assessments were performed at the end of the 5th postoperative day and at 1, 3, 6, and 12 months following surgery.

Operative technique

The patients were hospitalized 1 day prior to surgery. The gluteal region was shaved and an enema for rectal cleansing was carried out 4–6 h before surgery. Patients were operated upon under spinal or general anesthesia. Ampicillin-Sulbactam (1 g) was given to all patients for prophylaxis before surgery. An adhesive tape was used to part the buttocks. The patients were placed in the jack-

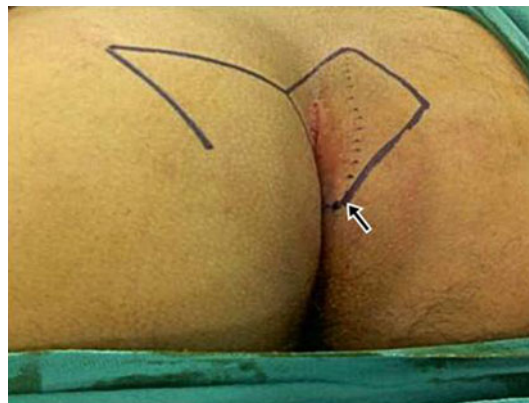


Fig. 3 The intergluteal region, marked before incision (black arrow-tailored lower pole)

knife position (Fig. 3). Methylene blue (2–4 ml) was injected through the most prominent external opening of the sinus. All sinus tracts were resected *en bloc* with a rhomboid-shaped excision, using a surgical blade and electrocautery (Fig. 4). The inferior apex of the excision was placed about 1–2 cm lateral to the midline. A Limberg flap, containing skin, subcutaneous tissue, and fascia of the gluteal muscle, was prepared (Fig. 5) with meticulous hemostasis and a vacuum drain was placed down to the presacral fascia. The Limberg flap was sutured with deep



Fig. 4 Rhomboid excision and preparation of free flap



Fig. 5 Flaps are ready for wound closure



Fig. 6 The subcutaneous tissue and skin were sutured. The lower pole of rotated flap (black arrow) was located approximately 2 cm lateral to intergluteal cleft

and interrupted 2–0 vicryl sutures to the edges of the defect. The subcutaneous tissue was approximated with 4–0 interrupted sutures. The skin was closed with 3–0 polypropylene sutures (Fig. 6).

Postoperative follow-up

The patients were asked to return to the clinic on the 5th postoperative day. The drains were removed when the daily drainage decreased to less than 20 ml. The skin sutures were removed on the 10th postoperative day. Follow-up examinations were performed at the end of the 1st, 3rd, 6th, and 12th months after surgery. The long-term follow-up (after 1 year) was performed by means of a telephone interview. Patients with any complaints were recalled and physical examination was performed.

Maceration was described as softening and whitening of the skin with some associated wetness. Wound dehiscence was described as separation of the layers of a surgical wound after opening of the sutures. The data were presented as means \pm SEM (standard error of the mean), or medians and interquartile ranges. The clinical and demographic variables were compared using the Student's *t* test for continuous variables with a normal distribution and the Wilcoxon rank sum test for non-parametric variables or the Chi-square test (or Fisher's exact test) for categorical variables. A *P* value <0.05 was considered statistically significant.

Results

There were 83 male and 11 female patients. Among the patients, 5 had undergone a second and one had undergone a third operation for pilonidal sinus due to recurrence. Six patients had been treated because of an infected pilonidal sinus. All of these patients were free of infection at the time of operation. The mean operation time was

Table 1 Patient characteristics

Operation	Mean \pm SEM	Range
Age	29.78 \pm 8.50	17–56
Sex (male/female)	83 M/11 F	
Symptoms (months)	9.66 \pm 8.50	2–36
Drain usage (days)	3.71 \pm 1.55	1–7
Follow-up (months)	30.97 \pm 12.70	12–54
Patient satisfaction score	3.68 \pm 0.59	1–4

Table 2 Comparison of patients with and without wound healing complications

	Wound complication (–) (n = 78)	Wound complication (+) (n = 16)	P value
Hypoesthesia			
Present	7 (9%)	2 (13%)	0.7
Absent	69 (91%)	14 (87%)	
Length of hospital stay (day)			
Median (range)	1 (1–3)	1 (1–2)	0.6
Mean ± SEM	1.2 ± 0.1	1.1 ± 0.3	
Toilet seat (day)			
Median (range)	12 (10–14)	13 (11–16)	0.002*
Mean ± SEM	11.9 ± 0.1	12.9 ± 0.3	
Return to work (day)			
Median (range)	9 (7–14)	15 (10–20)	<0.001*
Mean ± SEM	9.5 ± 0.2	14.4 ± 0.9	

* Indicates statistically significant

38.95 ± 6.77 min (range 30–67 min). Tenoxicam 40 mgr/day was sufficient for pain control in all patients. There were neither major complications nor mortality. All patients were followed up longer than 12 months and the mean follow-up period was 30.97 ± 12.7 months (range 12–54 months). Wound dehiscence was observed in only one patient, and we did not detect any flap necrosis. A drain was used in all cases. The general characteristics of patients are shown in Table 1. Two patients who were found to have a seroma were managed with simple drainage. Wound infection was detected in 5 patients (5.3%). Surgical drainage was performed on 2 patients and another 3 patients were treated with oral antibiotics. Wound dehiscence was not detected in patients with seroma or wound infection. Maceration was detected in 8 patients (8.5%). Maceration was always located on the lower part of the incision near the anal region. These patients were successfully treated with conservative measures. A comparison of patients with and without wound complications is summarized in Table 2. There were 4 cases (4.2%) of recurrence in our series during follow-up. Recurrent cases were treated with a marsupialization technique.

Discussion

PSD was first described by Hodges [7]. It is a chronic, inflammatory disease with intractable symptoms. Various non-surgical and surgical methods have been used to treat PSD. The conservative methods such as phenol injection, laser epilation, and shaving are used in the early stages of PSD with different success rates [8–10]. Surgical methods

including primary closure, marsupialization, the Limberg flap, and cleft closure [11–15] have also been performed for treating PSD; however, there is no current agreement as to what the ideal treatment is. The preferred operation for PSD should be simple, cost-effective, and associated with minimal pain and postoperative complications. It should also be associated with a low recurrence rate. Wide excision of the sinus and reconstruction of the defect by different flaps became more popular in recent years. Flap techniques shorten the duration of hospital stay and are associated with early healing of the wound. They are also associated with a low recurrence rate of 0–5%. The Limberg flap repair was originally described by Azab et al. [16]. It changes the anatomy of the gluteal region by flattening the intergluteal cleft. One of the most important disadvantages of the Limberg flap is relatively poor wound healing particularly at the lower pole of the flap near the anal canal where serious maceration and wound dehiscence can be seen. The Limberg flap technique was modified by performing the rhomboid excision asymmetrically to place the lower end of the flap about 1–2 cm lateral to the intergluteal cleft.

This modification was assumed to decrease the recurrence rate and maceration at the suture line. Akın et al. [17] compared the conventional Limberg and MLF techniques in 416 patients operated upon for PSD. The maceration rate was 9.04 and 1.95%, respectively, in the 2 groups. The recurrence rate was 4.73% with the standard Limberg flap and 0.97% with the MLF method. They also reported that time until recovery of deambulation, time until deambulation without pain, and time until sitting on the toilet without pain were shorter in patients operated upon with the MLF technique than in those who were treated with the conventional Limberg flap technique. We compared our patients with and without wound complications. Although the rate of hypoesthesia in the gluteal region was almost the same in the two groups ($P > 0.05$), the time until return to work and the time until sitting on the toilet without pain were significantly shorter in patients without wound complications ($P < 0.05$) in the MLF group. In a study conducted by Cihan et al. [18], the maceration rate was 45.7% with the classical Limberg flap and 6.1% with the MLF method. Moreover, all macerations were detected at the lower part of the flap tailored on the intergluteal sulcus. The maceration rate in our study was 8.5% and patients were successfully treated by keeping the gluteal region dry during the day. The recurrence rate in our study was 4.24%. When compared with other studies, the maceration and recurrence rates were relatively high in our patients. Most of the patients with maceration problems and recurrence had poor personal hygiene with poor compliance concerning postoperative instructions regarding gluteal cleaning and shaving after surgery.

We also evaluated patient satisfaction after surgery. The mean patient satisfaction score was about 3.6 in our study group. Sixty-eight patients (72.3%) considered the operation as excellent. Lower complication rates and early wound healing appeared to be associated with high satisfaction scores. A common complaint after flap surgery was hypoesthesia in the gluteal region which occurred in 9 patients of our patients (9.5%). This rate of hypoesthesia is similar to published data. Akin et al. [17], for instance, reported an 8.9% hypoesthesia rate.

Conclusions

Wound complications including maceration and dehiscence of the lower pole of the Limberg flap as well as recurrence are still important problems in patients operated upon for PSD. The MLF technique is associated with a lower maceration and recurrence rate when compared with reported results for the conventional Limberg procedure. It is also associated with greater patient satisfaction and can be used effectively in the surgical management of PSD.

Conflict of interest The authors declare that no conflict of interest exists.

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