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Evaluation of single center clinical experience in patients undergoing modified Limberg flap technique in pilonidal sinus disease

Burak Uçaner, Şebnem Çimen, Mehmet Zeki Buldanlı

Department of General Surgery, Gülhane Training and Research Hospital, University of Health Sciences, Ankara, Turkey

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ABSTRACT

Aims: Pilonidal sinus disease (PSD) is a chronic inflammatory disease that is seen especially in young men, is often located in the sacrococcygeal region and negatively affects the quality of life and daily life of the person. In this study, we aimed to share our experience with the literature by examining our clinical approach and results in the patient group who underwent Modified Limberg flap technique electively in PSD.

Methods: Patients who underwent elective modified Limberg flap application due to PSD in the general surgery clinic were included in the study. Demographic and clinical parameters of the patients were investigated retrospectively.

Results: The mean age of 76 patients included in the study was 27.5±8.5 years (18-51 years). The median duration of hospitalisation was 2 days. The most commonly preferred prophylactic antibiotic at surgery was cefuroxime + metranidazole combination (60.5%) or cefuroxime alone (32.9%). Drain use was present in approximately 40% of the cases. Subcutaneous tissues were closed with a single layer of polyglactin suture in most cases (94.7%). During the median follow-up period of 12 months, postoperative recurrence was observed in only 6 cases (7.9%).

Conclusions: Modified Limberg flap technique is a well-defined, safe and feasible surgical method. Since it is an effective off-midline technique, its application by experienced surgeons in complicated and recurrent cases in elective PSD surgery and its transfer to junior and resident surgeons will be effective in terms of moving away from midline techniques.

Keywords: Pilonidal sinus disease, modified Limberg flap, pilonidal sinus excision

INTRODUCTION

Pilonidal sinus disease (PSD) is a chronic inflammatory disease seen especially in young men, frequently localised in the sacrococcygeal region and negatively affects the quality of life and daily life of the person. Surgery is generally recommended for treatment, however, conservative methods such as phenol therapy can also be applied. Despite it is considered a chronic disease, patients may also present with pilonidal abscess clinic and may require emergency intervention in the form of surgical drainage.[1,2]

Successful treatment of the disease is determined not only by wound dehiscence, recurrence and low complications, but also by findings such as rapid and comfortable return to daily life and acceptable aesthetic appearance. In addition to various excision techniques, primary closure, flap methods can be applied in surgical treatment, and unroofing curettage and marsupialisation methods can also be preferred in selected cases.[2,3]

Due to complications such as recurrence and wound dehiscence, which are observed more frequently than primary closure technique, the application rate has decreased in recent years, but it is known that the preference for this technique is still high. Methods using flaps are increasingly preferred due to their advantages such as shifting the midline, decreasing the depth distance and low recurrence rates.[3]

Among the flap methods are Z-plasty, W-plasty, V-Y advancement flap, Limberg flap, Karydakis flap, gluteus maximus myocutaneous flap and fasciocutaneous rotation flaps. In the selection of these techniques, the experience of the surgeon is important, as well as the size and condition of the disease at the time the operation is decided, aesthetic concerns and patient comfort are also important.[4,5]

In this study, we aimed to share our experience with the literature by analysing our clinical approach and results in a group of patients who underwent elective Modified Limberg flap technique in PSD.

Corresponding Author: Burak UÇANER, burakucaner@hotmail.com

METHODS

The study protocol was approved by the University of Health Sciences Gülhane Training and Research Hospital Clinical Researches Ethics Committee (Date: 27.09.2023, Decision No: 2023/206). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

Study Procedure and Population

Patients who underwent elective modified Limberg flap application due to PSD in the general surgery clinic were included in the study.

Patients over the age of 18 who underwent elective excision and modified Limberg flap application due to PSD in the general surgery clinic between January 2017 and June 2023 in a single tertiary hospital were included in this descriptive retrospective cohort study after receiving ethical approval from the local committee. Patients who underwent other procedures due to pilonidal sinus disease, patients who underwent emergency pilonidal abscess drainage, and patients with missing or missing hospital records were excluded from the study as well as patients under the age of 18.

Demographic and clinical data of the patients such as age, gender, comorbidities, body-mass index (BMI), American Society of Anesthesiologists (ASA) scores, smoking and alcohol consumption status, preoperative crystallised phenol treatment status, operative findings such as preoperative symptom duration, duration of surgery, drain usage, postoperative findings such as postoperative antibiotic usage choices, hospital stay, complications were analysed retrospectively. Preoperative laboratory values such as hemoglobin (g/dl), hematocrit (%), albumin (g/dl), creatinine (mg/dl), Platelet (10^3/µl), blood urea nitrogen (mg/dl), C-reactive protein (mg/dl), leukocyte (10^3/µl), neutrophil (10^3/µl) as well as lymphocyte (10^3/µl) were also evaluated.

Surgical Technique

Following appropriate field cleaning with 10% povidone iodine solution and sterile dressing, marking and drawing was performed with sterile surgical skin marker. The pilonidal sinus orifices were taken to the central region and the patient was descended to the presacral fascia with a rhomboid incision. In order to ensure that the lower end of the flap did not reach the midline to include the entire lesion, excision was completed in the PSD region in the shape of a rhombus, with the lower corner on the left and right lateral sides of the midline, and then, after ensuring haemostasis in the operation area, the area was washed with 0.9% saline and aspirated. A flap was prepared from the right gluteal region, including the skin, subcutaneous tissues, fatty planes and the fascia over the gluteus maximus muscle, and the flap was freed sufficiently without creating flap tension, and the flap was prepared and shifted to cover the loin and the corners to be mutually equal. Afterwards, depending on the preference of the surgeon, following the use of Jackson-Pratt drain, the layers from the presacral fascia were closed mutually with the help of absorbable polyglactin sutures in the anatomical plan. Skin was closed with non-absorbable polypropylene sutures using matress technique or surgical skin stapler depending on the surgeon's preference. The patient was terminated with appropriate wound dressing.

Statistical Analysis

Statistical evaluation was performed using SPSS program version 22.0. The conformity of the variables to the normal distribution was analysed using visual (histograms and probability plots) and analytical methods ("Shapiro-Wilk tests"). Continuous variables distributed normally were expressed as mean ± standard deviation, and continuous variables not distributed normally were expressed as median (minimum-maximum value). Categorical data were shown as numbers (percentages). P value <0.05 was considered statistically significant.

RESULTS

The mean age of 76 patients included in the study who operated with Modified Limberg flap technique was 27.5±8.5 years (18-51 years). Also, 86.8% of the patients were male and 13.2% were female. The male/female ratio was 6.6/1. Most patients (80.3%) had a preoperative ASA score of I. Comorbid diseases accompanied 15.8% of the cases. The median symptom duration was 4.5 months. Approximately one-fourthof the cases had been previously treated with phenol. Table 1 shows the descriptive characteristics of the patients.

Table 1. Descriptive characteristics of patients

Characteristic	n (%)
Age*	27.5 ± 8.5
Gender	
Female	10 (13.2)
Male	66 (86.8)
American Society of Anesthesiologists Score	
I	61 (80.3)
II	15 (19.7)
Body-Mass Index (kg/m2)	27.0 ± 3.7
Smoking	44 (57.9)
Alcohol Consumption	20 (26.3)
Comorbidity	12 (15.8)
Diabetes mellitus	7 (9.2)
Hypertension	5 (6.6)
Symptom duration (month)**	4.5 (1-24)
Preoperative crystallized phenol treatment	21 (27.6)

*Mean ± Standard Deviation, * * Median (minimum-maximum).

The preoperative hematological and biochemical laboratory parameters of the patients are shown in Table 2. Examining the mean laboratory values of the patients, it was observed that they were within normal limits.

Table 2. Laboratory results of the patients

	Mean ± Standard Deviation
Haemoglobin (g/dl)	13.0 ± 1.2
Hematocrit (%)	37.9 ± 3.1
Albumin (g/dl)	4.1 ± 0.4
Creatinine (mg/dl)	0.8 ± 0.1
Platelets (10^3/µl)	298 ± 62
Blood urea nitrogen (mg/dl)*	33 (9-42)
C-Reactive Protein (mg/dl)*	4.2 (0.1-32.4)
Leukocyte (10^3/µl)*	7.4 (4.1-15.6)
Neutrophil (10^3/µl)*	5.5 (2.9-12.7)
Lymphocyte (10^3/µl)*	1.2 (0.5-2.8)

*Median (minimum-maximum)

The most commonly preferred prophylactic antibiotic at surgery was cefuroxime+metranidazole combination (60.5%) or cefuroxime alone (32.9%). Drain use was present in approximately 40% of the cases. Subcutaneous tissues were closed with a single layer of polyglactin suture in most cases (94.7%). The most preferred polyglactin suture materials were 2-0 (81.6%) and 3-0 (11.8%) absorbable polyglactin sutures. The skin was closed by mattress technique with polypropylene sutures in a significant proportion of patients (90.8%). The most preferred polypropylene suture materials were 3-0 (73.7%) and 2-0 (11.8%) non-absorbable polypropylene sutures. The median operation time was 50 minutes. Complications were observed in 22.4% of the cases. Nevertheless, these complications were limited to wound infection (13.2%) and wound dehiscence (9.2%). The median duration of hospitalisation was two days. During the median follow-up period of 12 months, postoperative recurrence was observed in only 6 cases (7.9%) (Table 3).

Table 3. Characteristics of patients related to surgery

Characteristic	n (%)
Antibiotic treatment	
Cefuroxime + Metranidazole	46 (60.5)
Cefuroxime	25 (32.9)
Metranidazole	5 (6.6)
Drain usage	31 (40.8)
Closure of subcutaneous tissues	
Single layer polyglactin	72 (94.7)
Double layer polyglactin	4 (5.3)
Type of polyglactin	
0-0	3 (3.9)
1-0	2 (2.6)
2-0	62 (81.6)
3-0	9 (11.8)
Skin closure	
Mattress with polypropylene	69 (90.8)
Surgical skin stapler	7 (9.2)
Polypropylene type	
0-0	6 (7.9)
1-0	5 (6.6)
2-0	9 (11.8)
3-0	56 (73.7)
Duration of operation (minutes)*	50 (25-110)
Complication	14 (22.4)
Wound infection	10 (13.2)
Wound dehiscence	7 (9.2)
Duration of hospitalization (days)*	2 (1 - 11)
Follow-up period (months)*	12 (12-18)
Recurrence	6 (7.9)

*Median (minimum-maximum)

DISCUSSION

PSD has an important place in general surgery practice and may require both elective and emergency interventions. This disease, which is especially characterized by sacrococcygeal region involvement and is blamed at a higher rate, can adversely affect the quality of life and the incidence rate has been reported as 26/100,000. Although it is 2 times more prevalent in the male population than in the female population, it peaks between 15-30 years of age and creates a high cost-effectiveness on the health system.6 Untreated disease often leads to infection and very rarely to squamous cell carcinoma within the sinus tracts in chronic non-healing tissues, leading to a wide range of complications.[7]

There are discussions in the literature on the relationship between the ideal treatment in PSD and the condition of the disease at the time of detection, risk factors, surgeon's experience and patient selection; and recently, especially depilative and ablation laser treatment applications and crystallised phenol treatment sessions are increasing in popularity.[7,8]

Even though it is stated in the literature that crystallised phenol applications can be applied with high success and low complication rates, it is observed that its application in uncomplicated cases is more prominent, and in some studies, it is also observed that it is applied as a stepwise treatment with excisional surgery. Furthermore, there are studies reporting that tissue adhesives such as fibrin glue are treatment options as monotherapy or surgical adjunct.[9,10] In our study, crystallized phenol treatment was found to be applied in the preoperative period in 27.6% of the patients.

Depilatory or ablation laser applications have also been increasing recently. It is stated in the literature that it is safe and successful in reporting aesthetically pleasing results, however, its high costs and the fact that it is not widespread in clinical practice emerge as its negative features.[11,12] In this study, laser application is not included in the history of any patient and in the practice of our clinic.

The idea of "tailored surgery" being the ideal treatment in PSD is at the forefront, and the superiority of the off-midline technique over the midline technique has been clearly stated, especially in scientific studies, and it has been revealed that it reduces the risk of recurrence. Among these techniques, especially Modified Limberg and Karydakis flap techniques stand out with their low complication rates and satisfactory results. Moreover, in many comparison studies, no significant differences were observed between the two techniques in terms of both complication rates and recurrence.[13,14] In this study, the results of Modified Limberg flap technique applied extensively in our clinic were emphasized.

Although the use of drains in the modified Limberg flap technique, like other flap techniques, is observed to be routine in some studies and related to the surgeon's preference and the condition of the operation in some studies, the use of drains with negative vacuum suction system is recommended to limit complications such as seroma and haematoma formation.[14,15] In this study, Jackson-Pratt drain utilisation remained at 40.8%.

The subcutaneous tissues are closed with absorbable polyglactin and the thickness of the suture material used and the number of layers applied are important for the flap to adhere to the intact tissue in a healthy way, to prevent necrosis and to provide tension-free tissues. Despite there is a consensus in the literature regarding the use of the mentioned suture material under the skin, it is advocated that the tissue depth is appropriate for the number of layers.[16,17] Single layer (94.7%) and 2-0 polyglactin suture (81.6%) were utilized more frequently in this study. In addition, the matress primary closure technique with 3-0 polypropylene suture for the skin was determined as the primary preference.

In the systematic review of Boshnaq et al.[18] the postoperative complication rate was 11.5%, the recurrence rate was 7.5% and the mean follow-up period was 18 months. In the studies of Destek et al.19, the mean operational time was 54 (44-75) minutes, the recurrence rate was 7.5%, and the mean length of hospital stay was 2.3 days. In the single-blinded, parallel, randomized study of Alvandipour et al.[20] 11.1% fluid collection and 3.7% surgical site infection were observed as complications, yet no recurrence was detected during the follow-up period. In this study, apart from the high complication rates, other findings were observed to be consistent with the literature.

This study has some limitations such as its retrospective design, the fact that operations are not performed by a single surgeon, the small number of patients and the absence of a comparison group. Nonetheless, the fact that the population is only on an elective single surgical procedure and the design of the study in a center with a high patient volume are seen as an important reason for these limitations.

CONCLUSION

Modified Limberg flap technique is a well-defined, safe and feasible surgical method. Since it is an effective off-midline technique, its application by experienced surgeons in complicated and recurrent cases in elective PSD surgery and its transfer to junior and resident surgeons will be effective in terms of moving away from midline techniques.

ETHICAL DECLARATIONS

Ethics Committee Approval: The study protocol was approved by the University of Health Sciences Gülhane Training and Research Hospital Clinical Researches Ethics Committee (Date: 27.09.2023, Decision No: 2023/206).

Informed Consent: Because the study was designed retrospectively, no written informed consent forms were obtained from patients.

Referee Evaluation Process: Externally peer-reviewed.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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