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Risk factors for complications and recurrence after the Karydakis flap



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ABSTRACT

Background: This study describes risk factors leading to the development of various post-operative complications and recurrence after the Karydakis procedure.

Materials and methods: In this prospective analytic cohort study, 179 patients with sacrococcygeal pilonidal disease underwent Karydakis procedure. Characteristics of the pilonidal disease and excised ellipse were measured as possible risk factors. Postoperative complications and recurrence were recorded as outcomes.

Results: Multivariate analysis showed that the distance between the last caudal pit and anal verge and length of excised part are independent factors predicting limited superficial skin disruption and infection, respectively. Delayed wound healing was associated with the distance between the last caudal pit and anal verge and history of previous pilonidal surgery. The length of excised part was the only predictor of future recurrence.

Conclusions: Patients with no history of previous pilonidal surgery, a short length of extracted part, and long distance of caudal pit from anal verge are best candidates for the Karydakis flap procedure.

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Introduction

Sacrococcygeal pilonidal disease (SPD) is a chronic subcutaneous infection in the natal cleft that spontaneously drains through cutaneous openings.¹ Surgery is the main known treatment option for SPD. Numerous surgical techniques including excision followed by primary closure or healing by secondary intention have been introduced. Excision and primary closure have been recommended due to its quick healing and low morbidity of the surgical wound.^{2,3} It has been shown that off-midline closure is the best option when primary closure is the desired surgical option.¹ Among techniques supporting primary closure, Karydakis flap (K-flap) is a well-known off-midline primary

closure with short hospitalization, low complication, and recurrence rate.¹

Recurrence after the K-flap has been reported from 0% to 10% in various studies.^{4–7} Early wound complications range about 20% for this procedure.^{4,8} Limited superficial skin disruption, as the most common complication, ranges from 6% to 38% according to previous studies.^{9–11} Surgical site infection is another studied complication with a prevalence of 6% to 14% after the K-flap.^{3,12,13} Hematoma and seroma are less frequent complications with a prevalence of around 1% to 2%.^{6,9,10} Limited data are available on the risk factor analysis in these patients. Smoking and obesity have been reported as possible independent risk factors for the surgical site infection.^{14–17} According to the literature, there are inadequate data

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on identification of risk factors affecting other complications including wound breakdown and delayed wound healing in these patients.

The aim of this study was to describe risk factors leading to the development of various postoperative complications and recurrence after the K-flap. This is the first clinical study designed and performed to evaluate possible relations between preoperative risk factors and disease properties on one side and postoperative complications and recurrence on another side. This can help surgeons to predict the outcome of their procedure and also to reduce and control complications and recurrence after modifying their preoperative risk factors. Identification of risk factors can help correct risk factors, better patient selection, optimize the patient's preoperative condition, and better inform patients of possible risks. Considering risk factors will also help surgeons to select best candidates for the K-flap.

Materials and methods

This is a prospective analytic cohort study conducted between 2007 and 2014 at Imam Hospital affiliated to Tehran University of Medical Sciences. The study protocol has been approved by the ethics committee of the university. All patients diagnosed with an SPD were included in the study. Patients having acute pilonidal abscess were excluded initially. Other patients were informed of currently available treatment options, the study protocol, and possible complications. Informed consents were obtained from the patients who were reluctant to participate in this study. Patients with lost follow-up were also excluded later from the study.

A total of 179 patients were included in this study. Demographic data of patients (including age, gender, and body mass index [BMI]) were recorded. All the patients underwent Karydakis procedure.⁹ All the operations were done in the prone position and under general anesthesia by one surgeon. Pilonidal disease's characteristics, as summarized in [Table 1](#), were measured before the procedure as possible risk factors. Operation times, defined as the time from incision to applying the final suturing of the skin, were also recorded in all operations. After excision, the excised ellipse's weight, height, and width were also measured. Postoperative complications including partial wound breakdown, wound dehiscence, infection, bleeding, hematoma, delayed wound healing, and recurrence were also recorded as primary outcomes.

Patients were discharged after 24 h of operation. They were advised to take care of their wounds from possible direct traumas without any limitation of their activity. Patients were not instructed to shave their sacrococcygeal hairs after the operation. Wound coverage was recommended until full epithelialization of the surgical wound and lack of any discharge from the wound. All the patients underwent routine postoperative examinations in the first week, first month, and then annually. In postoperative visits, all the patients were visited regarding their possible wound complications and recurrence.

Wound healing was described as complete epithelialization of the wound without any discharge and any need to further dressing. Skin disruption was defined as any form of

skin and/or subcutaneous separation located in any part of the surgical wound. Recurrence of disease was defined as detection of new orifices after complete healing. Surgical wounds complicated by skin disruption not healed within the first 2 wk after the operation were considered as delayed healing. Infection was defined as the clinical presentation of local wound infection including wound discharge and erythema.

Data analysis was performed using SPSS version 20 software (Chicago, IL). Descriptive values were expressed as the mean \pm standard deviation. All data were initially analyzed using the Kolmogorov–Smirnov test to assess for normality. Independent sample t-test and Pearson's chi-square were used to compare quantitative and qualitative variables, respectively. Multivariate analysis was also carried out using a forward regression model to detect possible risk factors, which independently affect postoperative complications, delayed wound healing, and recurrence. A 5% probability of a type I error (two-tailed) and a power of 80% were considered in the statistical analysis. All *P* values were two-tailed; *P* value <0.05 was considered significant.

Results

The study included 179 consecutive patients undergoing K-flap. There were 151 male (84.4%) and 28 female (15.6%) patients. Mean age was 26.43 ± 8.22 (range, 14–57) y. Patients' mean BMI was 26.27 ± 3.74 (range, 17.32–38.53). Smoking was reported in 30 patients (17.9%); all of them were male. Demographic data of patients are summarized in [Table 1](#). History of previous pilonidal surgery was found in 29 (16.2%) patients. The discharge was the most common presenting symptom detected in 142 (79.3%) patients, followed by pain and lump in 22 (12.3%) and 15 (8.4%) patients, respectively. The mean number of previously reported abscesses was 1.48 ± 3.91 (range, 0–20). Mean operating time was 54.43 ± 13.04 (range, 35–120) min. Characteristics of patients' pilonidal disease and the excised ellipse after excision have also been summarized in [Table 1](#).

Patients were followed up for an average of 31.26 ± 21.80 (maximum, 71) mo after the operation. Patients were returned to normal activity in an average of 14.49 ± 8.54 (range, 1–35) d. Recurrence was detected in two patients (1.1%) during the first and fourth postoperative year, respectively. In general, 32 patients (17.87%) developed, at least, one complication. Limited superficial skin disruption was the most common complication detected in an average time of 26.09 ± 37.89 (range, 5–142) d in 23 patients (12.8%). One patient developed complete wound breakdown as a result of a direct trauma in the ninth postoperative day. Infection was the second most common complication detected in an average time of 29.00 ± 36.32 (range, 5–113) d in eight patients (4.5%). Less common complications included hematoma and seroma in two (1.1%) and one (0.6%) patients, respectively.

The univariate and multivariate analysis were performed to find possible risk factors ([Table 2](#)). Multivariate regression analysis showed that length of excised part and history of previous pilonidal surgery were major risk factors leading to any complication in general. The distance from the last caudal

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