Effects of Bathing Habits on Postoperative Wound Complications Following Sacrococcygeal Pilonidal Sinus Surgery: A Retrospective Analysis of 67 Adolescent Patients

Murat Ferhat Ferhatoglu, MD[1]; Abdulcabbar Kartal, MD[1]; Ugur Ekici, MD[2]; and Abut Kebudi, MD, Professor, FACS[1]

ABSTRACT

Introduction. Sacrococcygeal pilonidal sinus disease generally affects young people and impacts their quality of life. Few published studies assessing the characteristics of the disease in the adolescent population exist. **Objective.** In this paper, the authors aim to evaluate the effects of bathing habits on wound complications in adolescent patients following Karydakis flap surgery for sacrococcygeal pilonidal sinus. **Materials and Methods.** The medical records of 79 adolescent patients who underwent sacrococcygeal pilonidal sinus surgery between January 2014 and December 2017 at the Surgery Clinic of Malatya State Hospital (Malatya, Turkey) were evaluated retrospectively. Following exclusion, 67 patients were evaluated for demographics, body mass index (BMI), previous abscess formation, bathing frequency, number of sinus pits, and postoperative wound infection and dehiscence. The total follow-up time for the 67 patients was 90 days. **Results.** The BMIs of patients with previous abscess formation were significantly higher ($P = .029$). In the cases with abscess, the number of pilonidal sinus pits was significantly higher ($P = .039$) There was a statistically significant difference between postoperative complication rates according to the number of baths per week. Wound infection rates were found to be higher in patients who bathed more than twice weekly during the 28 days after surgery ($P = .005$). No statistical significance was observed in complication rates from days 28 to 90 after the surgery between those who bathed twice weekly and more than twice weekly ($P > .05$). **Conclusions.** Postoperative wound complications in adolescent patients treated with Karydakis flap surgery for sacrococcygeal pilonidal sinus are more frequent in those who bathe more than twice weekly during the first 28 days postoperatively.

KEY WORDS

pilonidal sinus, adolescent, surgery, bathing, wound, complication, postoperative, obesity

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Sacrococcygeal pilonidal sinus disease (PSD) causes chronic inflammation of the sacrococcygeal skin and subcutaneous fatty tissue, and it commonly localizes in the sacrococcygeal region.[1] Generally affecting young people, particularly adolescent males, the presentation of PSD ranges from asymptomatic pits to draining inflammatory sinuses and painful abscesses.[2,3] The incidence of the disease among the adolescent population is 26 per 100 000.[4]

Despite advances in surgical and conservative treatment methods, no technique ensures a cure. An ideal treatment would eradicate the disease, lower recurrence rates, and minimize disability time. However, to date, few studies have focused on PSD characteristics in adolescent populations. The purpose of this paper is to evaluate the effects of bathing habits after Karydakis flap surgery due to sacrococcygeal pilonidal sinus on wound complications in adolescents.

MATERIALS AND METHODS

The medical records of patients who underwent Karydakis flap surgery due to sacrococcygeal PSD between January 2014 and December 2017 at the Surgery Clinic of Malatya State Hospital (Malatya, Turkey) were analyzed.

Initially, 79 adolescent patients (aged, 14-19 years) were considered for the study. Following exclusion criteria, 2 patients were removed due to regular steroid therapy for other medical conditions, 1 patient with a psychiatric disorder declined to participate, and 9 were lost to follow-up.

Demographics, body mass index (BMI), previous abscess formation, bathing habits, number of sinus pits, hospitalization time, and postoperative wound infection and dehiscence were evaluated.

Surgical procedure

Patients with acute inflammation or an abscess formation underwent surgery following the completion of anti-inflammatory (10 mg/kg ibuprofen) and antibiotic (125 mg clavulanic acid + 875 mg amoxicillin) treatment twice daily for 7 to 10 days. All patients were admitted to the hospital on the day of surgery. The affected area was shaved using an electric shaver and cleaned with povidone-iodine solution. A single dose of prophylactic cefazolin sodium (1000 mg) was administered before surgical incision. The asymmetric and biconcave elliptic incisions incorporating the external orifices of the pilonidal sinus were made in jack-knife position and by retracting the glutei from the sides. The cysts were excised without damaging the sinus and leaving no sinus residuals. On the medial edge of the wound, a flap measuring 1 cm deep and 2 cm inward alongside the incision line was prepared with cautery. Absorbable sutures were used for the fatty tissue of the flap, including both surfaces. Then, 2/0 polyglactin absorbable suture materials were used to place a series of sutures alongside the medial line of presacral fascia throughout the flap. A closed drain was placed in the gap. To approximate the flap's lower surface to the lateral fatty tissue, the second line of sutures was applied between the 2 layers using 2/0 polyglactin absorbable suture materials. The skin was closed intracutaneously using 3/0 polyglactin absorbable polyfilament suture material (**Figure**).

Patient follow-up

Patients received follow-up visits every 7 days in the first 28 days after surgery. Patients who had wound dehiscence or infection were seen daily for wound management and wound dressing (povidone-iodine 10% and nitrofurazone cream 0.2% was used in dressing). All patients had a follow-up visit at the fourth postoperative week. Five patients who did not attend follow-up visits were excluded from the study. At the third postoperative month, all patients were called by telephone for re-examination. Four patients who did not respond to the phone calls or attend follow-up visits were excluded from the study. One patient who had wound dehiscence and infection at the sixth week of complete wound healing could not be treated by medical treatment/daily wound dressing, thus underwent reoperation.

Ethical approval

All procedures performed in studies involving human participants followed the Helsinki declaration and its later amendments or comparable ethical standards. The study protocol was approved by the ethics committee of Okan University, Istanbul, Turkey (Ferhatoglu MF, Ekici U, Kartal A, Kebudi A, Number 94; Date: September 5, 2018).

Statistical analysis

Number Cruncher Statistical System 2007 (NCSS, LLC, Kaysville, UT) was used for statistical analysis. The fitness of data to the normal distribution was tested using

Figure. Skin closure using intracutaneous suturing after Karydakis flap surgery for sacrococcygeal pilonidal sinus.

Table 1. Preoperative characteristics of adolescent patients receiving Karydakis flap surgery for sacrococcygeal PSD

CHARACTERISTICS		N (%)
Age (y)	Min–max (median)	14–19 (17)
	Avg±SD	17.30±1.31
Female	Min–max (median)	14–19 (17)
	Avg±SD	17.08±1.48
Male	Min–max (median)	15–19 (18)
	Avg±SD	17.53±1.07
Gender; n (%)	Female	32 (47.8)
	Male	35 (52.2)
BMI (kg/m²)	Min–max (median)	15.2–32.4 (23.4)
	Avg±SD	23.65±3.63
	≥25 kg/m²	20 (29.9)
Baths/wk; n (%)	≤2/wk	25 (37.3)
	>2/wk	42 (62.7)
No. of sinus pits	Min–max (median)	1–5 (2)
	Avg±SD	2.40±1.14
	1	16 (23.9)
	2	22 (32.8)
	≥3	29 (43.3)
Hospitalization duration (d)	Min–max (median)	1–5 (2)
	Avg±SD	1.99±1.05

PSD: pilonidal sinus disease; y: year; min: minimum; max: maximum; Avg: average; SD: standard deviation; BMI: body mass index; wk: week; d: day

Table 2. Assessment for abscess formation in adolescent patients after Karydakis flap surgery for sacrococcygeal PSD

CHARACTERISTICS		PREOP ABSCESS; + (N=18)	PREOP ABSCESS; - (N=49)	*P* VALUE
Age (y)	Min–max (median)	16–19 (17.5)	14–19 (17)	.648[a]
	Avg±SD	17.50±1.20	17.27±1.34	
Gender; n (%)	Female	9 (50)	23 (46.9)	1.000[b]
	Male	9 (50)	26 (53.1)	
BMI (kg/m²)	Min–max (median)	20.6–32.4 (26.7)	15.2–31.5 (23.2)	.029[a,c]
	Avg±SD	26.27±4.34	23.30±3.41	
No. of sinus pits	Min–max (median)	2–5 (3)	1–5 (2)	.039[c,d]
	Avg±SD	3.13±0.99	2.31±1.13	

PSD: pilonidal sinus disease; preop: preoperative; +: positive; -: negative; y: year; min: minimum; max: maximum; SD: standard deviation; BMI: body mass index

[a] Student's *t* test

[b] Fisher exact test

[c] *P*<.05

[d] Mann-Whitney *U* test

Table 3. Assessment for postop wound infection and dehiscence in adolescent patients after Karydakis flap surgery for sacrococcygeal PSD

CHARACTERISTICS		POSTOP WOUND INFECTION OR DEHISCENCE; + (N=15)	POSTOP WOUND INFECTION OR DEHISCENCE; - (N=52)	*P* VALUE
Age (y)	Min–max (median)	16–19 (18)	14–19 (17)	.221[a]
	Avg±SD	17.67±0.90	17.19±1.40	
Gender, n (%)	Female	7 (46.7)	25 (48.1)	1.000[b]
	Male	8 (53.3)	27 (51.9)	
BMI (kg/m²)	Min–max (median)	17.7–31.5 (23.4)	15.2–32.4 (23.3)	.804[a]
	Avg±SD	23.86±3.70	23.59±3.64	
Baths/wk; n (%)	2	1 (6.7)	24 (46.2)	.005[c,d]
	>2	14 (93.3)	28 (53.8)	
No. of sinus pits	Min–max (median)	1–5 (3)	1–5 (2)	.069[e]
	Avg±SD	2.87±1.13	2.27±1.12	

Postop: postoperative; PSD: pilonidal sinus disease; +: positive; -: negative; y: year; min: minimum; max: maximum; Avg: average; SD: standard deviation; BMI: body mass index; wk: week

[a] Student's *t* test

[b] Chi-square test

[c] Fisher exact test

[d] *P*<.01

[e] Mann-Whitney *U* test

the Shapiro-Wilk test. For numerical values, Student's *t* test was used for normally distributed variables and Mann-Whitney *U* test for non-normally distributed values. The relationship of 2 independent variables at the categorical measurement level was tested using the chi-square method. For definitive statistics, the mean value ± standard deviation was used for numerical values and number and percentage values for the categorical variables. Statistical significance was set at $P < .05$.

RESULTS

Seventy-nine adolescent patients underwent surgery for PSD during the study period, and 12 patients were excluded from the study. All patients with wound dehiscence or infection were treated with wound care and dressings and no surgical intervention required. One patient treated medically due to wound dehiscence and infection had recurrence 6 weeks after complete wound healing. Demographics, preoperative findings, bathing habits, and hospitalization time are presented in **Table 1**.

As shown in **Table 2**, the BMI for patients with preoperative abscess formation was significantly higher than in patients without preoperative abscess formation ($P = .029$). Patients with preoperative abscess also had a significantly higher number of pilonidal sinus pits ($P = .039$).

Postoperative complication rates correlated with bathing habits. During the first 28 days of postoperative follow-up, wound infection or dehiscence was significantly higher in patients who bathed more than twice weekly ($P = .005$; **Table 3**). However, no statistical significance was observed in complication rates between days 28 and 90 following surgery between patients who bathed twice weekly and more than twice weekly (**Table 4**).

Patients with wound dehiscence or infection (n = 15) were treated daily for wound management and dressing changes (povidone-iodine 10% and nitrofurazone cream 0.2% was used in dressing) at the outpatient clinic. Two of these

patients had recurrence of the disease during the 90-day follow-up period and underwent reoperation.

DISCUSSION

Ingrown hairs, skin abrasions, or sinus pits created by the rotational movements of the buttocks while walking are presumed to be the leading causes of PSD.[5-7] Obese patients have a deep intergluteal cleft, increasing the possibility for ingrown hairs. Also, in obese patients, the skin of the intergluteal cleft is softened and more fragile because of the presence of moisture.[8] Arda et al[9] reported high BMI to be a risk factor for adolescent PSD and stated postoperative complication rates are significantly higher for obese or overweight adolescent patients than for their nonobese peers. Cubukçu et al[10] reported that obese patients with a high BMI (mean: 29.35 kg/m^2) have significantly higher rates of recurrence. Similarly, the present study describes a cohort wherein almost one-third of patients were either obese or overweight. Moreover, pilonidal sinus abscess rates were found to be significantly higher for this group (**Table 2**). The increased surface area of moist, fragile intergluteal skin could facilitate the pilonidal sinus abscess formation for obese and overweight patients.

Contrary to the adult population, the incidence rate for men and women is identical in adolescent populations.[11] In the present study, the female-to-male ratio was 0.97:1. However, previous studies have shown the age of disease occurrence was higher for male adolescents.[6,9] Likewise, the males in the present study were older than the females (**Table 1**). Pubescent hormones are related to PSD. Therefore, females may present at an earlier age, because they begin puberty at a younger age.

Another risk factor for pilonidal sinus abscess formation is the number of pilonidal sinus pits. In this study, pilonidal sinus pits correlated with the abscess formation rate (P = .039). Bacteria found within pilonidal sinus abscesses include both aerobic and anaerobic species.

Table 4. Complications and recurrence in adolescent patients after Karydakis flap surgery for sacrococcygeal PSD by bathing habits between postop days 28 and 90

POSTOP COMPLICATIONS AND RECURRENCE	AVG 2 BATHS/WK (N=25)	AVG >2 BATHS/WK (N=42)	*P* VALUE
Maceration (%)	2 (8.0)	2 (4.8)	
Wound dehiscence (%)	0 (0)	1 (2.4)	.152[a]
Abscess/seroma (%)	0 (0)	1 (2.4)	
Recurrence (%)	0 (0)	2 (4.8)	.897[a]

PSD: pilonidal sinus disease; postop: postoperative; Avg: average; wk: week
[a] Chi-square test

Pilonidal sinus pits and dilated follicles create an anaerobic space; gram-negative, anaerobic bacteria, which are common in fecal flora, dominantly colonize this region.[12] Moreover, a large number of pits have the potential to create a larger anaerobic cavity, containing more ingrown hairs and skin residue, thus perpetuating a cycle for a more massive abscess formation.

Poor hygiene and bathing habits have been identified as predictive risk factors for PSD.[13] Frequent bathing may cause impairment of the skin's defensive microflora.[14] Many studies examined the relationships among preoperative day bathing, bathing frequency, and postoperative wound complications. Harlak et al[1] reported the odds of having PSD were 6.33 times higher for people who bathe at least twice weekly than for those who bathe more than or equal to 3 times weekly.[1] The authors of that study[1] advocate decreasing the amount of dead hair caught in the intergluteal cleft and cleaning the intergluteal sulcus to prevent PSD. In a study by Bolandparvaz et al,[13] patients bathing or showering less than 3 times weekly also had an increased risk for PSD.

Bathing may have aesthetic and relaxing benefits, but it does not serve microbiologic purposes. In truth, the number of bacterial colonies is the same or higher after bathing.[15] The present study is the first to examine the relationship between postoperative bathing frequency and wound complications following pilonidal sinus surgery. Bathing or showering more than twice weekly in the first 4 weeks postoperatively was shown to significantly increase postoperative complication rates (P = .005). Frequent bathing can alter the bacterial microflora of the skin and facilitate the colonization of pathogenic bacteria. It is also likely that pathogenic bacteria penetrate wounds more easily via excess water, thus leading to more frequent wound complications.

LIMITATIONS

Because few studies in the literature can be used in comparing the data of the present study, the retrospective nature and short follow-up period of the present study are the primary limitations. However, it also can be seen as an advantage that there is no such study on Karydakis flap method in adolescents.

CONCLUSIONS

Based on the presented data, obese or overweight patients are more likely to have pilonidal sinus abscesses; an increased number of pilonidal sinus pits is directly related to the risk of abscess formation; and wound complications among adolescent patients are correlated with a bathing or showering frequency of more than twice weekly in the first 28 days postoperatively.

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Affiliations: [1]Okan University, Faculty of Medicine, Department of General Surgery, Istanbul, Turkey; and [2]Gelisim University, Istanbul, Turkey

Correspondence: Murat Ferhat Ferhatoglu, MD, Assistant Professor, Okan University, Faculty of Medicine, Aydinli yolu cd, No 2, Okan University Hospital, Istanbul 34734 Turkey; ferhatferhatoglu@yahoo.co.uk

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