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Evaluation of the coexistence of pilonidal sinus disease and hirsutism in female patients: a retrospective cross-sectional study

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Background: This study aimed to investigate the coexistence of pilonidal sinus disease (PSD) and hirsutism in female patients.
Materials and methods: The demographic and clinical data of 164 female patients who underwent surgery for PSD between January 2007 and May 2014 were evaluated for this retrospective cross-sectional study. Data collected for this study were age, BMI, the modified Ferriman and Gallwey scale (mFGS) for hirsutism, main symptoms, type of surgery, early postoperative complications (wound infection, wound dehiscence), recurrence, and follow-up. The independent variables are hirsutism (mFGS scores) and BMI. Dependent variables are early postoperative complications and recurrence.
Results: The median age was 20 years (95% CI for median: 19–21 years). According to the BMI, 45.7, 50.6, and 3.7% of patients were considered normal, overweight, and obese, respectively. According to the mFGS, 11, 9.8, 52.4, and 26.8% of patients were considered to have none, mild, moderate, or severe hirsutism, respectively. Fourteen (8.5%) patients had developed recurrence. Recurrence developed in six patients with primary closure, five patients with Limberg flaps, two patients with Karydakis, and one with marsupialization. There was no statistical difference between recurrent and nonrecurrent patients in terms of BMI ($P = 0.054$) and mFGS ($P = 0.921$). On the other hand, BMI was statistically significantly higher in those who developed early postoperative complications than in those who did not ($P < 0.001$).
Conclusion: PSD is no longer a 'men's only disease'. BMI increases the risk of early postoperative complications, but this association was not found between BMI and recurrence. Prospective multicenter studies are needed on the relationship between PSD and hirsutism.

Keywords: hirsutism, pilonidal sinus disease, postoperative complications, recurrence, women

Introduction

Pilonidal sinus disease (PSD) was described as a congenital condition by Herbert Mayo in 1833, but the term 'pilonidal' was first coined by Richard Hodges in 1880, which in Latin means 'nest of hair'[1,2]. It was also described as 'jeep disease' during World War II because it was found to be common among jeep drivers. The current understanding of the disease has since changed from the initial hypothesis of its congenital origin of the disease[3]. It has been found that PSD is an acquired disease resulting from chronic infection of the natal cleft skin and subcutaneous tissue. It has also been found to affect interdigital clefts, especially among barbers[1–3]. Its spectrum may range from asymptomatic midline pits or sinuses to complex cavities with multiple fistulous tracks. The commonest pattern of presentation

HIGHLIGHTS

- As is known, most of the studies on pilonidal sinus disease (PSD) have been published by countries in the Middle East, including Turkey.
- To our knowledge, no study has been published specifically on PSD in women.
- No other research on the relationship between PSD and hirsutism scores in women has yet been published. Therefore, this is the first study in the literature regarding its subject and nature.
- Our study aimed to investigate the relationship of PSD with hirsutism and BMI in women. We found that while PSD recurrence is not affected by BMI and hirsutism, the rates of early complications are affected by these factors.

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is the chronic pattern, but a few of these patients may present with acute PSD[1,4,5].

The mechanism of development of PSD has been the subject of a lot of discussion, with different authors providing different theories. There are reports that loose hairs, burrowing into normal tissue, induce a reaction leading to secondary pits and cyst formation. Others believed that PSD developed as a result of blockage of hair follicles, which can lead to enlargement of the pilosebaceous glands with either abscess formation or the formation of a chronically discharging sinus[1,6,7].

There are multiple risk factors implicated in the development of PSD. Occupation is a commonly considered risk factor for PSD, which frequently occurs in the interdigital cleft of barbers. Other risk factors include deep natal cleft, male gender, positive family history, obesity, a sedentary lifestyle, excessive sweating, hirsutism, local irritation, or trauma[2,6–8].

PSD is considered a disease of young males. In fact, the first report of a female affected by the disease came in 1880, which is about 47 years after the first reported case. There is recent increase in female PSD and it is now around 15–21% of all PSD[8,9]. The role of hirsutism and obesity in developing PSD among females has been established[6,10,11]. In this study, we aimed to evaluate the clinical findings, and clinical outcome in women with PSD.

Materials and methods

This bicentric retrospective, cross-sectional study was conducted in the Department of Surgery, Diyarbakir State Hospital, and Diyarbakir Education and Research Hospital. This work is fully compliant with the STROCSS 2021 criteria[12].

Inclusion criteria

Consecutive female patients who underwent surgical treatment for PSD in both hospitals from January 2007 to May 2014 were included in the study.

Exclusion criteria

Female patients whose data is incomplete.

Data collection

Clinical data including age, BMI, grade of hirsutism [using the modified Ferriman–Gallwey scale (mFGS)], clinical presentation, type of surgical intervention, early postoperative complication (infection, wound dehiscence), recurrence status, and follow-up time were obtained from the patients' records.

Study protocol and ethics committee approval

This study involving human participants was conducted in accordance with the ethical standards of the Institutional and National Research Committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. As a routine procedure, written informed consent was obtained from each patient for all medical and surgical procedures. Inonu University Institutional Review Board (IRB) for Non-Interventional Clinical Research (Approval no: 2022/3837).

Modified Ferriman–Gallwey scale

Clinical assessment of hirsutism was done according to the mFGS scoring system[13]. Nine body areas were evaluated for density and area of hair growth and quantified on a 0 to 4-point scale. These areas included the upper lip, chin, chest, upper back, lower back, upper abdomen, lower abdomen, upper arm, and thigh. Areas such as the axilla and pubis are not included because terminal hair grows in these places at normal androgen levels in women. The total score correlates roughly with the elevation of androgen levels. According to the mFGS score system, patients were categorized as having no hirsutism (0–8 points), mild hirsutism (8–16 points), moderate hirsutism (17–24 points), and severe hirsutism ($\geq$25 points)[14,15].

BMI

The BMI is the weight (kg) ratio divided by the m^2 (in metric units). Women with a BMI range of 18.5–24.9 kg/m^2 were classified as average, while women with a BMI range of 25–29.9 kg/m^2 were classified as overweight, and women with a BMI greater than or equal to 30 kg/m^2 were classified as obese.

Statistical analysis

Data was analyzed using licensed version 25.0 of the IBM SPSS Statistics software program was used for statistical analysis (Statistical Package for the Social Sciences Inc.). Qualitative variables were summarized using number, and percentages, while quantitative variables were expressed as median, and minimum-maximum or Interquartile range (IQR). The *P* value less than 0.05 were accepted as significant.

Results

A total of 164 female patients were recruited for the study. The median age of our study population was 20 years (95% CI for median: 19–21; interquartile range: 5) with a median BMI of 23.6 kg/m^2 (95% CI for median: 22.8–24.1; IQR: 3). According to the BMI, 75 (45.7%) patients were considered normal weight, 83 (50.6%) were considered overweight, and six (3.7%) patients were considered obese. The median hospitalization time was 1.8 days (minimum–maximum: 1–9 days). The distribution of hirsutism in our patients shows that 18 (11%) had no hirsutism, while 16 (9.8%), 86 (52.4%), and 44 (26.8%) patients were considered to have mild hirsutism, moderate hirsutism, and severe hirsutism, respectively. Seventy-eight (47.6%) patients were treated with the Limberg flap, 63 (38.4%) patients were treated with primary closure, 12 (7.3%) patients were treated with Karydakis, six (3.7%) patients were treated with the V-Y flap, and five (3%) patients were treated with marsupialization. Sociodemographic data of 164 female patients were summarized in Table 1.

Recurrence was observed in 14 (8.5%), and most of the recurrences developed within 2–7 years after surgery. The choice of surgical intervention among the patients that had recurrence shows that six were treated with primary closure, five with Limberg flaps, two with Karydakis, and one with marsupialization. Ten of the patients with recurrence were overweight, two were obese, and two were normal. The median BMI for patients with recurrence was 25.8 kg/m^2 (minimum–maximum: 22.8–30.2). There was no statistical difference between recurrent

Table 1

Sociodemographic data of 164 female patients with pilonidal sinus disease

Demographic data ($n=164$)	
Age	
Median (IQR)	20 (5)
95% CI for median	19–21
BMI (kg/m^2)	
Normal	75 (45.7)
Overweight	83 (50.6)
Obesity	6 (3.7)
mFGS [*n* (%)]	
No hirsutism	18 (11.0)
Mild hirsutism	16 (9.8)
Moderate hirsutism	86 (52.4)
Severe hirsutism	44 (26.8)
Smoking [*n* (%)]	
Yes (everyday)	30 (18.3)
No (never)	134 (81.7)
Marital status [*n* (%)]	
Married	37 (22.6)
Single	127 (77.4)
Give birth [*n* (%)]	
Yes	26 (15.9)
No	138 (84.1)
Dysmenorrhea [*n* (%)]	
Yes	37 (22.6)
No	127 (77.4)
Oral contraceptive use [*n* (%)]	
Yes	42 (25.6)
No	122 (74.4)
Abscess drainage (preoperative) [*n* (%)]	
Yes	34 (20.7)
No	130 (79.3)

mFGS, modified Ferriman–Gallwey score; PSD, Pilonidal sinus disease.

and nonrecurrent groups regarding BMI, but this indifference had a borderline value. ($P=0.054$) (Table 2). Eight patients with recurrence had moderate mFGS hirsutism scores, three had severe mFGS scores, two had normal mFGS scores, and one had mild mFGS scores. There was no statistically significant difference between patients with and without recurrence in terms of mFGS score ($P=0.921$). Also, there was no statistically significant difference between patients who smoked and those who did not smoke in terms of postoperative recurrence ($P=0.751$).

Table 2

Relationship between BMI, recurrence, and early postoperative complications

	BMI			
	Median	**Minimum**	**Maximum**	***P***
Recurrence				0.054
Yes ($n=14$)	25.8	22.8	30.2	
No ($n=150$)	24.3	18.8	36.5	
Complications (early postoperative)				0.010
Yes ($n=33$)	28.1	25.3	36.5	
No ($n=131$)	23.7	18.8	26.6	

Cellulitis, abscess, and wound dehiscence requiring antibiotic use were defined as postoperative early complications.

Twenty-seven of the patients developed an early postoperative mild wound infection. Six patients developed superficial incisional dehiscence in the early postoperative period. The BMI was considered obese in six patients and overweight in 27 patients. Twenty of them had moderate mFGS hirsutism scores, nine had severe hirsutism, and four had mild hirsutism. There was no statistically significant difference between postoperative complications and mFGS hirsutism scores. The median BMI value of the patients with early postoperative complications was higher than the group without complications ($P=0.01$) (Table 2).

Pathological findings were PSD in 128 patients, chronic inflammation in 28 patients, Condylomata acuminata in one patient, blue nevus in one patient, and no pathological examination in six patients. Preoperative, intraoperative, and postoperative images of several patients with PSD are shown in Figures 1–5.

Discussion

PSD was initially considered a 'men's disease' and females with the disease were studied with intense curiosity. However, with increasing understanding and research into the disease, it is now obvious that it is not gender specific and in Australia and New Zealand, up to 33.73% of those affected are females[9].

In our study, we found that only 45.7% of our patents' were of normal weight while the remaining 54.3% are either overweight or obese. This is supported by Ekici and Moray[10] who also found that 82% of females with PSD are either obese or overweight. This is supported by the study conducted by Arda *et al.*[11] in which they found that 57.1% of all the patients who had surgery for PSD were either overweight or obese. This is however less than 78% reported by Sakr *et al.*[16] in a study conducted in Egypt. The difference may be due to the inclusion criteria for the patients' studies. In our study, we included all female patients who received operated intervention for PSD while the study conducted by Sakr *et al.*[16] included all genders and also only patients with chronic PSD were included.

Hirsutism has been associated with PSD in multiple studies. This is also the finding of our study, in which we found that only 11% of our patient population has no hirsutism according to the

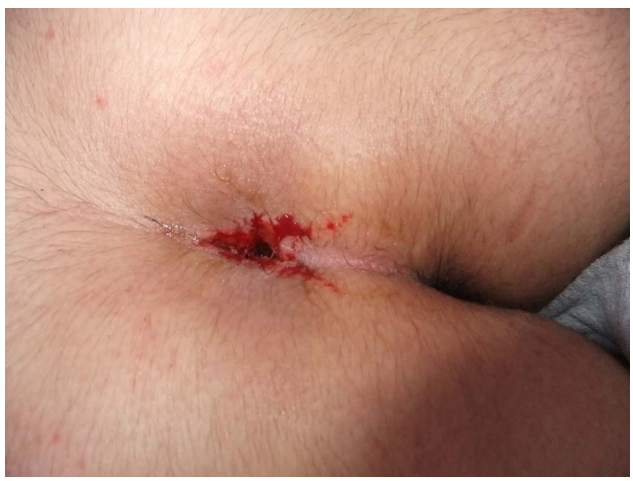

Figure 1. Preoperative view of hirsutism.

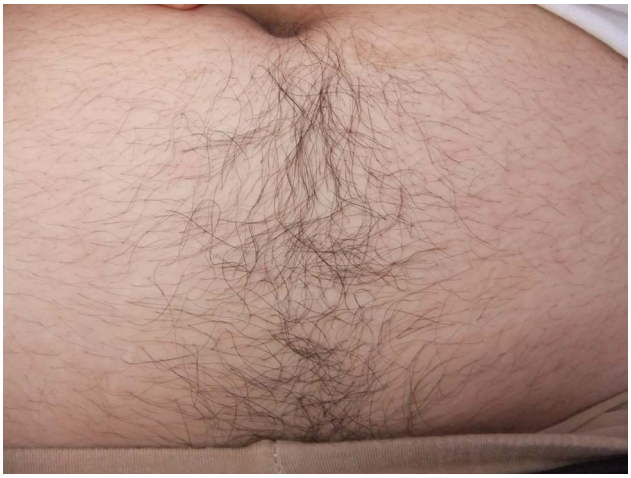

Figure 2. Preoperative view of intergluteal pilonidal sinus disease.

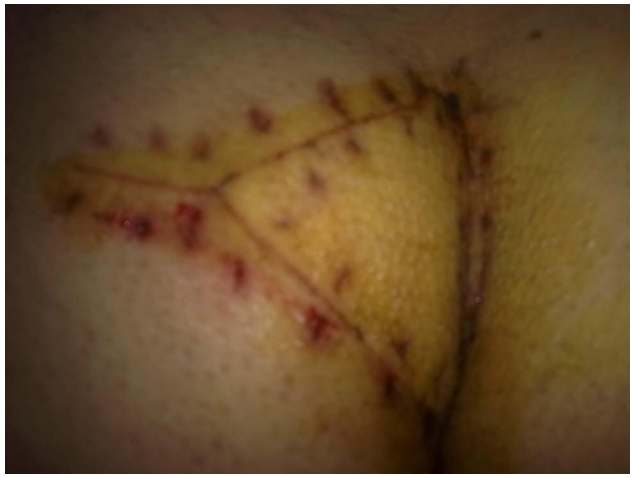

Figure 4. Intraoperative view of V-Y advancement flap reconstruction.

mFGS grade. The remaining 89% have varying degrees of hirsutism, from mild to severe. This is similar to the findings of Ekici and Moray[10] who found that 100% of females with PSD have some form of hirsutism. A report by Harlak *et al.*[6] showed that about 92% of all patients with PSD are hairy to some extent. However, in the study, they used visual inspection of the intergluteal cleft to assess excess hairs in the patients, and this is subject to interobserver variation[6].

There are various surgical treatment options for PSD, and each of the options has advantages and disadvantages. Limberg flap procedure was the most common surgical option we utilized in 47.6% of our study population, followed by primary closure in 38.4% and the Karydakis procedure in 7.3%. Six (3.7%) patients were treated with the V-Y flap, and five (3%) patients were treated with marsupialization. This is similar to the treatment options utilized by Alrashid *et al*[.17] for the treatment of PSD. In their study, Limberg flap was utilized in 44.2%while they utilized primary closure in 19.6% of their patients[17]. Onder *et al.*[7] utilized Limberg flap 73.6% while primary closure was done for only 26.4%. Marsupialization was however the most common form of treatment utilized by Varnalidis *et al.*[18] in Greece to treat 111 patients. It was used for 57% of the patients, while excision was done for only 43%[18]. In a retrospective analysis of 29 women treated for PSD, Saydan and Sahin revealed that the Karydakis procedure was the most common surgical intervention they offered to 48.3% of the patients, followed by primary closure in 34.5% of cases and the Limberg flap in 17.2%[19]. The difference in the surgical intervention may be attributed to the choice of surgeon treating these patients.

The early outcome after surgery for our patient group is good, with only 16.5% of the patients developing a mild surgical site infection and 3.7% developing superficial wound dehiscence. We also found that the BMI of the patients can affect the risk of wound infection or dehiscence after surgical intervention for PSD. The infection rate reported by Al-Khayat *et al.*[20] in their study was 12.8%, which is similar to our finding. However, our findings indicate that the infection rate is higher than the rates reported by Onder *et al.*[7], Saydam *et al.*[19], Alrashid *et al.*[17], and Sakr *et al.*[16] all of which reported infection rates of 7.6, 6.89, 4.4, and 4.9%, respectively. Our study population included

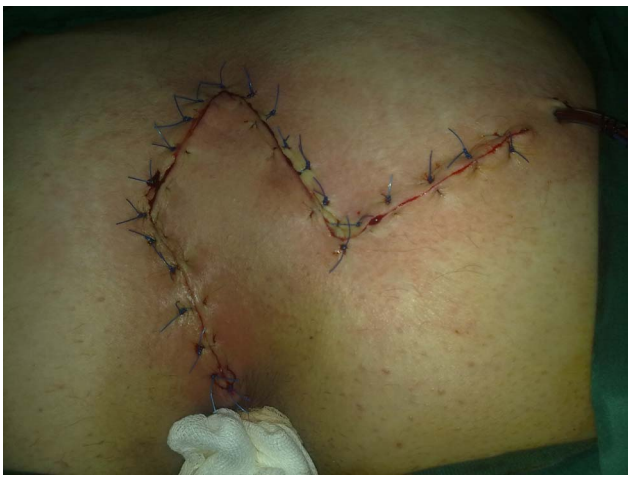

Figure 3. Intraoperative view of Limberg flap reconstruction.

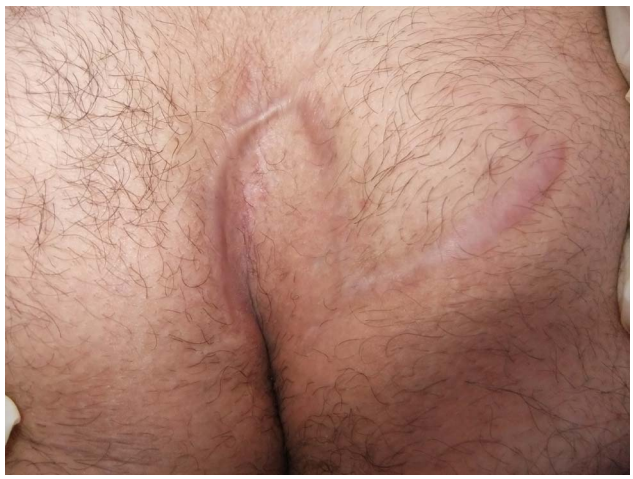

Figure 5. Postoperative late-term view of Limberg flap reconstruction.

only females with PSD. While in these studies, the study population is not gender specific and this may be responsible for difference in the infection rate as female patients tend to have more fat and higher BMI which we found is associated with postoperative infection after surgical treatment for PSD. The association between obesity and postoperative surgical site infection for PSD was confirmed by studies by Al-Khayat *et al.*[20] and Sakr *et al.*[16].

Post-treatment recurrences in our study are 8.5%, and they occur within 2–7 years in our study population. The recurrence of 7.1% was reported by Alrashid *et al.*[17] among patients treated for PSD. This is similar to our findings. Sakr *et al.*[16] reported a recurrence rate of 3.1% while Onder *et al.*[7] and Varnalidis *et al.*[18] reported recurrence rate of 13.2 and 14.4%, respectively. Our study revealed that recurrence after surgical treatment is not affected by obesity, hirsutism, or the choice of surgical therapy. Other studies however found that obesity is associated with increased risk recurrence after surgery for PSD[21]. In a clinical trial conducted by Çubukçu *et al.*[21], they found that recurrence after treatment for PSD is commoner in the obese and overweight patients.

The most important limitations of this study are that it was retrospective, there was no control group, and all data on the patients could not be reached. Prospective multicenter studies are needed to analyze the possible risk factors associated with PSD in female patients.

Conclusion

PSD is no longer a 'men's only disease'. BMI increases the risk of early postoperative complications, but this association was not found between BMI and recurrence. Prospective multicenter studies are needed on the relationship between PSD and hirsutism.

Ethical approval

Ethics approval was obtained from Inonu University Institutional Review Board (IRB) for Non-Interventional Clinical Research (Approval no: 2022/3837)

Patient consent statement

Written and verbal informed consent was obtained from patients' relatives to publish this case report and accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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Author contribution

S.A., A.A., and Y.Y.: conceptualization. S.A., A.C., A.A., D.Y., and Y.Y.: investigation. S.A., I.U.G., and A.A. writing – original draft preparation. S.A., I.U.G., A.A., and Y.Y.: writing – review and editing. S.A., A,A., and Y.Y.: project administration. All authors have read and agreed to the published version of the manuscript.

Conflicts of interest disclosure

The authors stated that they have no conflict of interest.

Research registration unique identifying number (UIN)

1. Name of the registry: not applicable.
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Guarantor

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