original article

Eur Surg
https://doi.org/10.1007/s10353-022-00777-5

european surgery
ACA Acta Chirurgica Austriaca

Gender-specific prevalence of sacrococcygeal pilonidal sinus disease in Turkey: A retrospective analysis of a large cohort

Muhammer Ergenç · Tevfik Kıvılcım Uprak

Received: 7 August 2022 / Accepted: 10 August 2022

Summary
Background Many studies have been carried out to find the optimal treatment for pilonidal sinus disease (PSD), but the gender-specific prevalence in Turkey has not been revealed. Therefore, this article evaluated patients diagnosed with pilonidal sinus disease in our hospital. We aimed to analyze the gender ratio in PSD.
Methods We evaluated patients admitted and who underwent pilonidal sinus excision at the Istanbul Sultanbeyli State Hospital between January 2010 and January 2022. Patients with missing data, multiple admissions, and multiple surgeries of the same patient were excluded from the analyses. Patients were stratified according to age into two groups: <18 (teenage) and ≥18 (adult). Age and gender, diagnosis at admission, and operation status were analyzed.
Results A total of 10,324 PSD patients were analyzed. 24.8% (n=2559) of the patients were female and 75.2% (n=7765) were male. Patients' ages ranged from 13 to 86 years; the mean age was 26.5 years. Of all patients, 1621 (15.7%) had an abscess at the time of diagnosis. 4345 pilonidal sinus surgery cases were evaluated; 25.3% (n=1100) of the patients were female and 74.7% (n=3245) were male. The girl/boy ratio of PSD in teenagers was 0.86, and the female/male ratio of PSD in patients aged 18 years and older was 0.27.
Conclusion The female gender prevalence of sacrococcygeal pilonidal sinus disease is 25% in Turkey. Pilonidal sinus disease surgery is mainly performed in secondary care hospitals; therefore, unpublished data from these centers may contribute more to pilonidal sinus disease research.

Keywords Pilonidal sinus · Pilonidal sinus disease · Hair · Epidemiology · Gender medicine · Turkish population · Pilonidal cyst

Main novel aspect

The female gender prevalence of sacrococcygeal pilonidal sinus disease is 25% in Turkey.

Introduction

Pilonidal sinus disease (PSD) is a chronic and inflammatory disease that is often generated in the sacrococcygeal region. It is commonly observed in puberty and the young adult period and usually affects men. The incidence of pilonidal sinus disease is 26:100,000 and rising globally [1–3].

PSD risk factors include young age, obesity, male gender, Mediterranean ethnicity, deep natal cleft, hairiness, and poor hygiene. It has been shown that PSD incidence increases in parallel with body weight. The precise etiology of pilonidal sinus disease is unclear [3–7]. Pilonidal sinus disease can initially begin as either a discharging sinus or acute abscess. After

Availability of data and material The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

Code availability Not applicable

M. Ergenç, MD (✉)
Department of General Surgery, Istanbul Sultanbeyli State Hospital, Battalgazi Mah., Pasakoy Cd. No:60, Sultanbeyli, 34935 Istanbul, Turkey
muhammerergenc@gmail.com

T. K. Uprak, MD
Department of General Surgery, Marmara University School of Medicine, Marmara University Pendik Training and Research Hospital, Fevzi Cakmak Mah., Muhsin Yazıcıoglu Cad. No:10, Pendik, 34899 Istanbul, Turkey
kuprak@gmail.com

Published online: 27 September 2022

treatment of an acute disease episode, many treatment options are available [3, 8–10].

Many studies have been carried out to find the optimal treatment for pilonidal sinus disease in Turkey and all over the world. Turkish surgeons occupy a leading position in 21st-century PSD research [11]. The prevalence and gender-specific prevalence of the disease have not been clearly revealed in Turkey [2, 12].

Therefore, this article evaluated patients diagnosed with pilonidal sinus disease in our hospital. We aimed to analyze the gender ratio in pilonidal sinus disease and compare it to the literature.

Materials and methods

We performed a retrospective evaluation of patients admitted to the Istanbul State Hospital General Surgery Clinic between January 2010 and January 2022. In 2021, Sultanbeyli State Hospital had 170 inpatient beds (20 general surgery clinic beds). The hospital's service area as a secondary care hospital covers a rural district in Istanbul, which has a population of approximately 350,000 (179,000 male, 170,000 female). These patients were analyzed for cases with a primary diagnosis of pilonidal sinus disease according to the International Classification of Diseases (ICD) version 10 (L05.0: pilonidal cyst and sinus with abscess; L05.9: pilonidal cyst and sinus without abscess).

This study was approved by the Istanbul Kartal Dr Lutfi Kırdar City Hospital Clinical Research Ethics Committee (Number: 2021.514.212.11).

In addition, we analyzed patients who underwent pilonidal sinus excision in the same period with or without any reconstruction, such as primary closure, Karydakis flap, and Limberg repair.

The hospital electronic health record system was used for data acquisition. Patients with missing data, multiple admissions, and multiple surgeries of the same patient were excluded from the analyses. The following parameters were analyzed: age and gender, diagnosis at admission, and operation status. For further analysis, patients were stratified according to age into two groups: < 18 (teenage) and ≥ 18 (adult).

The primary outcome of this study was to determine the gender ratio in pilonidal sinus disease and compare it to the literature.

Statistical analysis

We performed statistical analysis using the Statistical Package for Social Sciences (version 25 for Mac; IBM Corp., Armonk, NY, USA). Descriptive data for continuous variables are expressed as mean and standard deviation. Frequencies were used for categorical variables. The chi-square test was used to compare categorical variables. The confidence interval for statistical significance was accepted as 95% and a bilateral p-value < 0.05.

Results

In the 11 years from January 2010 to January 2022, there were 561,286 admissions to the general surgery outpatient clinic in Istanbul Sultanbeyli State Hospital. Pilonidal sinus was diagnosed in 26,813 (4.7%) of these admissions.

After applying exclusion criteria, 10,324 patients were analyzed (Table 1); 24.8% (n = 2559) were female and 75.2% (n:7765) were male. Patients' ages ranged from 13 to 86 years; the mean age was 26.5 years (±9.08). The age at diagnosis of female patients was significantly younger than males (27.57 vs. 23.26 years, p = 0.00). Approximately 17% of female and 19% of male patients were diagnosed with pilonidal sinus abscesses. When the patients were compared according to the abscess status at the time of diagnosis, there was no significant difference between the male and female groups.

Of all patients, 1621 (15.7%) had an abscess at the time of diagnosis. When the patients were divided into two groups—with abscess and without abscess—according to the diagnosis, the mean of age

Table 1 Patient demographics of pilonidal sinus diagnosis in the outpatient clinic

Parameters		Gender		Total n = 10,324 (100%)	P-value
		Male n = 7765 (75.22%)	Female n = 2559 (24.78%)		
Age (years)	Mean (standard deviation)	27.57 (9.04)	23.26 (8.40)	26.50 (9.08)	< 0.001
	Minimum–maximum	13–86	13–76	13–86	–
Diagnosis	Pilonidal sinus	6522 (63.17%)	2181 (21.12%)	8703 (84.3%)	–
	Pilonidal sinus with abscess	1243 (12.03%)	378 (3.66%)	1621 (15.7%)	0.136

Table 2 Patient demographics of who underwent pilonidal sinus surgery

Parameters		Gender		Total n = 4345 (100%)
		Male n = 3245 (74.7%)	Female n = 1100 (25.3%)	
Age (years)	Mean (standard deviation)	26.54 (8.45)	20.92 (5.85)	25.12 (8.24)
	Minimum–maximum	13–72	13–56	13–72

Table 3 Comparison of the operation status of patients with pilonidal sinus disease according to gender

Parameters	Total $n=10,324$ n (%)	Male $n=7764$ n (%)	Female $n=2560$ n (%)	P-value
Operated patients	4345 (42.1%)	3245 (41.8%)	1100 (43%)	0.29
Non-operated patients	5979 (57.9%)	4519 (58.2%)	1460 (57%)	

was significantly older in the with-abscess group (27.3 vs. 26.3 years, $p=0.02$). Detailed information is given in Table 1.

A total of 4524 pilonidal sinus excision surgeries were performed from January 2010 to January 2022. After excluding recurrent operations of the same patient, 4345 cases were evaluated. 25.3% ($n=1100$) of the patients were female and 74.7% ($n=3245$) were male. Patients' ages ranged from 13 to 72 years; mean age was 25.1 years (±8.24). Detailed information is given in Table 2.

When the patients were divided into two groups according to their operation status in our center, there were a total of 10,324 patients, 4345 of whom were operated and 5979 who were non-operated. There was no statistical difference between males and females regarding operating status ($p=0.29$; Table 3). When the surgical status of patients with PSD was compared according to age, the age of the operated patients was significantly lower than among non-operated patients ($p=0.00$).

The patients were divided into two groups as teenage and adults in terms of age. Patient demographics by age subgroups are detailed in Table 4. When we analyzed teenagers' patient data, the girl/boy ratio of PSD in teenagers was 0.86, and the female/male ratio of PSD in patients aged 18 years and older was 0.27. There was no statistical difference between males and females regarding operation status (teenage patients $p=0.11$; adult patients $p=0.17$; Table 5).

Discussion

Sacrococcygeal pilonidal sinus disease (PSD) is characterized by chronic inflammation and recurrent infection. Although it is a benign disease, it can be quite painful, significantly affect quality of life, and cause absence from work and school [13–15] For this reason, the number of studies on PSD has increased in recent years. Most of the reported studies are from Mediterranean countries. The most significant contributing countries were Turkey (23,998 patients) and Italy (16,088). While 26% of the patients in Italy were women, women in Turkey contributed 13% [4].

This study revealed the data of 10,000 patients with a PSD diagnosis and 4000 PSD patients who underwent surgery. We think it is important that this patient population is large and accurately reflects the prevalence of PSD. PSD appears in approximately 0.7% of the population, and the highest incidence age is between 15 and 30 years [16]. The mean age of our study population was 26 years. A meta-analysis showed that the prevalence of PSD is increasing in both genders. There are differences between men and women regarding lifestyle, perception of disease, and physiology. These factors affect gender-specific prevalence. PSD prevalence has increased over the past three decades, and women represent approximately 20% of patients [12]. Our study showed an approximately 4:1 male-to-female ratio of PSD (women 25%), which is consistent with the Mediterranean region and worldwide average of 21% [4, 12].

The incidence of PSD is approximately fivefold higher in adult males than in females [4, 12]. Unlike in adults, PSD studies concentrating on teenagers have demonstrated a girl/boy ratio of approximately 1:1 [7, 17–19]. When we analyzed our cohort subgroups, the teenager and adult patients' female/male ratios were 0.86 and 0.27, respectively, in line with the literature.

A study from Turkey was evaluated in the meta-analysis analyzing the gender-specific prevalence of

Table 4 Patient demographics of pilonidal sinus diagnosis according to gender in different age groups

Age (years)		<18				≥18			
Gender		Total $n=1256$ (100%)	Male $n=673$ (53.6%)	Female $n=583$ (46.4%)	P-value	Total $n=9068$ (100%)	Male $n=7091$ (78.2%)	Female $n=1977$ (21.8%)	P-value
Age (years)	Mean (Standard deviation)	16.02 (1.09)	16.14 (1.03)	15.89 (1.14)	<0.001	27.91 (8.80)	28.62 (8.76)	25.37 (8.46)	<0.001
	Minimum–maximum	13–17	13–17	13–17	–	18–86	18–86	18–76	–

Table 5 Comparison of the operation status according to gender in different age groups

Age (years)	<18				≥18			
Gender	Total $n=1256$ n (%)	Male $n=673$ n (%)	Female $n=583$ n (%)	P-value	Total $n=9068$ n (%)	Male $n=7091$ n (%)	Female $n=1977$ n (%)	P-value
Operated patients	670 (53.3%)	345 (51.3%)	325 (55.7%)	0.11	3675 (40.5%)	2900 (40.9%)	775 (39.2%)	0.17
Non-operated patients	586 (46.7%)	328 (48.7%)	258 (44.3%)	–	5393 (59.5%)	4191 (59.1%)	1202 (60.8%)	–

PSD. In a 2017 survey of 19,013 Turkish participants between the ages of 17 and 28 years, Duman et al. found that only 6% were women, a value 3–4 times lower than other reports. This study's gender-specific prevalence results were inconsistent with ours, and we believe our secondary care hospital population reflects Turkish populations better. In this meta-analysis, the authors commented as follows: a limitation is that the number of patients included in published data may not reflect the prevalence of the disease [2, 12]. Pilonidal sinus is an as yet unidentified disease with important cofactors that differ between men and women [5, 7, 20].

This study shows that the age at diagnosis of female patients was significantly younger than in males. Although it is controversial, this result might be related to differences in the level of health awareness among women leading to differences in the number and age of women seeking surgical treatment for PSD [4].

A study in which 1962 patients were included reported the rate of admission with an acute abscess in pilonidal sinus patients as 36% and the mean age as 23.6 years. In this study, no significant difference was observed between acute abscess-forming PSD and chronically fistulating PSD in the age of onset (23.0 ± 0.2 and 22.7 ± 0 years, respectively). In contrast, the onset of symptomatic disease was detected 1 year earlier than the incidentally seen pilonidal sinus disease age (24.0 ± 0.8 years) [21]. In our study, 15.7% of patients had an abscess at the time of diagnosis; the mean age was significantly older in the with-abscess group (27.3 vs. 26.3 years, $p = 0.02$). However, since our study was not a screening study in a specific cohort and all patients admitted were symptomatic, we could not compare it with the age of asymptomatic patients in the population.

When the surgical status of patients with PSD was compared according to age, the age of the operated patients was significantly lower than in non-operated patients. However, there is no major age difference, and we think this result was related to our large patient cohort.

Data from studies examining regional geographic differences may identify the essential cofactors of pilonidal sinus disease between men and women [4]. Small and medium-sized hospitals like our center are major locations for pilonidal sinus surgeries [11, 22].

Our study has certain limitations. It is a retrospective, single-center study. The operation status of all patients' data was unavailable, as patients may have surgery in another center. We could not compare the recurrence rate and other perioperative parameters.

The female gender prevalence of sacrococcygeal pilonidal sinus disease is 25% in Turkey. Pilonidal sinus disease surgery is mainly performed in secondary care hospitals. These hospitals' population represents demographics better; therefore, data from these centers may add more value to research and treatment of pilonidal sinus disease.

Funding All authors have declared that they have no financial relationships with any organizations that might have an interest in the submitted work at present nor had they within the previous 3 years. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Author Contribution All listed authors meet the ICMJE criteria. We attest that all authors contributed significantly to the creation of this manuscript, each having fulfilled criteria as established by the ICMJE. We confirm that the manuscript has been read and approved by all named authors. *CRediT authorship contribution statement:* conceptualization: Muhammer Ergenç and Tevfik Kıvılcım Uprak; methodology: Muhammer Ergenç and Tevfik Kıvılcım Uprak; formal analysis and investigation: Muhammer Ergenç and Tevfik Kıvılcım Uprak; writing—original draft preparation: Muhammer Ergenç and Tevfik Kıvılcım Uprak; writing—review and editing: Muhammer Ergenç and Tevfik Kıvılcım Uprak; funding acquisition: Muhammer Ergenç and Tevfik Kıvılcım Uprak; resources: Muhammer Ergenç and Tevfik Kıvılcım Uprak; supervision: Muhammer Ergenç and Tevfik Kıvılcım Uprak.

Declarations

Conflict of interest M. Ergenç and T.K. Uprak declare that they have no competing interests.

Ethical standards This study was performed in line with the principles of the Declaration of Helsinki. This study was approved by the Istanbul Kartal Dr. Lutfi Kırdar City Hospital Clinical Research Ethics Committee (number: 2021.514.212.11).

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