



Is Routine Histologic Examination of the Pilonidal Sinus Required? A Retrospective Analysis

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Objective: To assess whether routine histopathologic examination of the pilonidal sinus is necessary.

Background: Pilonidal sinus disease (PSD) is an acquired condition of the hair follicles and is thought to be an obstruction of the infundibulum of a hair follicle. The follicle enlarges and ruptures, causing secondary infection, the development of fistulae and abscesses, and other complications.

Methods: This is a retrospective study including all patients who had pilonidal sinus excision from January 2015 to December 2021 at King Abdulaziz Medical City, Ministry of National Guard Health Affairs, Riyadh, Saudi Arabia. A review of pathologic slides took place in the Department of Pathology, and the chart review was conducted in the Department of Surgery through patients' electronic medical records.

Results: All of the excised sinuses (100%) were benign, and none of the patients in the study population had any cancerous lesions. Approximately 90% of the patients had no history of recurrence, and 84.8% had no history of surgical abscess drainage. With respect to the

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histopathologic subtype of a benign sinus, the most common type was chronic inflammation, followed by granulation and fibrosis.

Conclusions: This study's findings reveal that none of the patients were diagnosed as having malignancy after excision of the pilonidal sinus. However, the findings reveal no need for performing an unnecessary histopathologic examination unless someone is at risk of developing cancer based on whether they have palpable lymph nodes and a history of recurrence.

Key words: Pilonidal sinus – Malignant degeneration – Histopathologic examination

Pilonidal sinus disease (PSD) is an acquired disease of the hair follicles and is believed to occur due to the obstruction of the hair follicle. PSD is a tract or cavity in the sacrococcygeal region characterized by recurring infection and chronic inflammation. Enlargement of the follicle followed by its rupture, along with development of fistulas and abscesses results in secondary infection causing PSD. Poor hygiene, obesity, and unhealthy behaviors, including prolonged sitting, are risk factors for PSD. The presence of an acute abscess and discharging sinus might be the earliest symptoms of pilonidal sinus illness.¹ The most typical form of PSD is a noninflamed pit in the natal cleft. The symptoms could range from an acute to chronic disease.² Young male individuals are typically more affected by PSD than female individuals and have an estimated incidence of 26 per 100,000 people.³

Obesity and sweating are considered risk factors for PSD around the world. Poor hygiene has been debunked as a cause in both military and civilian populations for PSD. Significant pathogenic features of PSD include a skin fold and straight, rigid, acutely cut hair that penetrates the upper intergluteal fold. However, the pathogenesis of PSD has never been completely understood.⁴ The exact cause of PSD is imprecise, but hormonal changes can lead to enlargement of hair follicles, resulting in blockage of the pilosebaceous glands in the sacral area. The movement of the buttock and the shape of the natal cleft promote the burial of the hairs into these sinuses, which in turn augment the infection.¹

The average number of inpatient episodes of pilonidal sinus illness per 100,000 male individuals grew from 43 in 2005 to 56 in 2017. The average number of inpatient episodes per 100,000 women in the female population increased from 14 in 2005 to 18 in 2017. In the entire population, there were 3.1 cases per 100,000 male individuals compared with 1 case per 100,000 female individuals; however, the ratios varied greatly by age group. Inpatient bouts of

pilonidal sinus illness rose by approximately a third across practically all age groups and both sexes. Despite the national surgical guidelines, most surgeries removed the pilonidal sinus without reconstructive measures, which accounted for approximately 13% of all procedures.⁵

Malignant transformation of pilonidal cysts is rare and is probably provoked by a chronic inflammatory process with an incidence of less than 0.1%. Since the first case of malignant transformation of a PSD described by Wolff in 1900⁶ the total number of reported cases in the literature is fewer than 100 cases. The most common histopathologic type is squamous cell carcinoma, which occurs in ~90% of cases. Malignant transformation of the PSD is often associated with the male sex, a mean age of 50 years, and chronic symptoms, with a mean duration of 20 years before diagnosis. It has also been reported to have an association with immunosuppression and human papilloma virus infection.⁷

Materials and Methods

Study area

This is a retrospective study including all patients who had pilonidal sinus excision from January 2015 to December 2021 at King Abdulaziz Medical City, Ministry of National Guard Health Affairs, Riyadh, Saudi Arabia. A review of pathologic slides took place in the Department of Pathology, and the chart review was conducted in the Department of Surgery through BestCare (patient electronic medical records).

Data collection methods

The data collection sheet was designed to include demographics, clinical variables, and histopathologic variables (see Supplemental Material). Prepared pathology slides were reviewed to ensure the accuracy of the diagnosis. Histopath-

Table 1 Baseline characteristics of study participants (n = 459)

Characteristic	Value
Sociodemographic	
Age, mean (SD)	26.09 (8.05)
Age categories, n (%)	
10–20	101 (22)
20–30	262 (57.1)
30–40	67 (14.6)
40–50	23 (5)
>50	6 (1.3)
Sex, n (%)	
Male	410 (89.3)
Female	49 (10.7)
Body mass index (BMI), mean (SD), kg/m ²	30.3 (6.5)
BMI categories, n (%), kg/m ²	
Underweight (<18.5)	3 (0.7)
Normal weight (18.5–24.99)	84 (18.3)
Obese or overweight (≥25)	372 (81.0)
Hemoglobin, mean (SD)	14.7 (2.1)
Clinical comorbidities	
Hypertension, n (%)	
No	447 (97.4)
Yes	12 (2.6)
Diabetes mellitus, n (%)	
No	451 (98.3)
Yes	8 (1.7)
Obesity, n (%)	
No	243 (53)
Yes	216 (47)
Hyperlipidemia, n (%)	
No	430 (93.7)
Yes	29 (6.3)
Immunocompromised, n (%)	
No	455 (99.3)
Yes	4 (0.9)

ologic features, such as acute and chronic inflammation, granulation tissue formations, and the presence or absence of neoplastic changes, were considered. The electronic patient record was reviewed using BestCare to document the clinical findings.

Statistical methods

Frequencies and proportions were used to describe the characteristics of the study population. Categorical variables such as sex, presence of diabetes or hypertension, and obesity were described based on frequencies and proportions. The normality assumption for continuous variables was performed by superimposing the histograms with the normal curve. Normally distributed continuous variables such as age and body mass index (BMI) were reported as mean and SD. For skewed data, median and interquartile range (IQR) were used for report-

Table 2 Clinical features of patients with pilonidal sinus

Variable	Value
Duration of pilonidal sinus by days, median (IQR)	180 (480)
History of recurrence, n (%)	
No	391 (89.8)
Yes	44 (9.6)
History of abscess surgical drainage, n (%)	
No	369 (84.8)
Yes	66 (15.2)
Type of surgery, n (%)	
Elective	435 (100)
Emergency	0 (0)
Time from diagnosis to surgery, median (IQR), days	60 (90)
Time from excision to complete healing, median (IQR), days	90 (60)
Recurrence after excision, n (%)	
No	420 (91.5)
Yes	39 (8.5)
Inguinal lymph node, n (%)	
No	458 (99.8)
Yes	1 (0.2)

IQR, interquartile range.

ing data. Data analysis was performed by using SPSS 23.0 (IBM Corp., Armonk, New York).

Results

Descriptive characteristics of study participants

Data from 459 study participants were analyzed. The mean age of the patients was 26.09 ± 8.05 years. The mean BMI was 30.3 ± 6.5, and the mean hemoglobin was 14.7 ± 2.1. More than three-fourths of the patients (89.3%) were male. Moreover, 1.7% of the patients were diabetic, and 2.6% were hypertensive. Approximately 80% of the patients were overweight or obese, 6.3% had hyperlipidemia, and 0.9% were immunocompromised (Table 1).

Clinical features of patients with pilonidal sinuses

Table 2 shows the clinical features of patients with pilonidal sinuses. The median duration of the pilonidal sinus was 180 days. Approximately 90% of the patients had no history of recurrence, and 84.8% had no history of surgical abscess drainage. We performed all surgeries electively. The median time from diagnosis to surgery was 60 days, with an IQR of 90 days. The median time from excision to complete healing was 90 days, with an IQR of 60 days. Approximately 90% of the patients had no recurrence after sinus excision, and approximately 100% did not have palpable inguinal lymph nodes.

Table 3 Histopathologic characteristics of excised pilonidal sinus

Characteristics	Value
Pathology result, n (%)	
Benign	459 (100)
Malignant	0 (0)
Benign subclassification, n (%)	
Fibrosis	11 (2.4)
Acute inflammation	2 (0.4)
Chronic inflammation	351 (76.5)
Granulation	95 (20.7)
Size of resection (the largest diameter of the resection), mean (SD), cm	4.57 (2.05)
Quality of the resection, n (%)	
Complete	459 (100)
Incomplete	0 (0)

Histopathologic characteristics of excised pilonidal sinus

Table 3 shows the histopathologic characteristics of the excised pilonidal sinus. All of the excised sinuses (100%) were benign, and none of the patients in the study population had any cancerous lesions. The mean size of the resection (the largest diameter of the resection) was 4.57 ± 2.05 cm. The quality of the resection was complete for 100% of the excised sinuses.

With respect to the histopathologic subtype of a benign sinus, the most common type was chronic inflammation, followed by granulation and fibrosis. The percentage of acute inflammation in our study population was negligible, as shown in Fig. 1.

Discussion

The study was conducted to measure the prevalence of different histopathologic subtypes of pilonidal sinuses in Saudi Arabia and to determine the necessity of a routine histologic examination after excising the pilonidal sinus to exclude cancer.

The pilonidal sinus is a blind-end tract surrounded by granulation tissue, leading to a cystic cavity lined by epithelial tissue. Some of the risk factors for developing a pilonidal sinus include obesity (found to be higher in our study), sweating, poor hygiene, and prolonged sitting.⁸ The findings of this retrospective study of surgically treated pilonidal sinuses revealed that almost all of the excised pilonidal sinuses were benign in the Saudi population, and none of the patients had cancer. Moreover, the most common sex was found to be male, which is not surprising, because pilonidal sinuses are most commonly found in young men.⁹ Furthermore, it was observed that the most common histopatholog-

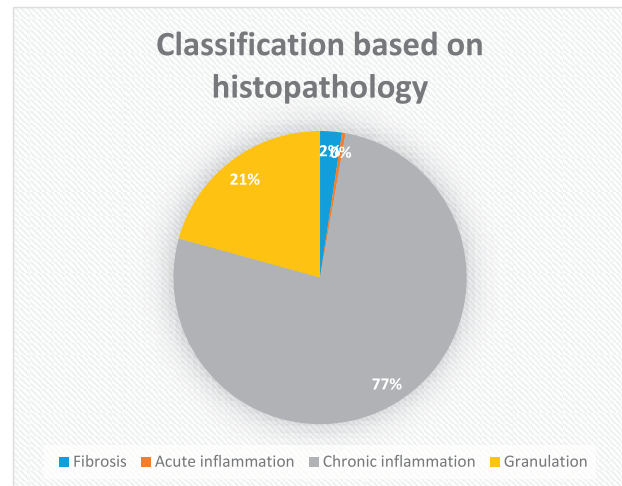


Fig. 1 Histopathologic subtype of the benign sinus in the study population.

ic subtype of the pilonidal sinus in Saudi Arabia was chronic inflammation, followed by granulation. Chronic inflammation is typically characterized by the presence of lymphocytes, histiocytes, and plasma cells, including macrophages, with a lack of granulocytes. In contrast, acute inflammation is predominantly marked by the presence of neutrophils without the obvious presence of chronic inflammatory cells.

Our findings regarding the histopathologic subtype of the pilonidal sinus are consistent with the existing literature, which shows that the most common diagnosis group is characterized by chronic inflammation.¹⁰ In addition, we found that fewer than 10% of the patients had a recurrence after excision, which may be due to incomplete excision of tracts, as supported by the literature.¹¹ All of the patients had benign pilonidal sinuses with no signs of malignancy, and these findings are consistent with the existing studies in which authors did not find any malignant lesions in their histopathologic examinations of the pilonidal sinuses.^{12,13} The possible explanation for this could be that very few patients (9.6%) had histories of recurrences. Usually, the probability of cancerous pilonidal sinus increases when a patient presents with a prolonged history of recurrence, as indicated in the literature.^{14,15} For example, Mentés and Bagci¹⁶ published a case report of a 48-year-old man with a 10-year history of recurrence. This patient eventually developed sacrococcygeal verrucous carcinoma, a rare disease arising in the pilonidal sinus tract.

One of the main research questions answered by this study was whether routine histopathologic examination of the pilonidal sinus is necessary. Based on the risk profile of the study population, routine histopathologic examination of the pilonidal sinus seems to not be required, at least for our study population. This is because our population appears to be at lower risk of developing cancer, as depicted by the low proportion of the study population with recurrence after excision (8.5%) and the negligible proportion of the population with palpable inguinal lymph nodes (0.2%). These findings are consistent with the literature, which also suggests no need for additional routine histopathologic examination of the pilonidal sinus, unless patients are at higher risk. Our findings are consistent with existing studies answering a similar research question in which the authors did not find any malignant lesions in their analyses and concluded that there was no need for routine histopathologic examination.¹⁷

Strengths and limitations

This is a unique study measuring the prevalence of histopathologic subtypes among patients in Saudi Arabia. The findings provide useful insights into the various histologic types of pilonidal sinuses. Although our sample was convenient, the sample size was large enough to study a reasonable number of cases to categorize the histopathologic subtypes. However, the study findings should be interpreted with caution after considering some inherent limitations. First, the study was a retrospective review of charts conducted on a convenient sample of patients. Therefore, the findings may not be representative of the overall population. Second, we could not explore the factors associated with various types of pilonidal sinuses, as the objective was to measure the prevalence of the various histopathologic subtypes.

Conclusion

The study's findings reveal that none of the patients were diagnosed as having malignancy after excision of the pilonidal sinus. The most common histopathologic subtype was chronic inflammation, which was predominant in male individuals and obese patients. The rate of recurrence was much lower in our population, which may be a potential reason for the noncancerous occurrence. However, future large epidemiologic studies are required to understand the reasons for benign pilonidal sinuses in the Saudi

population. Although no malignancy was observed, this should not prevent clinicians or surgeons from performing a histopathologic review of pilonidal sinuses when indicated. However, the findings reveal no need for performing an unnecessary histopathologic examination unless someone is at risk of developing cancer based on whether they have palpable lymph nodes and a history of recurrence.

Acknowledgments

The Research Ethics Committee in King Abdullah International Medical Research Center with the institutional review board approved the current study (approval number IRB/2598/22). Moreover, the patients' identities were kept confidential throughout the study. We thankfully appreciate the medical students and the residents for the great efforts. All authors have seen and approved the final version of the manuscript being submitted.

References

1. Harries RL, Alqallaf A, Torkington J, Harding KG. Management of sacrococcygeal pilonidal sinus disease. *Int Wound J* 2019;**16**(2):370–378
2. Bi S, Sun K, Chen S, Gu J. Surgical procedures in the pilonidal sinus disease: a systematic review and network meta-analysis. *Sci Rep* 2020;**10**(1):13720
3. Albabtain IT, Alkhalidi A, Aldosari L, Alsaadon L. Pilonidal sinus disease recurrence at a tertiary care center in Riyadh. *Ann Saudi Med* 2021;**41**(3):179–185
4. Doll D, Brengelmann I, Schober P, Ommer A, Bosche F, Papalois AE, et al. Rethinking the causes of pilonidal sinus disease: a matched cohort study. *Sci Rep* 2021;**11**(1):6210
5. Oetzmann von Sochaczewski C, Gödeke J. Pilonidal sinus disease on the rise: a one-third incidence increase in inpatients in 13 years with substantial regional variation in Germany. *Int J Colorectal Dis* 2021;**36**(10):2135–2145
6. Wolff H. Carcinom auf dem Boden des Dermoids *Arch Klin Chir* 1900;**62**:731–738
7. Vertaldi S, Anoldo P, Cantore G, Chini A, D'Amore A, D'Armiento M *et al.* Histopathological examination and endoscopic sinusectomy: is it possible? *Front Surg* 2022;**9**:793858
8. Kuckelman JP. Pilonidal disease: management and definitive treatment. *Dis Colon Rectum* 2018;**61**(7):775–777
9. Chintapatla S, Safarani N, Kumar S, Haboubi N. Sacrococcygeal pilonidal sinus: historical review, pathological insight and surgical options. *Tech Coloproctol* 2003;**7**(1):3–8

10. Doll D, Friederichs J, Boulesteix AL, Dusel W, Fend F, Petersen S. Surgery for asymptomatic pilonidal sinus disease. *Int J Colorectal Dis* 2008;**23**(9):839–844
11. Sondena K, Nesvik I, Andersen E, Soreide JA. Recurrent pilonidal sinus after excision with closed or open treatment: final result of a randomised trial. *Eur J Surg* 1996;**162**(3):237–240
12. Boulanger G, Abet E, Brau-Weber AG, Leclair F, Denimal F, Jean MH *et al*. Is histological analysis of pilonidal sinus useful? Retrospective analysis of 731 resections. *J Visc Surg* 2018; **155**(3):191–194
13. Otutaha B, Park B, Xia W, Hill AG. Pilonidal sinus: is histological examination necessary? *ANZ J Surg* 2021;**91**(7-8): 1413–1416
14. Abboud B, Ingea H. Recurrent squamous-cell carcinoma arising in sacrococcygeal pilonidal sinus tract: report of a case and review of the literature. *Dis Colon Rectum* 1999;**42**(4):525–528
15. Cilingir M, Eroglu S, Karacaoglan N, Uysal A. Squamous carcinoma arising from chronic pilonidal disease. *Plast Reconstr Surg* 2002;**110**(4):1196–1198
16. Menten A, Bagci M. Verrucous carcinoma (Buschke–Lowenstein) arising in a sacrococcygeal pilonidal sinus tract: report of a case. *Langenbecks Arch Surg* 2008;**393**(1):111–114
17. Akin T, Akin M, Ocakli S, Birben B, Er S, Tez M. Is it necessary to perform a histopathological examination of pilonidal sinus excision material? *Am Surg* 2022;**88**(6):1230–1233