European Journal of Therapeutics
pISSN: 2564-7784
eISSN: 2564-7040

Eur J Ther. 2025;31(5):341-347.
https://doi.org/10.58600/eurjther2818

Original Research

Necessity of Routine Histopathological Examination in Pilonidal Sinus Surgery: A Retrospective Analysis

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Received: 2025-08-10 **Accepted:** 2025-10-01 **Published Online:** 2025-10-08

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ABSTRACT

Objective: Pilonidal sinus disease (PSD) is a benign but recurrent disease of the sacrococcygeal region, occasionally associated with malignant transformation, most frequently squamous cell carcinoma. The increasing use of minimally invasive approaches without routine histopathological evaluation has raised concerns regarding the potential risk of missing rare malignancies. This study aimed to evaluate the necessity of routine histopathological examination of pilonidal sinus excision specimens.

Methods: This retrospective study analyzed 420 patients who underwent pilonidal sinus surgery at Gaziantep University between 2012 and 2025. Demographic characteristics (age, gender, comorbidities, smoking/alcohol use), the presence of additional malignancies, and histopathological findings (benign versus malignant and subtypes) were recorded and analyzed.

Results: The mean age of the patients was 25.8 ± 8.9 years, and 85.9% were male. All histopathological evaluations demonstrated benign pathology (100%), with no malignancy identified in any specimen. Active chronic inflammation (62.1%) and inflammatory granulation tissue (35.9%) were the most common findings. Rare histopathological findings included abscess formation (1.4%), dermatofibroma (0.2%), and fibrotic changes (0.2%).

Conclusion: Although no malignancies were detected in this large cohort, the potential risk of malignant transformation in long-standing, recurrent, or atypical pilonidal sinus lesions cannot be fully excluded. Routine histopathological evaluation remains a low-cost, safe diagnostic approach and should be particularly considered in patients aged >50 years, with recurrent disease or atypical presentations.

Keywords: histopathology, malignancy, pilonidal sinus, retrospective study, squamous cell carcinoma

INTRODUCTION

Pilonidal sinus disease (PSD) is a condition characterized by tracts and cavities in the sacrococcygeal region, typically associated with recurrent infections and chronic inflammation, and is most commonly observed in young male patients [1]. Although it is most widely observed in the sacrococcygeal region, it can occasionally occur in other, less common sites such as the umbilical, inguinal, or sternal regions. Reported risk factors include male sex, obesity, prolonged sitting, poor hygiene, deep natal cleft, and dense body hair [1, 2]. If left untreated, it may lead to recurrent discharge, infections, and abscess formation. Although it is a benign condition, its painful nature and frequent recurrences can significantly impair quality of life and cause problems in daily activities and work life. Furthermore, it is known that these chronic, non-healing, and progressively enlarging lesions carry a rare but potential risk of transformation into squamous cell carcinoma. Therefore, appropriate treatment is of critical importance [1, 3]. In the literature, the incidence of malignancy associated with PSD is reported to be extremely rare, with squamous cell carcinoma being the most commonly observed histological type. It has been noted that these patients often present with recurrent PSD, progressive ulcerated areas within the lesion, and episodes of bleeding, which create a clinical picture distinct from that of benign PSD [4, 5].

Clinical presentation most commonly includes abscess formation in the sacrococcygeal region, the presence of painful or painless draining sinuses, or a sensation of swelling in the affected area [2, 6]. For the diagnosis of pilonidal sinus, the patient's medical history and physical examination are usually sufficient. The presence of infected hair follicles within the midline gluteal cleft, in the absence of other anal pathologies, is considered a pathognomonic finding. Additionally, imaging studies are generally not required for diagnosis [6]. In addition to surgical interventions, various alternative methods are available for the treatment of pilonidal sinus disease. Treatment options include drainage of the sinus, surgical excision with or without flap techniques, as well as minimally invasive approaches such as endoscopic treatment, laser ablation, and phenol instillation for cavity obliteration [7]. In recent years, non-surgical treatment modalities for pilonidal sinus have become increasingly common, and pathological examination of excised material is often not performed in these approaches. The rising use of treatment methods without histopathological evaluation has further highlighted the question of whether routine pathological examination should be conducted in pilonidal sinus cases, given the low but potential risk of malignancy. This study aimed to investigate the necessity of routine histopathological analysis of excised specimens following pilonidal sinus surgery.

Main Points

- In this retrospective analysis of 420 pilonidal sinus surgery cases, no malignant lesions were identified.
- Histopathological examination retains diagnostic value in patients over 50 years of age, those with recurrent disease, and lesions with atypical features.
- The increasing use of minimally invasive approaches may preclude specimen collection, raising the potential risk of missing rare malignancies.
- Routine histopathological evaluation is a low-cost, safe, and clinically valuable practice, yet further large-scale, multicenter studies are warranted to refine its indications.

MATERIALS AND METHODS

Study Design and Patient Selection

This retrospective study was conducted at the Department of General Surgery, Gaziantep University Faculty of Medicine, after obtaining approval from the Clinical Research Ethics Committee of Gaziantep University (Desicion number: 2025/250, Date: 2025-08-06) and in compliance with the Declaration of Helsinki. A total of 512 patients who underwent pilonidal sinus surgery were identified from the institutional patient archive database between 2012 and 2025. Demographic characteristics, including age, sex, comorbidities, smoking, and alcohol use, as well as the presence of any additional malignancies, were extracted from the patient records. Histopathological results of the excised specimens, including benign versus malignant status and histopathological subtypes, were analyzed individually and recorded. Exclusion criteria included incomplete medical records, non-sacrococcygeal pilonidal sinus, patients under the age of 18 years, and cases without available pathology reports. After applying these criteria, 420 patients were included in the final analysis. The selection process is presented as a flow diagram in Figure 1.

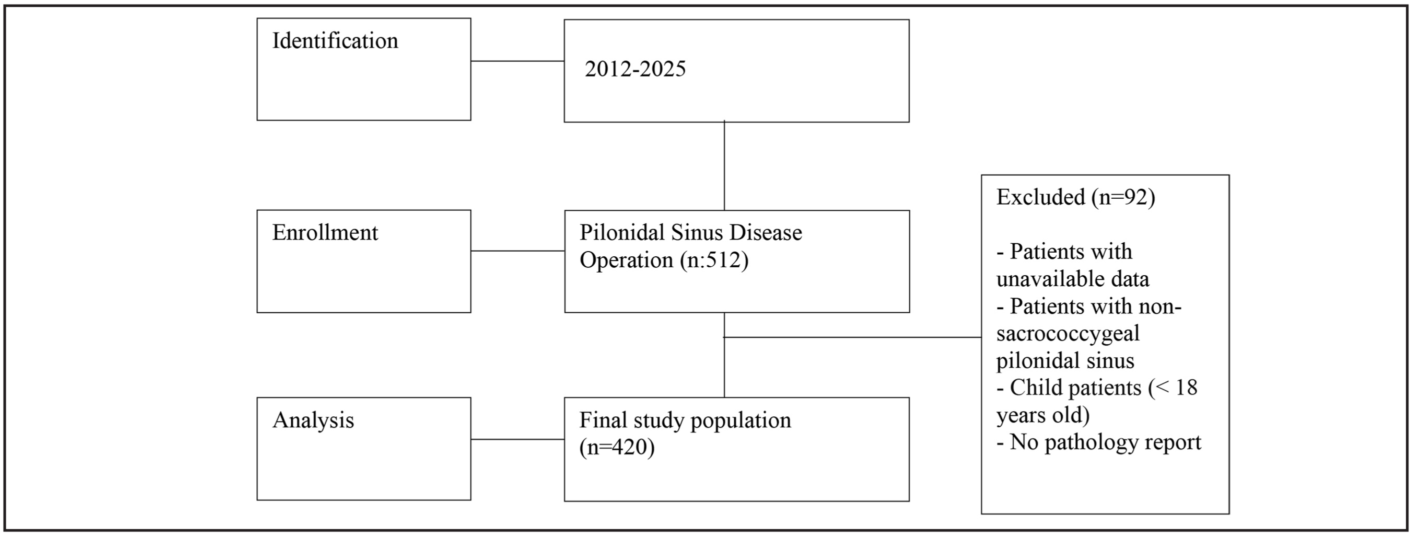

Figure 1. The sample collection scheme.

Statistical Analysis

All statistical analyses were performed using SPSS software version 22.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize the data. Continuous variables, such as age and weight, were presented as mean ± standard deviation (SD). Categorical variables, including gender, smoking and alcohol status, comorbidities, American Society of Anesthesiologists (ASA) score, disease type (primary/recurrence), and histopathological findings, were expressed as numbers and percentages (n, %).

RESULTS

A total of 420 patients who underwent surgery for pilonidal sinus disease were included in the final analysis. The mean age of the patients was 25.84 ± 8.95 years, and the mean weight was 79.11 ± 13.84 kg. The majority of patients were male (85.95%) and under 40 years of age (91.9%). Smoking was reported in 51.67% of patients, while alcohol consumption was rare (3.1%). Comorbidities were present in 15.24% of the study population. Regarding ASA classification, most patients were classified as ASA II (57.62%**).**

Primary pilonidal sinus disease accounted for 86.67% of cases, while 13.33% were recurrent. All specimens were histopathologically benign, with no malignant findings. Additionally, none of the patients had a co-existing malignancy (Table 1).

Histopathological examination demonstrated active chronic inflammation as the most common finding (62.14%), followed by granulation tissue with inflammatory infiltrate (35.95%). Abscess formation was detected in 1.43% of cases. Rare findings included dermatofibroma (0.24%) and fibrotic changes (0.24%) (Table 2).

DISCUSSION

In recent years, non-surgical treatment modalities for pilonidal sinus have become increasingly common. The growing use of these approaches, which often do not include pathological evaluation, has raised the question of whether routine histopathological examination should be performed in pilonidal sinus cases, given the low but potential risk of malignancy. In a large-scale database review conducted by Safadi et al. [5] in 2023, all reported cases of pilonidal sinus–associated malignancies in the literature were analyzed, identifying a total of 140 malignant cases. The study emphasized that patients with untreated disease or recurrent episodes over an average of 20 years had an increased risk of malignant transformation, highlighting the importance of early treatment to reduce the potential risk of cancer [5]. Histopathological examinations of pilonidal sinus specimens are almost entirely composed of hair-containing granulomatous or inflammatory cystic formations. Nevertheless, many surgeons continue to submit specimens for routine histopathological evaluation despite a typical PSD appearance, due to the potential risk of malignancy. In our clinical practice, we routinely send all excised PSD specimens for pathological examination, and in our analysis, all cases were reported as benign. The most common histopathological finding was active chronic inflammation and granulation tissue with inflammatory infiltrate, identified in approximately 98%

Table 1. Clinical and Demographic Characteristics of Patients

Variable		n
Age (mean ± SD) (years)		25.84±8.95
Weight		79.11±13.84
Gender (%)	Male	361 (85.95)
	Female	59 (14.05)
Smoking (%)	No	203 (48.33)
	Yes	217 (51.67)
Alcohol (%)	No	407 (96.9)
	Yes	13 (3.1)
Comorbidity (%)	No	356 (84.76)
	Yes	64 (15.24)
ASA Score (%)	1	167 (39.76)
	2	242 (57.62)
	3	11 (2.62)
	4	0 (0)
Pilonidal sinus disease (%)	Primary	364 (86.67)
	Recurrence	56 (13.33)
Pathology (%)	Malign	0 (0)
	Benign	420 (100)
Age (years)	<40	386 (91.9)
	≥40	34 (8.1)
Co-existing Malignancy	Yes	0
	No	420 (100)

n: number of patients, SD: standard deviation, ASA: American Society of Anesthesiologists

Table 2. Comprehensive Histopathological Findings of the Patients

Histopathology		n (%)
Benign Findings	Pilonidal sinus disease; active chronic inflammation	261 (62.14)
	Pilonidal sinus disease; abscess formation	6 (1.43)
	Pilonidal sinus disease; Granulation tissue with inflammatory infiltrate	151 (35.95)
	Dermatofibroma	1 (0.24)
	Fibrotic changes	1 (0.24)
Malign Findings		0 (0)

n: number of patients

of cases.

In our study, the mean age of the patient cohort was 25.8 years, and 85.9% of the patients were male. The age and gender distribution of our study population were found to be consistent with previously reported series in the literature [8,9]. In our analysis of 420 patients, no cases of malignancy were identified. Similarly, in a retrospective study of 731 patients undergoing pilonidal sinus disease surgery, Boulanger et al. [10] reported no cases of malignancy while evaluating the necessity of routine histopathological examination. In the same study, the authors recommended routine histopathological evaluation, particularly for patients over 50 years of age and for those with atypical localization or long-standing lesions. In a large series involving 2,068 cases, Ergenc similarly reported no instances of malignancy and suggested that routine histopathological examination may be reserved for older patients, those with atypical localization or appearance, recurrent cases, and long-standing disease [8]. Similarly, Yüksel et al. [11] examined 905 patients who underwent pilonidal sinus disease surgery and reported no cases of malignancy in their series. However, in contrast to the findings of Boulanger et al. [10], they advocated that routine histopathological examination is necessary. In their analysis, Otutaha et al. [12] similarly did not detect any malignancy and recommended routine histopathological examination only for patients over 50 years of age. In their study analyzing 1,070 patients, Özdemir et al. [9] identified squamous cell carcinoma (SCC) in two cases, in contrast to our findings. A common characteristic of these patients was being over 50 years of age and having a disease duration exceeding 10 years.

While many studies on the treatment of pilonidal sinus disease have focused on whether routine histopathological examination is necessary due to the potential risk of malignancy, recent publications on minimally invasive treatment modalities—such as laser ablation, phenol application, and endoscopic procedures—do not provide clear information regarding whether histopathological evaluation was performed or the outcomes of such assessments [13-15]. Since these minimally invasive techniques often involve ablative procedures following curettage and drainage, it is well recognized that histopathological examination is frequently not feasible [16]. The presence of these treatment modalities further underscores the importance of evaluating whether routine histopathological examination is necessary. Our findings suggest that routine histopathological evaluation is a low-cost method that provides diagnostic safety and can contribute to clinical decision-making, particularly in elderly patients, recurrent cases, and atypical lesions. However, multicenter prospective studies are required to make a definitive recommendation regarding its necessity for all patients.

Limitations

This study has several limitations. First, its retrospective single-center design may limit the generalizability of the findings to broader populations. Second, the study included only patients who underwent surgical excision, thereby excluding cases treated with minimally invasive methods, which could influence the applicability of the results to all pilonidal sinus disease patients. Additionally, the absence of malignancy in our cohort may reflect the relatively young age of the study population, which could limit the generalizability of the findings to older patient groups who might carry a higher risk of malignant transformation. Finally, the lack of long-term follow-up data prevents the assessment of delayed malignant transformation after surgery.

CONCLUSION

Although no malignancies were detected in our study, when evaluated together with the literature, the possibility of a low but existing malignancy risk cannot be completely excluded. Therefore, we recommend histopathological examination in all patients, particularly in atypical lesions, recurrent cases, patients over 50 years of age, and those with long-standing disease. We believe that future studies with larger datasets will provide further insight and add significant value to this field.

Acknowledgments: We sincerely thank Lecturer İlkay Doğan from the Department of Biostatistics, Faculty of Medicine, Gaziantep University, for his valuable contributions and expert support in the statistical analysis of this study.

Conflict of interest: The authors declare no conflicts of interest.

Funding: This study did not receive any funding.

Ethical Approval: This study was obtained from Clinical Research Ethics Committee of Gaziantep University with decision number 2025/250 (Date: 2025-08-06).

Informed Consent: Since this study was designed as a retrospective review of archived patient records and did not involve the use of any personal patient identifiers, informed consent was not obtained.

Author Statement Regarding the Use of Artificial Intelligence-Enhanced Tools: During the preparation of this manuscript, an AI-assisted language tool (ChatGPT, OpenAI) was used solely for grammar checking and improving the fluency of certain sentences. The tool was not used for generating original scientific content, designing the study, collecting or analyzing data, or creating figures. All interpretation of findings, construction of the scientific framework, and preparation of the final version of the manuscript were carried out entirely by the authors. The authors take full responsibility for the scientific integrity, originality, and accuracy of the entire work.

Author Contributions: Conception: A,A; I,H,O - Design: A,A - Supervision: A,A -Materials: A,A; I,H,O - Data Collection and/or Processing: A,A; I,H,O - Analysis and/or Interpretation: A,A; I,H,O - Literature: A,A; I,H,O - Review: A,A - Writing: A,A - Critical Review: A,A.

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How to Cite;

Aytekin A, Ozdemir IH (2025) Necessity of Routine Histopathological Examination in Pilonidal Sinus Surgery: A Retrospective Analysis. Eur J Ther. 31(5):341-347. https://doi.org/10.58600/eurjther2818