

Use of the laser in the pilonidal sinus alone or in combination with phenol

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SUMMARY

OBJECTIVE: We investigated the effectiveness of combining laser treatment with phenol in the management of pilonidal sinus.

METHODS: We present here a retrospective analysis of patients with pilonidal sinus disease who were treated in the general surgery clinic of the Balıkesir University Hospital between October 2019 and February 2022.

RESULTS: Recurrence was observed in three patients (13.6%) in the laser treatment group and one patient (4.8%) in the laser-phenol treatment group after the fourth month. Notably, 22 (91.7%) patients in the laser treatment group and 21 (95.5%) patients in the laser-phenol treatment group had complete healing.

CONCLUSION: Although not statistically significant, the laser-phenol treatment group exhibited a lower recurrence rate and a higher complete healing rate.

KEYWORDS: Lasers. Phenol. Pilonidal cyst. Pilonidal sinus.

INTRODUCTION

Pilonidal sinus disease is a condition that commonly manifests between the ages of 15 and 30 years and has a significant impact on quality of life. It can occur in various locations throughout the body but predominantly in the sacrococcygeal region. The incidence rate is approximately 26 per 100,000. An analysis of the existing literature indicates a male predominance in pilonidal sinus disease, with females accounting for only approximately 21% of total cases¹⁻³.

The etiology of pilonidal sinus disease involves genetic factors, obesity, prolonged sitting, excessive body hair, and poor hygiene. Patients commonly present with symptoms such as pain, discharge, swelling, and discomfort while sitting. The clinical presentation of the disease can vary from an asymptomatic form to the development of acute abscesses and chronic presentations⁴. The prolonged persistence of pilonidal sinus increases the risk of squamous cell carcinoma within the sinus tracts⁵.

Pilonidal cysts are, in fact, not true cysts, as histopathological examination reveals the absence of a definitive epithelial lining. Upon examination of the cyst cavity, the presence of hair, debris, foreign body giant cells, and granulation tissue is frequently observed⁶.

The most efficient treatment approach to pilonidal sinus disease remains controversial, although it is accepted that the ideal treatment will be simple with a short operative time and

have a low recurrence rate without the need for hospitalization⁷. Various surgical methods have been proposed, such as excision with primary closure, marsupialization, and various flap techniques, as well as non-surgical techniques such as phenol filling of the sinus cavity, endoscopic pilonidal sinus treatment (EPSIT), video-assisted ablation of the pilonidal sinus (VAAPS), and laser treatments⁸⁻¹². Efforts to determine the optimal treatment approach continue by exploring combinations of the aforementioned treatment methods.

This study investigated the effectiveness of combining laser treatment with phenol in the management of pilonidal sinus.

METHODS

We present here a retrospective analysis of patients with pilonidal sinus disease who were treated in the general surgery clinic of the Balıkesir University Hospital between October 2019 and February 2022. Patients aged 18 years and above with primary or recurrent pilonidal sinus disease, without abscesses, and without chronic diseases that could affect wound healing were included in the study. The patients were divided into two groups: a laser treatment group (n=24) and a laser-phenol treatment group (n=22). No prophylactic antibiotics were administered prior to the treatment, and all procedures were performed under local anesthesia. Informed consent was obtained from all patients before the procedures.

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Surgical technique

For the cases of pilonidal sinus undergoing laser treatment, the periphery of the sinus pit was first cleansed with povidone-iodine, after which the pilonidal sinus tract was cannulated using a stylet. Any granulation tissue and hair within the cyst were cleared using a curette, and the sinus tract was irrigated with saline solution. After curettage and irrigation, the laser treatment was applied involving the delivery of an average energy of 320 joules using a 1470-nm diode laser (1 pulse: 6 s, 15 watts/1 pulse in 6 s=90 joules) (Figure 1).

For the cases in which the combined laser-phenol treatment was employed, in addition to the previously mentioned laser procedures, crystallized phenol was carefully applied to the sinus pit using a clamp, ensuring minimal damage to the surrounding tissues (Figure 2). A dressing was applied to complete the procedure.

Follow-up examinations were conducted on the postoperative 1st, 7th, and 30th days and in the 3rd, 6th, and 12th months involving an assessment of the patients' wound sites and addressing any issues that may have developed.

The term “complete healing” refers to the total closure of the wound without any indications of infection, regardless

of the time since the procedure, while “recurrence” refers to a return of symptoms at least 4 months after the wound has completely healed.

Statistical analysis

Descriptive statistics were used in the analysis of the results of the study. For numeric variables, the mean±standard deviation or median, minimum, and maximum values were presented in tabular form, while categorical variables were expressed as numbers and percentages. The normality of the numeric variables was assessed using Shapiro-Wilk, Kolmogorov-Smirnov, and Anderson-Darling tests.

To analyze the disparities in categorical variables between groups, a Pearson chi-square test was employed for 2×2 tables with expected frequencies of 5 or above, and in instances where the expected frequencies were below 5, Fisher's exact test was used.

For the comparison of numerical variables between the treatment groups, an independent samples t-test was used for variables that followed a normal distribution, whereas a Mann-Whitney U test was employed for variables that did not exhibit a normal distribution.



Figure 1. Ablation of sinus tract by a radial diode laser probe.



Figure 2. Application of crystallized phenol to the sinus cavity after the laser procedure.

The statistical analyses were performed using two software programs: Jamovi (Version 2.3.18) and JASP (Version 0.16.3.0). The significance level for the analyses was set at 0.05 (p-value).

Ethical aspects

This study was conducted according to the Declaration of Helsinki and approved by the Clinical Studies Ethics Board of Balıkesir University (date: 19.04.2023, No. 2023/60).

RESULTS

A total of 46 patients were included in the study, with 24 in the laser treatment group and 22 in the laser-phenol treatment group. No significant differences were observed between the treatment groups in terms of demographic and pilonidal sinus characteristics ($p > 0.05$) (Table 1), and both treatment groups exhibited similar characteristics in terms of the number of pilonidal sinus pits, history of abscess drainage, and duration of hospital stay ($p = 0.540$, $p = 0.999$, and $p = 0.296$, respectively).

On the seventh-day follow-up visit, two patients (8.3%) in the laser treatment group and one patient (4.5%) in the laser-phenol treatment group were identified with wound infections. There was no significant difference observed in the occurrence of wound infection between the two groups ($p = 0.999$) (Table 2).

During the follow-up examinations on and after the 30th day, all patients except those who had previously developed complications in both groups had healed. Notably, 22 (91.7%) patients in the laser treatment group and 21 (95.5%) patients in the laser-phenol treatment group had complete healing.

Table 1. Demographic and clinical characteristics of the patients in the treatment groups.

	Treatment groups		p-value
	Laser (n=24)	Laser+phenol (n=22)	
Age (years) [†]	29.0±7.7	27.9±5.5	0.552
Gender [†]			
Male	19 (79.2)	16 (72.7)	0.869
Female	5 (20.8)	6 (27.3)	
Pit numbers [§]	2.0 [1.0–3.0]	1.5 [1.0–3.0]	0.540
Abscess drainage history [†]			
No	20 (83.3)	18 (81.8)	0.999
Yes	4 (16.7)	4 (18.2)	
Length of hospital stay (days) [§]	0.0 [0.0–0.0]	0.0 [0.0–1.0]	0.296

[†]Mean±standard deviation; [†]n (%); [§]Median [min–max].

Although the rate of complete healing was higher in the laser-phenol treatment group, the difference was not found to be statistically significant ($p = 0.999$) (Table 3).

Recurrence was observed in three patients (13.6%) in the laser treatment group and one patient (4.8%) in the laser-phenol treatment group after the fourth month. No significant difference was found in the recurrence rates of the two groups ($p = 0.607$) (Table 3).

Table 2. Comparison of treatment groups in terms of the development of complications at different follow-up times.

Follow-up examination time	Complication	Treatment groups		p-value
		Laser	Laser+phenol	
1st day [†]				
	No	24 (100)	22 (100)	NA
	Yes	0 (0)	0 (0)	
7th day [†]				
	No	22 (91.7)	21 (95.5)	0.999
	Yes	2 (8.3)	1 (4.5)	
30th day [†]				
	No	22 (100)	21 (100)	NA
	Yes	0 (0)	0 (0)	
3rd month [†]				
	No	22 (100)	21 (100)	NA
	Yes	0 (0)	0 (0)	
6th month [†]				
	No	19 (100)	20 (100)	NA
	Yes	0 (0)	0 (0)	
12th month [†]				
	No	19 (100)	20 (100)	NA
	Yes	0 (0)	0 (0)	

[†]n (%). NA: not applicable.

Table 3. Comparison of treatment groups in terms of complete healing and recurrence development.

	Treatment groups		p-value
	Laser (n=24)	Laser+phenol (n=22)	
Complete healing [†]			
No	2 (8.3)	1 (4.5)	0.999
Yes	22 (91.7)	21 (95.5)	
Recurrence			
No	19 (86.4)	20 (95.2)	0.607
Yes	3 (13.6)	1 (4.8)	

[†]n (%).

DISCUSSION

The safe and optimum treatment method for pilonidal sinus remains a subject of debate. While various surgical and minimally invasive treatment approaches are currently available, consensus has yet to be reached on the best treatment option. The ideal treatment method should be simple and short term, require no hospitalization, have a low recurrence rate, and be cost-effective, allowing for a quick return to daily activities and work.

Laser therapy for the treatment of pilonidal sinus disease was first described by Pappas and Christodoulou, who reported a success rate of 90.3% in their prospective study of 237 patients¹³. Recent years have witnessed an increased interest in laser therapy for the treatment of pilonidal sinus disease due to its simplicity and ease of application. A systematic review study reported that laser treatment in patients with pilonidal sinus disease resulted in a complete healing rate of 94.4% and a recurrence rate of 3.8%¹⁴. In a retrospective study conducted in Belgium in 2017, a success rate of 87.5% (35 out of 40 patients) and a recurrence rate of 2.9% (1 out of 35 patients) were reported¹⁵. In a retrospective study published by Bonito et al. in 2021, the use of a radial diode laser probe for the treatment of pilonidal sinus yielded a success rate of 84% and a recurrence rate of 9.5%¹⁶. In a study conducted by Li et al. involving 48 patients, a success rate of 100% was achieved, and a recurrence rate of 2.1% was observed¹⁷.

In this study, a complete healing rate of 91.7% and a recurrence rate of 13.6% were achieved among the patients treated exclusively with laser therapy.

Phenol treatments have long been considered a simple and cost-effective option for the treatment of pilonidal sinus. In a publication investigating the outcomes of a single-session crystallized phenol application for pilonidal sinus disease, a cure rate of 64.5% was reported with no recurrence observed¹⁸. Another study investigating the efficacy of phenol treatment for pilonidal sinus disease in 76 patients reported a success rate of 67% and a recurrence rate of 2%¹⁹. In a retrospective study examining 1026 patients with pilonidal sinus, a success rate of 84.3% was observed²⁰. In the study conducted by Kaymakcioglu et al. with 143 patients, a recurrence rate of 8.3% was observed following phenol treatment²¹.

There have been several studies in the literature investigating the use of different combination treatments involving crystallized phenol on treatment success and recurrence rates. In a study published in 2017, EPSIT used in combination with phenol resulted in zero treatment failure and disease recurrence²². Additionally, there have been studies in the literature investigating the use of laser treatments in combination

with other methods for the management of pilonidal sinus disease. In a study conducted by Dönmez et al., the results of laser-EPSIT treatments used in combination were compared with those combining electrocautery-phenol-EPSIT, and it was reported that the laser-EPSIT combination achieved a complete healing rate of 92.3% and a recurrence rate of 7.7%⁴. Another study comparing laser treatments with endoscopic treatments for pilonidal sinus disease revealed no significant difference in the complete healing and recurrence rates of the two treatment approaches²³.

In this study, a higher rate of healing (95.5%, compared with 91.7%) and a lower rate of recurrence (4.8%, compared with 13.6%) were observed in the laser-phenol combination group than in the group treated solely with laser therapy, although the differences in outcomes were not found to be statistically significant.

We acknowledge that the limited number of cases included in our study may be considered a limitation, although, to the best of our knowledge, there has been no study to date comparing the efficacy of laser therapy and laser-phenol combinations for the treatment of pilonidal sinus. Consequently, we believe that our study can serve as a preliminary investigation that may stimulate further research in this field.

CONCLUSION

The findings of this study revealed no statistically significant differences in demographic and pilonidal sinus characteristics, and wound infection between the laser and laser-phenol combination treatment groups. Furthermore, although not statistically significant, the laser-phenol combination group exhibited a lower recurrence rate and a higher complete healing rate. Based on the findings of this study, we believe that a series of large-scale studies could be designed to further evaluate the impact of the addition of phenol to a laser treatment regime on the treatment success of pilonidal sinus disease.

ETHICAL ASPECTS

This study was conducted according to the Declaration of Helsinki and approved by the Clinical Studies Ethics Board of Balikesir University (date: 19.04.2023, No. 2023/60).

AUTHORS' CONTRIBUTIONS

EA: Conceptualization, Data curation, Formal Analysis, Investigation, Methodology, Project administration, Resources,

Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. **AGŞ:** Conceptualization, Data curation, Formal Analysis, Investigation, Methodology,

Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

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