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RESEARCH ARTICLE

# Comparison of Surgical Treatment with Crystallized Phenol Treatment in Recurrent Pilonidal Sinuses

Nizamettin Kutluer[1], Serhat Doğan[2], Bahadır Öndeş[2], Feyzi Kurt[3]

[1]Private Doğu Anadolu Hospital, Clinic of General Surgery, Elazığ, Turkey
[2]Malatya Turgut Özal University Faculty of Medicine, Department of General Surgery, Malatya, Turkey
[3]Adana Seyhan State Hospital, Clinic of General Surgery, Adana, Turkey

## ABSTRACT

**Aim:** One of the most important complications of the treatment of pilonidal sinus disease (PSD) is recurrence. Despite all treatment modalities, there is still no method that promises zero recurrence rate. Additionally, there is no clear consensus about the treatment method in primary cases and uncertainty is even greater in the treatment of recurrent patients. The aim of this study was to compare the results of surgical treatment and crystallized phenol treatment in patients with recurrent PSD.

**Method:** This study included patients with recurrent PSD who underwent re-surgery or crystallized phenol application as secondary treatment in a general surgery clinic. Both methods were compared in terms of patients' gender, age, complaints and duration of complaints in the preoperative period and wound infection, length of hospital stay, recurrence and time to return to work in the postoperative period.

**Results:** Of the total of 38 patients 31 (81.6%) were male. The mean age was 25.9±4.51 years (range: 19-36 years). The site of recurrence site was at the incision line in 29 (76.3%) and lateral in 9 (23.7%). Twenty-one (53.3%) underwent surgery and 17 (44.7%) were treated with crystallized phenol application. The mean treatment-recovery time was 40.7±28.45 days in the phenol group, while it was 20.33±24.05 days in the surgery group. Recurrence was observed in 3 (17.6%) patients in the phenol group and 1 (4.76%) patient in the surgery group. There was a statistically significant difference in these two parameters.

**Conclusion:** While the surgical method was more effective in recurrent PSD, crystallized phenol is a less invasive method. It does not require hospitalization, can be applied under local anesthesia in outpatient settings, and can be repeated for a few sessions. Crystallized phenol is a preferred treatment method for recurrent PSD only in suitable cases.

**Keywords:** Recurrent pilonidal sinus, crystallized phenol, surgery

## Introduction

Although pilonidal sinus disease (PSD) was described for the first time in 1833 by Mayo[1] as a sinus containing hair in the sacrococcygeal region in a female patient, it mostly affects young adult males.[1-3] The disease has remained controversial since it was first described. Many papers have reported on its etiology and treatment. However, there has been a loss of interest in the subject of etiology and no consensus has emerged for a definitive treatment. Almost all surgeons now agree that the disease is acquired[4] but despite the dozens of surgical treatment methods applied and their modified versions, non-surgical treatment of the disease has also remained on the agenda. In particular, the application of phenol has shown promise and found many advocates. Still, the ideal treatment has not been clarified, although almost two centuries have passed since its description.[5,6]

Recurrence is one of the most important complications of the treatment of this disease. Despite all treatment modalities, there is still no method that promises zero recurrence rate.[7] Additionally, there is no clear consensus about the treatment method in primary cases and uncertainty is even greater in the treatment of recurrent patients. There are opinions recommending re-surgery as well as authors suggesting conservative methods.[8]

The aim of this study was to compare the results of surgical treatment and crystallized phenol treatment in patients with recurrent PSD.

**Address for Correspondence:** Serhat Doğan MD,
Malatya Turgut Özal University Faculty of Medicine, Department of General Surgery, Malatya, Turkey
**E-mail:** drserhatdogan@gmail.com **ORCID ID:** orcid.org/0000-0002-3288-2963
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## Materials and Methods

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. This study was approved by the Institutional Review Board of Adana City Training and Research Hospital Clinical Research Ethics Committee (approval number: 25.03.2020/53/776).

The data of the patients who were treated with a diagnosis of recurrent sacrococcygeal pilonidal sinus between January 2015 and January 2020 were obtained from computer records and patient registry and analyzed retrospectively. In order to ensure recurrence status, patients who had previously undergone surgical treatment for pilonidal sinus, had healed post-operative wounds and had a disease-free period of at least 3 months were included in the study.

Those with second recurrence, those with incomplete data and those presenting with abscess were excluded from the study. In addition, those who did not come to their routine follow-up visits and/or could not be reached were not included in the study.

In the treatment of recurrence, the decision to perform re-surgery or employ the conservative method was left to the surgeon's preference. The Karydakis[4] flap was performed on the patients as surgical treatment (Figure 1, 2). Written informed consent was obtained from all patients prior to surgery. Intestinal cleansing was performed by administering an enema 2 hours before surgery. Surgery was performed under spinal anesthesia and 1 g cefazolin sodium was administered intravenously as a prophylactic antibiotic 30 minutes before the induction of anesthesia. Vacuum drains were placed in all patients and removed when drainage fell below 20 mL post-operatively. Patients were checked every other day in the general surgery outpatient clinic after discharge. Sutures were removed on the tenth post-operative day in patients who did not develop any complications, and those with wound infection were called for daily follow-up visits and dressed until their infection regressed.

### Crystallized Phenol Application

Before the procedure, the patients were advised to ensure their sacrococcygeal hair removal and hygiene. By creating a sterile environment in the outpatient settings, the sinus tract was cleaned from the sinus openings and curetted following local anesthesia. In patients with a small sinus cavity where the mosquito clamp (BH-109 Aesculap®, Aescuplap Werke AG, Tutlingen, Germany) cannot enter, the sinus opening was enlarged enough to allow the entry. The same procedure was applied separately for each sinus opening in patients with more than one sinus opening. While starting

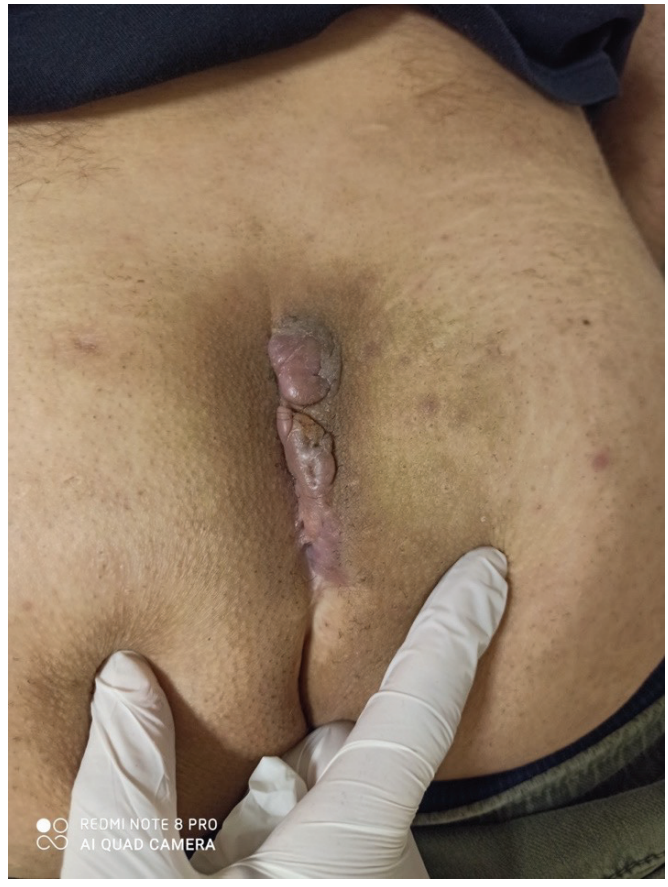


**Figure 1.** Photograph of the patient's recurrence after sinus excision and primary closure

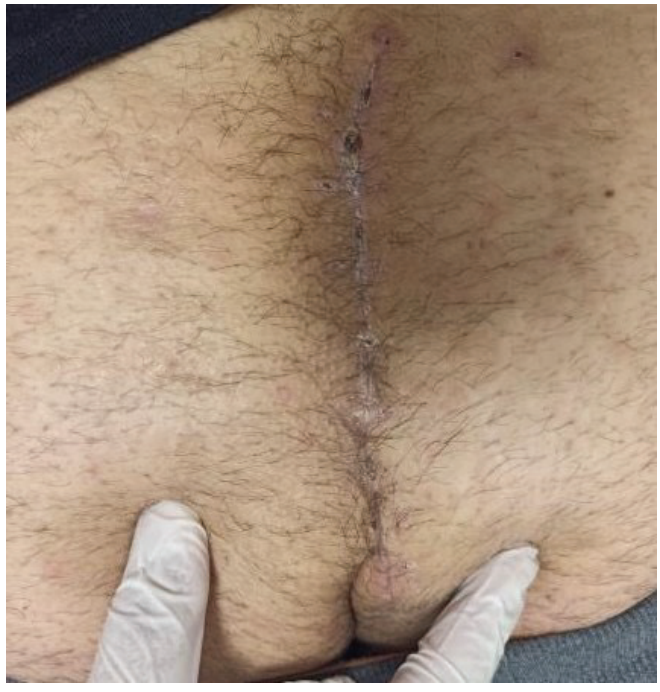

**Figure 2.** Photograph of the same patient after karydakis operation

the procedure, the surrounding skin tissue was protected with an antibiotic cream (Furacin® Eczacıbaşı İla. San. ve Tic. A.Ş., İstanbul, Turkey) against the caustic and irritant effects of undiluted, pure crystallized phenol. Debris and hairs in the sinus were completely removed. Crystallized phenol (BotaFarma İlaç Medikal Itriyat Kimya San. Tic. Ltd. Sti., Ankara, Turkey) was applied into the pilonidal sinus pouch with the same mosquito clamp. The irritant effect of crystallized phenol, which turned into liquid form at body temperature, was utilized. Approximately 3-5 grams of crystallized phenol was applied to each sinus opening[6,9]. The patients were advised to return to work rather than to rest. They were also advised to bathe whenever they wanted after a single dressing 24 hours later. The patients were followed-up and examined at three-week intervals. At the end of the 3-week follow-up, those with completely closed sinuses and no leakage were considered to be cured, while crystallized phenol session was repeated in the same way if the openings were not completely closed and leakage continued. Patients were stratified into those having crystallized phenol (group 1) or those undergoing surgery (group 2).

A visual analog scale (VAS) was used to evaluate the general health status of the patients, and the patients were asked to evaluate their general health on a vertical, unnumbered scale. Afterwards, their evaluations were graded with the help of a scale divided into 1/10 divisions of the same length as the scale: "0: no pain and 10: unbearable pain." This information was obtained from the "Satisfaction" section of the patient files and from outpatient records.

Both methods were compared in terms of patient gender, age, complaints and duration of complaints in the preoperative period and wound infection, length of hospital stay, recurrence and time to return to work in the post-operative period.

Recurrence time was accepted as the first time of admission to the hospital for similar reasons after the first surgery of the patients. Regarding treatment-recovery time, the time until the symptoms ended and the sinus openings were closed was calculated in the phenol group, while the time from the date of surgery to the time when the sutures were removed and the wound healed was calculated in the surgery group. The computer record of the last admission to the hospital for post-operative examination was used to calculate the follow-up period. The time between the procedure and last admission was calculated.

Complications included skin burn associated with phenol treatment, seroma and wound dehiscence associated with surgery, and abscess associated with either method. Recurrent patients were determined by the recurrence of their complaints after a disease-free period of at least 3 months.

### Statistical Analysis

Statistical Package for Social Science for Windows, version 24.0, was used for statistical comparison (IBM Inc., Armonk, NY, USA). Percentage and frequency analysis were used for the variables of treatment method, gender, recurrence site, presence of complications, and presence of recurrence, and mean and standard deviation values were calculated for the variables of age, recurrence time, treatment-recovery time and follow-up period.

The Independent samples t-test was used to examine the differences in age, recurrence time, treatment-recovery time and follow-up period values of the patients in terms of treatment method applied. In addition, the chi-square independence analysis was applied to examine whether treatment methods were correlated with gender, recurrence site, presence of complications and presence of recurrence. The results were analyzed at the 99% ($p<0.01$) and 95% ($p<0.05$) confidence levels.

## Results

A total of 38 patients were included in the study. In the whole cohort, the mean age was 25.9±4.51 years (range: 19-36 years) and 31 (81.6%) were male and 7 (18.4%) were female. The recurrence site was at the incision line in 29 (76.3%) patients and lateral in 9 (23.7%) patients. Twenty-one (53.3%) underwent surgery and were included in group 2 and 17 (44.7%) were treated with crystallized phenol and constituted group 1. There was no statistically significant difference between the two groups in terms of gender, age and recurrence site.

The mean age was 26.05±4.46 years in group 1 and 25.61±4.65 years in group 2. The mean recurrence time after the first surgery was 18.76±11.65 months in group 1 and 17.38±8.24 months in group 2. There was no statistically significant difference between the groups in terms of mean age and recurrence time after the first surgery. However, when the groups were evaluated in terms of treatment applied, the mean treatment-recovery time was 40.7±28.45 days in group 1, while it was 15.61±12.94 days in the surgery group. The mean treatment-recovery time was significantly shorter in the surgery group, which was statistically significant ($p<0.05$). Both groups had similar follow-up periods, and there was no statistically significant difference in terms of follow-up period (Table 1).

In group 1, 3 (17.7%) patients developed complications which were skin burn (n=2) (11.8%) and abscess (n=1) (5.9%). In group 2 4 (19.04%) patients developed complications, including abscess (n=2) (9.5%), seroma (n=2) (9.5%) and wound dehiscence (n=1) (4.76%). Recurrence occurred in 3 (17.6%) in group 1 and one (4.76%) patient in group 2, thus

significantly fewer patients undergoing surgical treatment experienced recurrence ($p<0.05$) (Table 1).

## Discussion

There are many different methods employed in the treatment of PSD. Surgical excision of the sinus, primary closure, open healing and various flap techniques are the leading methods.[10] Some less invasive treatments have recently been used with crystallized phenol being foremost.[11] The main problem in surgical and less invasive methods is the frequent recurrence of this disease and aesthetic problems that may occur.[12] Although some characteristics of the patient, including gender, obesity, and disease complexity seem to have an effect in the development of recurrence, there are studies indicating that the main problem is due to the treatment applied.[13,14] In the current study, both groups showed similar characteristics. Therefore, there was no statistically significant difference between the two groups in terms of recurrence of the disease.

The main problem in the disease is recurrence and some aesthetic problems that occur after repeated surgical interventions during the treatment of these recurrences.[15] Although these surgical procedures have a high success rate in treating recurrent disease, some more non-invasive procedures are required. Methods such as laser hair removal and crystallized phenol are the leading procedures.[16]

Aygen et al.[8] reported the study with the longest follow-up period of 54.4 months with 36 recurrent pilonidal sinus cases previously undergoing surgical or conservative treatment. These authors concluded that crystallized phenol could be applied in recurrent cases, with a high success rate (91.7%). In our study, the success rate with crystallized phenol was significantly lower than in the surgery group and our success rate was lower compared to other published studies. These differences are probably due to the small sample sizes in this and the study of Aygen et al.[8] (Table 2).

There is a paucity of published evidence about how many sessions and how long crystallized phenol can be applied. In our clinic, a maximum of five sessions were applied at 21-day intervals. We believe that longer applications will considerably extend the treatment period. However, crystallized phenol may be preferred due to its advantages such as being a minimally invasive method, not requiring hospitalization, being applied with local anesthesia and more aesthetic wound healing.

Regarding complications, more minor and more tolerable problems for both the patient and surgeon may be encountered in the crystallized phenol method compared to surgical methods. Along with the side effects of local anesthesia, there are also complications specific to crystallized phenol application. These include mostly local side effects. Exfoliation occurs if the skin is not sufficiently protected during the application. In addition, infection and hematoma can be observed. The exfoliation rate was reported as 8.3% in the literature.[17] Infection and hematoma rates were reported as 8% and 4%, respectively.[18]

In our study, complications developed in three patients in the phenol group and four patients in the surgery group which was statistically similar. Problems such as abscess and wound dehiscence that develop in patients with PSD increase the rate of recurrence in later periods.[19] In our study, the complication rate in the surgery group was higher compared to the literature but this is due to seroma being included as a surgical complication, which was not consistently done in previous studies. Patients who were admitted to the outpatient clinic due to seroma and who underwent repeated aspiration were reasonably considered as experiencing a complication of surgery.

The follow-up period in both our study groups was just over 14 months, which was similar, but considerably shorter than that reported from some other studies. There are studies in the literature suggesting that the follow-up period should be 3 years.[20,21] Even considering only the results of our study, the patients were observed to develop recurrence within an average of 17-19 months after the first surgery. Therefore, our follow-up period is short, which constitutes the most important limitation of the study. It seems reasonable to assume that there would be changes in recurrence rates during longer follow-up periods.

It will not be surprising that the minimally invasive method will prevail when a surgical method and a minimally invasive method are evaluated in terms of VAS, and our study result supports this with VAS scores in group 1 being significantly lower than in the surgical group. Furthermore, studies have reported that phenol treatment improves the quality of life,[18] but we did not assess this aspect of treatment.

## Conclusion

Different surgical flap techniques are still the most valid method in the treatment of recurrent PSD. However, the disease may recur after this. Therefore, crystallized phenol application may be one of the alternative treatment methods since crystallized phenol is cheap, can be applied in outpatient settings, is more aesthetically successful, can be applied multiple times and has advantages such as being a less invasive method. It can be applied safely in selected suitable patients and can be chosen as an alternative treatment to surgical methods. For example, crystallized phenol is unlikely to affect the patient in Figure 1. Therefore, crystallized phenol may be more effective when applied in

**Table 1.** Demographic data, treatment and follow-up periods of patients

| | | Group 1 (phenol) (n=17) | Group 2 (surgery) (n=21) | p |
|---|---|---|---|---|
| Age | | 26.05±4.46 | 25.61±4.65 | 0.77 |
| Female/male | | 4/13 | 3/18 | 0.465 |
| Recurrence time after the first surgery (months) | | 18.76±11.65 | 17.38±8.24 | 0.671 |
| Procedure time (minute) | | 13.0±4.2 | 40.0±15.2 | **0.018** |
| Total treatment time (days) | | 40.7±28.45 | 20.33±24.05 | **0.022** |
| Length of hospital stay (days) | | 0.0 | 1.40±0.9 | **<0.001** |
| VAS | VAS (12 hours) | 1.8±1.4 | 4.2±1.1 | **0.006** |
| | VAS (24 hours) | 1.4±1.5 | (3.4±2.4) | |
| | VAS (48 hours) | 0.8±1.2 | 2.0±1.8 | |
| Complication, n (%) | | 3 (17.7) | 4 (19.04) | 0.295 |
| Follow-up period (months) | | 14.11±6.2 | 14.57±3.9 | 0.786 |
| Recurrence, n (%) | | 3 (17.7) | 1 (4.8) | **0.034** |

VAS: Visual analog scale

**Table 2.** Studies in the literature on recurrent cases treated with crystalline phenol

| | Age | Gender, (female/male) | Follow-up period (mean/month) | Complication | Single/multiple applications | Cure |
|---|---|---|---|---|---|---|
| Bayhan et al.[22] | 25±4.7 | 5/21 | 12.1 | 4 wound infection | 19/7 | 92.3% |
| Yüksel[23] | 29.2±5.2 | 10/28 | 6 | - | 38/0 | 52.63% |
| Aygen et al.[8] | 28.9 | 33/3 | 54.4 | 3 exfoliation | | 91.7% |
| Akici and Çilekar[24] | 24.4±5.3 | 5/27 | 13.1 | 3 wound infection | 22/10 | 90.7% |
| Kutluer et al. | 26.05±4.46 | 4/13 | 14.1 | 2 exfoliation<br>1 abscess | 10/7 | 82.4% |

selected cases. However, based on the results of our study, surgical methods are superior in recurrent cases.

### Ethics

**Ethics Committee Approval:** This study was approved by the Institutional Review Board of Adana City Training and Research Hospital Clinical Research Ethics Committee (approval number: 25.03.2020/53/776).

**Informed Consent:** The patients were informed of the procedures and consents were obtained prior to the procedure.

**Peer-review:** Externally peer-reviewed.

### Authorship Contributions

Surgical and Medical Practices: N.K., S.D., F.K., B.Ö., Concept: N.K., S.D., F.K., B.Ö., Design: N.K., S.D., F.K., B.Ö., Data Collection or Processing: N.K., S.D., F.K., B.Ö., Analysis or Interpretation: N.K., S.D., F.K., B.Ö., Literature Search: N.K., S.D., F.K., B.Ö., Writing: N.K., S.D., F.K., B.Ö.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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