

Factors affecting the success of crystallized phenol treatment in sacrococcygeal pilonidal sinus disease

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Abstract

There are 2 mainstays of sacrococcygeal pilonidal disease (SPD) treatment: non-operative and surgical. None of them was superior, and it was associated with some degree of recurrence. Crystallized phenol treatment is a non-operative procedure performed in outpatient settings. This retrospective study aimed to assess crystallized phenol treatment in patients with primary and recurrent SPD and the factors that influence disease recurrence. A total of 92 patients were included and followed up. Crystallized phenol was administered in an outpatient setting under local anesthesia. All demographic, patient, sinus features, procedure and outcome data were recorded and analyzed for treatment success and factors for recurrence were identified. Between January 2019 and December 2021, 92 patients (77 male and 15 female) with a mean age of 28.4 were treated with 1, 2, or 3 doses of crystallized phenol. Recurrence rate after the procedure was 20.7%. Univariate regression analysis showed that the grade of hirsutism, initial presence of abscess, pit number and number of showers per week had statistically significant effect on recurrence. Multivariate logistic regression analysis pointed on the hirsutism grade ($P = .008$) and the number of pit openings ($P = .003$) as statistically significant factors for recurrence. Crystallized phenol application for primary and recurrent SPD is safe, inexpensive and efficient non-operative method with few minor complications, even when is repeated. Factors responsible for the recurrence of the procedure are grade of hirsutism and sinus pit number.

Abbreviation: SPD = sacrococcygeal pilonidal disease.

Keywords: crystallized phenol, pilonidal disease, recurrence, sacrococcygeal, treatment

1. Introduction

The sacrococcygeal pilonidal disease (SPD) is currently considered to be an acquired disease closely related to the presence of hair in the gluteal cleft despite its early description as congenital.^[1] The term pilonidal is derived from the terms: pilus (hair) and nidus (nest). The name “pilonidal disease” is attached to R.M. Hodges (1880), while Mayo described the disease for the first time in 1833. The condition was common among U.S. soldiers as the “Jeep disease.”^[2]

The etiology of the disease is unclear. Different hypotheses were proposed. According to Karydakos, 3 main factors responsible for the etiologic process are: the hair (foreign body), the force that causes hair deposition in the sinus and the skin vulnerability.^[3]

Treating SPD is challenging due to its recurrence. Two mainstays of its treatment are nonoperative therapy/nonoperative adjuncts and operative management. The Clinical Practice Guidelines for the Management of Pilonidal Disease of the American Society of Colon and Rectal Surgeons advise elimination of hair in the affected area (the gluteal cleft and the surrounding skin) as an adjunct treatment in active disease and at the same time, to be a

preventative tool in recurrence avoidance and abscess formation. Even in the presence of acute pilonidal disease (formed abscess), incision and drainage is recommended to be followed by shaving along the intergluteal fold and surrounding area.^[4]

Another nonoperative procedure feasible in an outpatient setting is the application of phenol into the cyst and tracts. The use of pure liquid phenol was first described by Maurice in 1964.^[5] Alternative variant of phenol treatment is described by the use of crystallized phenol.^[6] Since then, several studies have shown the high success rate of the method. The reported therapeutic success was achieved in over 86% of the cases.^[7-9]

The aim of this study was to evaluate the success rate of crystallized phenol treatment of SPD and to point out the factors that lead to recurrence.

2. Methods

2.1. Patients

In this retrospective cohort study conducted in the period between January 2019 and December 2021, 108 patients

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

The study was approved by the local ethics committee of the clinic, No. E-48670771-514.99.

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were treated with crystallized phenol application due to primary and recurrent SPD in ambulatory setup. All of the treated patients preferred crystallized phenol administration instead of the offered operative procedures as an alternative. Patients who did not show on the scheduled post procedural checkup were excluded from the study. Demographic and lifestyle data (age, gender, grade of hirsutism, daily sitting hours, number of showers per week), pilonidal sinus characteristics (primary or recurrent, presence of abscess at initial presentation, sinus pit number), procedure data (duration of the procedure, local anesthetic dose) and cases of post procedural recurrence and complications were analyzed. In terms of factors influencing recurrence, additional statistical analysis was conducted.

Modified Ferriman and Gallwey visual scoring scale for hirsutism evaluation was used.^[10] Patients' data on weekly showers was collected and defined as follows: 1 time, 2 times and ≥ 3 times of shower per week. Due to the data for duration of sitting hours, 3 categories were given: <4 hours/day, 4 to 8 hours/day and ≥ 8 hours of daily sitting.

Patients were advised to go to work the next day after the procedure and for a regular local hygiene (regular hair removal with depilatory cream or shaving twice per month) of the diseased area. They were scheduled for the first checkup within 1 month after the phenol installation. If necessary, 1 month after the first application, a second dose of crystallized phenol was used (in 25 patients). Third time application was performed in 5 patients at day 45. If the sinus opening was closed at the first visit, we accepted as it was healed. In case of open sinus persistence, a second dose of crystallized phenol was installed. Third dose was administered in cases where the second dose was without effect.

2.2. Procedure

All the procedures were performed by 2 surgeons in ambulatory settings with local anesthesia by using 2% Lidocaine. Patients were set in a prone position. Dilation and enlargement of the sinus openings was done with a curved clamp without additional skin incision. Hair removal from the sinus cavity followed. The sinus tracts were washed with saline if an abscess was present. Then, the sinus cavity and tracts were filled with crystallized phenol. In case of bleeding, additional local compression was applied and a compressive wound bandage was used. In case of acute disease presentation (abscess during the procedure), oral antibiotic (Cephalosporin II generation) and anti-inflammatory drug (non-steroidal anti-inflammatory drug) were prescribed in duration of 10 days.

Patients were considered cured if no clinical signs of recurrence were present at control checkup and they were completely free of symptoms.

2.3. Statistical analysis

IBM SPSS, version 25 (IBM Corp., Armonk, NY) was used for statistical analysis. Variable distribution normality was tested with Kolomogorov-Smirnof test. Univariate regression analysis of the independent variables and their influence on dependent variable (recurrence) was used. Chi-square test was used for 2 categorical variables comparison. Recurrence in cases of unbalanced samples was additionally tested with Welch test. Logistic regression analysis was conducted for multivariate analysis on recurrence factors. P value of $<.05$ was considered significant.

2.4. Ethics statement

The study was approved by the local ethics committee of the clinic.

3. Results

Of 108 patients treated, 16 of them were not available for scheduled post procedural checkup and were excluded from the analysis. A total number of 92 (77 male and 15 female) patients were included and followed up completely. Among them, 77 were male, and the rest 15 were female patients. Age range was between 15 and 56 years. All patients presented with a grade of hirsutism 1, 2 or 3 according to the Modified Ferriman and Gallwey visual scoring scale. The number of hours spent in sitting was not statistically significant among the 3 categories. Predominant number of patients presented with 1 sinus pit opening (44.5%). Two pit openings were noted in 24 (26.1%), 3 in 26 (28.3%) and 4 openings in 1 patient (1.1%). Average procedure time was 8.34 minutes and average amount of local anesthetic dosage was 7.7 cubic centimeters. Post-procedural complication occurred in 3 patients (3.3%) Two of them experienced skin burns due to phenol effect and one had local wound infection. All demographic, patient, sinus features and procedure data are shown in Table 1.

Univariate regression analysis of the independent demographic, patient and sinus variables showed that the grade of hirsutism, the initial presence of abscess, sinus pit number and number of showers per week had a statistically significant effect on the recurrence. Recurrence was confirmed in 19 patients with a recurrence rate of 20.7%. Recurrence occurred in 9 patients with grade 2 and in 10 patients with grade 3 hirsutism which was statistically significant ($P < .001$). Of 87 patients presented with primary SPD, recurrence occurred in 17 of them, while the rest 2 cases of recurrence were noted in patients presented at the beginning as recurrent SPD. Among 62 patients presented without abscess, the disease recurred in 8. Eleven recurrences showed in 30 patients in SPD with initial presentation of abscess ($P = .008$). In terms of gender influence on the recurrence, there was no statistical significance. Thirteen male and 6 female patients experienced recurrence. Number of showers per week and sinus pit number influenced significantly on the recurrent SPD after crystallized phenol application. Patients with 3 or more pit openings were predominant among the ones with recurrence. The initial analysis of the gender and the sinus presentation (primary or recurrent) with the Chi-square test revealed P value on the border of statistical significance due to the existence of unbalanced samples. Therefore, an additional Welch test was conducted giving values for both variables without statistical significance ($P = .11$ and $P = .45$, respectively). The sitting time also showed no significant effect on recurrence of the disease (Table 2).

To test the independent variables effect on the recurrence (dependable variable) in 1 model, multivariate logistic regression analysis was conducted. The analysis proved that factors associated with recurrence are hirsutism grade and the number of pit openings ($P = .008$, $P = .003$, respectively). On the other hand, gender, number of sitting hours and the initial presence of abscess did not have significant effect on SPD recurrence (Table 3).

The group of patients ($n = 19$) that experienced recurrence was not uniformly treated. Six of them accepted appropriate surgical treatment and the rest 13 did not want to be subjected to any other type of treatment. Even still having some discharge from the sinus, they declared that it is not worsening their quality of life.

4. Discussion

Phenol is an antiseptic, sclerosing and caustic chemical agent with local anesthetic effect. It exists in forms of liquid, gel and solid crystal. The crystal form melts in body temperature after its application. Due to its denaturation properties, the cell membranes and the cellular proteins are dissolved.^[11]

Table 1
Demographic, patient, sinus features and procedure data of 92 patients treated with crystallized phenol for SPD.

Variable	All patients
Total number of patients	92
Age, mean	28.4 (15–56)
Gender	
Male	77
Female	15
Modified Ferriman and Gallwey visual scoring scale	
1	31
2	40
3	21
Number of showers per wk	
<3	13
≥3	79
Daily sitting h	
<4	37
4–8	41
≥8	14
Average procedure duration (min)	8.34
Average dose of local anesthetic used (cc)	7.7
Primary sinus	87
Recurrent sinus	5
Presence of abscess at presentation	
No	62
Yes	30
Number of pit openings	
1	41
2	24
3	26
4	1
Recurrence	19
Complications	3
Healed	73

Values are given as number and range (in brackets).
 cc = cubic centimeter, min. = minutes, SPD = sacrococcygeal pilonidal disease.

The Clinical Practice Guidelines for the Management of Pilonidal Disease, strongly recommend the application of

crystallized phenol into the sinus cyst and the additional tracts in outpatient setup under local anesthesia. This type of nonoperative treatment offers minor complications (skin burns and local infection), resolution of the disease of 67% to 100% and recurrence rate ≤20%.^[4]

Doll reports increasing rates of interest both in surgical and scientific activity on the pilonidal disease overall, especially in the Mediterranean region. In the period between the years of 1833 and 2018, Turkey and Italy contributed the most of the knowledge on pilonidal sinus disease with 64.3% of the reported Mediterranean patients and 30.7% of the patients worldwide.^[12]

First series on crystallized phenol treatment for SPD was published in 2004 by Doğru. He treated the patients in ambulatory setup with immediate discharge and advised them to return to daily activity the same day after the procedure and had their first follow-up a week later. Recurrence was reported in 2 (4.84%) patients.^[6] Aygen reports recurrence in 5 (13.9%) out of 36 patients treated with 1 course of crystallized phenol. The second application in 2 of the patients with recurrence resulted in complete healing. Therefore, the overall success was reported to be 91.7%.^[13] Girgin accents the importance of laser depilation usage as an addition to the crystallized phenol application. In his series conducted on 42 patients, the repeated use of laser depilation (6–8 sessions per patient) resulted without recurrence during the follow-up period (mean: 24 months).^[14] In his comparative retrospective study, Bayhan reports recurrence rate of 18.9% in crystallized phenol application when compared to modified Limberg flap reconstruction (recurrence rate of 6.8%) but without statistical significance.^[15] Sozuer applies crystallized phenol on 209 patients with a recovery rate of 93.7% after 12 months follow-up.^[16]

According to present theories, retained hair is the main primary cause of recurrence.^[17] It is assumed that the presence of free hair and/or the hair follicles in the critical area are responsible for the development of sinus cavity.^[18,19] In general, hair removal after any kind of pilonidal sinus treatment is important in the recurrence prevention.^[20–22]

To our knowledge, very few articles are present in the literature addressing the factors responsible for recurrence after crystallized

Table 2
Univariate analysis of demographic, patient and sinus variables as independent factors that influence on recurrence.

Variable	Non recurrent	Recurrent	P value
Gender			
Male	64	13	.11
Female	9	6	
Hirsutism grade			
1	31	0	<.001
2	31	9	
3	11	10	
Primary/recurrent			
Primary	70	17	.45
Recurrent	3	2	
Abscess			
No	54	8	.008
Yes	19	11	
Pit number			
1		1	<.001
2		2	
≥3		15	
Sitting time			
<4 h	34	4	.09
4–8 h	30	10	
≥8 h	9	5	
Shower number			
<3 times/wk	5	8	<.001
≥3 times/wk	68	11	

Table 3
Multivariate logistic regression analysis for independent factors determination on the recurrence of sacrococcygeal pilonidal disease.

Factors	B	S.E.	Wald	P value	Exp(B)	95% C.I. ^a for EXP(B)	
						Lower	Upper
Shower number	-2.043	0.911	5.026	.02	0.130	0.022	0.773
Hirsutismus grade	2.051	0.777	6.973	.008	7.778	1.697	35.657
Pit number	1.861	0.620	9.000	.003	6.433	1.907	21.705
Sitting time	-.136	0.584	0.054	.81	0.873	0.278	2.741
Abcess	-.476	0.846	0.317	.57	0.621	0.118	3.263
Primary/recurrence	-.894	1.333	0.450	.50	0.409	0.030	5.578
Gender	-1.737	0.994	3.057	.08	0.176	0.025	1.234
Constant	-1.521	3.116	0.238	.62	0.219		

C.I. = confidence interval, S.E. = standard error.

phenol treatment. Dag et al report that history of abscess drainage and more than 3 sinus openings are significant factors for higher risk of treatment failure.^[23] The series of Kaymakçioğlu et al conducted on 143 patients treated with phenol injection determined that the number of sinus openings and the volume of the sinus itself are significant factors affecting recurrences in the mean follow-up period of 24 months.^[24] In this study, the grade of hirsutism and pit number affected significantly on the recurrence of SPD.

Regarding the recurrence of the SPD after initial treatment with crystallized phenol, repeated applications may also be performed in outpatient settings. Another successful ambulatory alternative for SPD recurrence that offers fast recovery is the endoscopic pilonidal sinus treatment. According to Meinreo et al, it is performed under local anesthesia, and it offers high success rate and low morbidity.^[25]

Most of the reported series on recurrence have reported relatively short follow-up periods. According to Doll, the recurrence rate may rise within the next few years. Therefore, he encourages long-term reports on recurrence and points 5- and 10-year recurrence rate to be the gold standard for results evaluation.^[26]

Limitations are present in this study. Firstly, it is a single center retrospective study. Secondly, the examined sample size is moderate when compared to other published studies on SPD. Finally, the follow-up period is relatively short.

5. Conclusion

Crystallized phenol application as non-operative treatment of SPD is simple, inexpensive, short and efficient outpatient procedure with few minor complications. It offers the patient immediate chance for returning to regular daily activities. Even the repeated application for the second and third time (when needed) is as simple and safe as the first one. The success rate of the procedure in terms of healing of the pilonidal sinus is high. Factors that affect the success of the procedure are the grade of hirsutism and pit number. They are certainly diminishing the efficiency of the procedure without the possibility to be influenced on.

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