Research Article / Araştırma Makalesi

Comparison of 3 Different Techniques in the Treatment of Pilonidal Sinus

Pilonidal Sinüs Tedavisinde 3 Farklı Tekniğin Karşılaştırılması

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Abstract

Background: Pilonidal sinus (Ps) is an infectious disease characterized by pain, swelling, redness and discharge. Minimally invasive interventions that allow the patient to return to daily life more easily. In this study, it was aimed to compare the surgical excision and primary suturing, liquid phenol application and laser application in Ps treatment.
Materials and Methods: The files of 358 patients diagnosed with Ps and operated in the years 2019-2022 were retrospectively evaluated. The patients were divided into 3 groups. Group 1 consisted of 125 patients who underwent surgical excision and primary suturing in 2019, group 2 of 194 patients who underwent liquid phenol in 2020-2021, and group 3 of 39 patients who underwent laser in 2022. The patients were evaluated at the postoperative 7th day, 1st month and 3rd month outpatient policlinic control.
Results: A significant correlation was found between the groups and the development of infection ($p<0.05$). Infection was detected in 30.4% of those in group 1, 15.5% of those in group 2 and 10.3% of those in group 3. Recurrence was detected in 25 (20%) in group 1, 24 (12.2%) in group 2, and 3 (7.7%) in group 3. However, no significant relationship was found between the groups and recurrence ($p>0.05$). Recurrence was observed in 14 (36.8%) of 38 patients with infection in group 1, 18 (60%) of 30 patients with infection in group 2, and 2 (50%) of 4 patients with infection in group 3. A significant relationship was found between infection and recurrence ($p<0.05$). Recurrence is positive in 6.3% of infection-negative patients and 47.2% of infection-positive patients. The mean hospital stay was 1.7 ± 1.16 days for surgical excision and 1±0 days for those who received liquid phenol, while it was 1±0 day for patients who had laser treatment. The lenght of stay rate of group 1 was found to be significantly higher than groups 2 and 3 ($p<0.05$).
Conclusions: Rapid recovery, short operative time, low complication and recurrence rates have increased the tendency for minimally invasive methods. Liquid phenol application and laser application may be preferred over surgical excision and primary suturing in terms of shorter hospital stay and rapid recovery. The presence of infection may cause recurrence regardless of the surgical method used in the treatment. Postoperative infection follow-up of patients is important to reduce recurrence rates.

Key Words: Pilonidal sinus, child, Laser, Phenol

Öz

Amaç: Pilonidal sinüs (Ps) ağrı, şişlik, kızarıklık ve akıntı ile karakterize enfeksiyöz ve inflamatuar bir hastalıktır. Tedavide hastanın günlük yaşamına daha kolay geri dönmesini sağlayan minimal invaziv girişimler popülerdir. Bu çalışmada bir cerrahın pediatrik hastalarda dönemsel tercih ettiği cerrahi eksizyon ve primer sütürasyon, sıvı fenol uygulaması ve lazer uygulamasının postoperatif takipleri, enfeksiyon ve nüks oranları açısından karşılaştırılması amaçlandı.
Materyal ve Metod: 2019-2022 yıllarında Ps tanısı alıp opere edilen toplam 358 hastanın dosyaları geriye dönük tarandı. Hastalar uygulanan cerrahi müdaheleye göre 3 gruba ayrıldı. 2019 yılında cerrahi eksizyon ve primer sütürasyon yapılan 125 hasta grup 1, 2020-2021 yılında sıvı fenol uygulanan 194 hasta grup 2, 2022 yılında lazer uygulanan 39 hasta ise grup 3' ü oluşturdu. Hastalar postoperatif 7. gün, 1. ay ve 3. ay poliklinik kontrolünde değerlendirildi.
Bulgular: Gruplar ile enfeksiyon gelişimi arasında anlamlı bir ilişki bulundu ($p<0,05$). Grup 1' de olanların %30.4'ünde, grup 2' de olanların %15,5'inde ve grup 3' te olanların %10,3' ünde enfeksiyon saptandı. Ek olarak, grup 1' deki hastaların 25 (%20)' inde, grup 2' deki hastaların 24 (%12.2)' ünde, grup 3' deki hastaların ise 3 (%7.7)' ünde nüks saptandı. Ancak, gruplar ile nüks arasında anlamlı bir ilişki bulunmadı ($p>0,05$). Grup 1' de enfeksiyon saptanan 38 hastanın 14 (%36.8)' ünde, grup 2' de 30 hastanın 18 (%60)' inde, grup 3' de ise 4 hastanın 2 (%50)' sinde nüks görüldü. Enfeksiyon ile nüks arasında anlamlı bir ilişki saptandı ($p<0,05$). Enfeksiyon negatif olanların %6,3' ünde, enfeksiyon pozitif olanların %47,2' sinde nüks pozitiftir. Ortalama hastanede kalış süresi cerrahi eksizyon grubunda 1,7 ± 1,16 gün, sıvı fenol uygulanan hastalarda 1±0 gün, lazer tedavisi uygulananlar da ise 1±0 gün idi. Grup 1'in yatış süresi grup 2 ve 3'e göre anlamlı olarak yüksek bulundu ($p<0,05$).
Sonuç: Hızlı iyileşme, ameliyat süresinin kısalığı, komplikasyon ve nüks oranlarının az olması minimal invaziv yöntemlere eğilimi arttırmıştır. Sıvı fenol uygulaması ve lazer uygulaması daha az hastanede yatış süresi ve hızlı iyileşme sağlanması açısından cerrahi eksizyon ve primer sütürasyona göre daha tercih edilebilir. Enfeksiyon varlığı nüks açısından tedavide kullanılan cerrahi yöntemden bağımsız olarak nüks oluşumuna neden olabilir. Nüks oranlarını düşürmek için hastaların postoperatif enfeksiyon takipleri önemlidir.

Anahtar Kelimeler: Pilonidal sinüs, Çocuk, Lazer, Fenol

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Introduction

Pilonidal sinus (Ps) is an infectious and inflammatory disease which occurs in the sacrococcygeal area, known to cause pain, swelling, rash, and defluxion. Furthermore, it affects men 3 times more than women (1). Among the factors blamed in its etiology are obesity, poor hygiene, excessive hairiness, sitting for a long time and genetic predisposition (2).

Many forms of treatment have been described for Ps. These include surgical excision, flap techniques, chemical injections, endoscopic approaches and laser application (3,4). Today, there is a trend towards minimally invasive interventions such as chemical injections, endoscopic interventions and laser applications that allow the patient to return to his daily life more easily, rather than surgical excision and flap methods, which require a long recovery period and require postoperative care (5,6). Gold standard treatment has not been defined. There is no clear consensus on which treatment option will be determined according to which criteria for which patient (6). In this study, it was aimed to compare the surgical excision and primary suture, liquid phenol application and laser application that a surgeon prefers periodically in pediatric patients in terms of postoperative follow-up, infection and recurrence rates.

Materials and Methods

The files of a total of 358 adolescent patients who were diagnosed with Ps and operated between January 2019 and April 2022 were reviewed retrospectively. A total of 399 surgical interventions were performed on 358 patients. The patients were divided into 3 groups according to the surgical intervention method applied according to the years. Group 1 consisted of 125 patients who underwent surgical excision and primary suturing in 2019, group 2 of 194 patients who underwent liquid phenol in 2020-2021, and group 3 of 39 patients who underwent laser in 2022. The groups were evaluated in terms of demographic data, length of hospital stay, postoperative follow-up, infection and recurrence rates. Diagnosis, surgical intervention and follow-up of all patients were performed by the same surgeon. Recurrence was defined as abscess, infection or pain lasting for 3 months, while infection was defined as a foul-smelling discharge, redness and pain at the incision site. Postoperative wound closure, absence of infection and pain findings were considered complete success. Oral antibiotics were started in all patients with preoperative signs of infection. The patients underwent surgery after the signs of infection completely regressed. Patients who had been operated by different surgeons for Ps before the study dates were not included in the study. All patients were advised to remove hair from the Ps area on the morning of surgery. Patients who underwent surgical excision and primary suturing were given intravenous antibiotics preoperatively and during the hospitalization, while a single preoperative dose of intravenous antibiotic was administered to the phenol and laser group. The patients who underwent surgical excision were discharged with oral antibiotics and paracetamol, and the patients who were treated with phenol and laser were discharged with only oral paracetamol.

The patients were evaluated at the postoperative 7th day, 1st month and 3rd month outpatient policlinic control. Patients who did not come to the outpatient policlinic control were not included in the study group. The wound sites of the patients were evaluated in terms of infection and recurrence.

In 2019, surgical excision and primary suture were applied to all patients, regardless of patient or disease. In 2020 and 2021, only liquid phenol was administered to all patients, regardless of the number of sinus openings of Ps, the size of the cavity and the patient. In the first three months of 2022, only laser application was applied to all patients. Since all the applications were performed by the same surgeon, the interventions were made to the same standard for the patients in the same group. Secondary or tertiary surgeries performed on patients with recurrence were performed with the surgical technique adopted by the surgeon at that time.

All of the interventional procedure was standardized for each patient. While the patients were lying in the prone position, after local anesthesia, the hairs and foreign bodies in the cavity were removed by entering the region with a clamp one by one from each sinus mouth. If there were sinus mouths close to each other, the mouths were joined with the help of clamps (Figure 1). Before the laser application, the sinus walls were brushed by entering with a brush specially produced for the procedure, and bleeding of the cavity floor and walls was ensured. Then, the radial optical fiber laser was inserted into the cavity or cavities one by one and applied with 6 W energy, starting from the cavity floor. As it was felt that the cavity walls were sticking together at the base, the skin surface was reached (Figure 2). A total of 90 J energy was applied for each centimeter of sinus tract. The failure of the optical fiber laser to re-enter the sinus opening, and the adhesion of the tissues to each other was accepted as an indication that the procedure was adequate. After the operation area was wiped with povidone iodine, it was covered with gauze. The patients were discharged 2 hours after the procedure.

All procedures performed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1964 and later versions. This study was approved by the Harran University, Clinical Research Ethics Committee (approval number 2022/11-07) and written informed consent for surgery was obtained from all patients.

Statistical Analysis

Statistical analysis was performed using the IBM SPSS Statistics for Windows, Version 21.0. (Armonk, NY: IBM Corp.) The demographic and clinical characteristics of the patients were analyzed descriptively. The values of kurtosis and

skewness obtained for age were found to be between +3 and -3 for normal distribution. Accordingly, the difference in age according to the group was analyzed with the ANOVA test. The relationship between categorical variables was analyzed with the chi-square test. A p-value of less than 0.05 was considered as significant.

Figure 1. Preparation of the sinus openings with clamps before laser application

Figure 2. Demonstration of laser application

Results

Of the 358 patients who were operated for Ps in 2019-2022, 235 (65.6%) were male and 123 (34.4%) were female. The number of patients who underwent surgical excision and primary suturing in 2019 was 125 (34.9%). The number of patients who received liquid phenol in 2020 and 2021 was 194 (54.1%). The number of patients who underwent laser treatment in the first 3 months of 2022 was 39 (10.8%). Age showed a significant difference among the groups (p<0.05). The mean age of those in group 1 was 15.10±1.43, those in group 2 were 16.27±1.47 and those in group 3 was 16.51±1.57. Accordingly, while the average age of those in group 3 is the highest, the average of those in group 1 is the lowest.

The mean hospital stay was 1.7 ± 1.16 days for surgical excision while it was 1±0 days for those who received liquid phenol, and it was 1±0 day for patients who had laser treatment. Length of stay was significantly different among the groups (p<0.05). Also, while 60.0% of those in group 1 had two day hospital stay, 96.4% of those in group 2 and all of those in group 3 had one day hospital stay. The lenght of stay rate of group 1 was found to be significantly higher than groups 2 and 3 in the subgroup analysis (p<0.05).

There was a significant relationship between the groups and infection (p<0.05). Infection was found in 30.4% of those in group 1, 15.5% of those in group 2, and 10.3% of those in group 3. The infection rate of group 1 was found to be significantly higher than groups 2 and 3 in the subgroup analysis (p<0.05). Oral antibiotics of the patients in the surgical excision group were extended for 1 more week after surgery, while a single preoperative dose of intravenous antibiotic was administered to the phenol and laser group and were discharged with only oral paracetamol. There was no patient whose infection findings did not regress in the postoperative 2nd week policlinic controls.

Recurrence was detected in 25 (20%) patients in group 1. Patients with recurrence at least 3 months after the first operation were operated again. A second surgical excision and primary suturing was performed in 13 of 25 patients, while liquid phenol was applied in 12 of them in their secondary surgery. Liquid phenol was applied in the secondary operations of the 12 patients who underwent liquid phenol application, as the surgeon preferred only liquid phenol application during the period of recurrence. Liquid phenol was applied to 2 patients who underwent surgical excision 2 times and still recurrenced, since the surgeon applied liquid phenol at that time. No recurrence was detected in the follow-ups. Secondary surgery rate of group 1 was found to be significantly higher than groups 2 and 3 in the subgroup analysis (p<0.05). Recurrence was observed in 24 (12.2%) patients in group 2. Liquid phenol was applied to all of them in the second operation. No recurrence was observed in the follow-ups. In group 3, recurrence was detected in 3 (7.7%) patients. Since the follow-up of the patients was not completed, the secondary surgeries of the patients were not performed. There was no statistically important relationship between the groups and recurrence (p>0.05) (Table 1).

Table 1. Relationship between the group and the gender, infection, recurrence rate, length of stay and secondary surgical intervention

		Group								Chi-square	p
		Group 1		Group 2		Group 3		Total			
		n	%	N	%	n	%	n	%		
Gender	Male	87	69,6	125	64,4	23	59,0	235	65,6	1,763	0,414
	Female	38	30,4	69	35,6	16	41,0	123	34,4		
Infection	Negative	87	69,6	164	84,5	35	89,7	286	79,9	13,201	0,001*
	Positive	38	30,4	30	15,5	4	10,3	72	20,1		
Recurrence	Negative	100	80,0	170	87,6	36	92,3	306	85,5	5,209	0,074
	Positive	25	20,0	24	12,4	3	7,7	52	14,5		
Length of Stay (day)	1,00	44	35,2	187	96,4	39	100,0	270	75,4	167,999	<0,001*
	2,00	75	60,0	7	3,6	0	0,0	82	22,9		
	3,00	4	3,2	0	0,0	0	0,0	4	1,1		
	4,00	2	1,6	0	0,0	0	0,0	2	,6		
2nd Surgery	Phenol	12	48,0	24	100,0	0	0,0	36	73,5	14,424	<0,001*
	Surgical	13	52,0	0	0,0	0	0,0	13	26,5		

**p<0,05*

Recurrence was seen in 14 (36.8%) of 38 patients with infection in group 1, 18 (60%) of 30 patients with infection in group 2, and 2 (50%) of 4 patients with infection in group 3 (Table 1). There was a significant relationship between infection and recurrence (p<0.05). Infection was present in 47.2% of the patients with recurrence and 6.3% had no infection (Table 2). The relationships between infection and recurrence according to groups are summarized in Table 3. 63.2% of the patients who had infection but did not recurrence were in group 1, and 61.1% of the patients who had recurrenced without infection were in group 1. 52.9% of the patients who had infection and recurrence during their follow-up were in group 2, 59.0% of the patients with no infection and no recurrence are in group 2. 5.9% of the group 3 patients also had infection and recurrence. According to the results of the analysis, there was a statistically important relationship between infection and recurrence and the groups (p<0.05).

Table 2. Examining the relationship between infection and recurrence

		Infection				Chi-square	p
		Negative		Positive			
		N	%	n	%		
Recurrence	**Negative**	268	93,7	38	52,8	74,347	<0,001*
	Positive	18	6,3	34	47,2		

**p<0,05*

Table 3. Relationship between infection and recurrence according to groups

		Infection - Recurrence								Chi- square	p
		Infection (+) Recurrence (+)		Infection (+) Recurrence (-)		Infection (-) Recurrence (+)		Infection (-) Recurrence (-)			
		n	%	n	%	n	%	n	%		
Groups	**Group 1**	14	41,2	24	63,2	11	61,1	76	28,4	25,215	<0,001*
	Group 2	18	52,9	12	31,6	6	33,3	158	59,0		
	Group 3	2	5,9	2	5,3	1	5,6	34	12,7		

**p<0,05*

Discussion

Ps is a disease that can lead to loss of workforce, absenteeism from school and alienation from social life (7). The fact that the patient group evaluated in this study is the adolescent age group emphasizes the importance of the choice of the treatment method.

Many treatment modalities such as; open surgical primary suturing, flap shifting, phenol application, endoscopic excision or laser have been described to date (8-10). Among the reasons for the spread of minimally invasive methods that started in the late 1900s are; easy applicability, adequacy of success rates, good cosmetic results, short hospital stay, less postoperative pain, and the fast return to social life (11,12). In the study, the type of surgical intervention has evolved towards minimally invasive over the years. As the surgeon gained experience, one preferred less invasive treatment method. Among the most effective factors in this orientation are; the rapid return of patients to social life, shorter operation time, no difference between less invasive methods in terms of complications and recurrences. There are publications in the literature comparing surgical excision and phenol, surgical excision and laser methods (13,14). What distinguishes the study from other studies in the literature is the comparison of 3 methods performed by the same surgeon.

In the literature, the rate of infection in children after surgical excision and primary suturing is 30%, and 15% in phenol application. In laser application, although there is no study conducted in the pediatric age group, there are publications detecting the infection rate of 9.5% in adult patients (15-17). In this study, infection rates were found similar to the literature. Although the decrease in invasiveness in the treatment is effective in decreasing the infection rate, intravenous antibiotic administration to all patients regardless of the treatment method may have decreased the incidence of infection in minimally invasive methods compared to surgical excision. The necessity of postoperative dressing in surgical excision, the need for suture removal and the longer recovery period, and the delay of the patient's wound care due to this may be effective in the high rate of infection.

Recurrence is quite common after Ps surgery. In the literature, recurrence has been reported in approximately 25% after surgical excision and approximately 10% after phenol and laser application (3,13). In the study of Ufuk and colleagues (18) in which they compared the recurrence rates in surgical excision and phenol application, although the recurrence rate was significantly lower in phenol application, in our study, no significant difference was found between surgical excision and phenol application, and also between phenol application and laser application in terms of recurrence rates. The fact that the number of patients in the study is higher than the publications in the literature, the applications are performed by the same surgeon, the number of sinus openings, the application of the same surgical procedure to each patient periodically, regardless of the width of the cavity, are the positive aspects of this study. The application of the same operation to every patient diagnosed with Ps periodically contributes to the literature in terms of allowing the comparison of the 3 techniques regardless of the patient, disease and surgeon variables.

Body mass index, hygienic conditions, hair removal of the area and treatment modalities were mostly evaluated in cases of recurrence after ps surgery (19,20). The effect of postoperative infection on recurrence is unknown. Since the body mass index of the patients, which is also a limitation of the study, is not known, it is difficult to say the effect of infection on recurrence (21). However, as it was determined in the study, the higher rate of recurrence, independent of the treatment method applied in patients with infection, suggests that the infection alone is significant in terms of susceptibility to recurrence. When we examine the treatment methods one by one, The use of antibiotics on postoperative patients after infection and/or surgical excision lowered chances of recurrence. On the other hand, the fact that the surgical excision group had the highest recurrence rate in the absence of infection among the 3 groups suggests that

the difficulty in postoperative care and prolonged treatment period increase the susceptibility to recurrence. Again, as seen in the study, the fact that the group in which phenol was administered was the group with the highest rate of recurrence when there was an infection and the group with the least recurrence when there was no infection indicates the necessity of discharging the patients with oral antibiotics after minimally invasive methods. In our study, similar to the literature, it was observed that infection formation after minimally invasive applications increased the recurrence susceptibility more than infection after surgical excision (22,23).

The preferred secondary or tertiary surgeries in recurrent cases are surgical excision, and in our study, the success of phenol application in patients with recurrence after surgical excision showed that surgical excision is not necessary in recurrent cases.

Conclusion

In current times, there are many invasive treatment methods used for pilonidal sinus. Laser application can be used safely in the childhood age group. Minimally invasive methods are very promising in terms of surgical success and can be preferred in both primary and recurrent cases. Liquid phenol application and laser application may be preferred over surgical excision and primary suturing in terms of shorter hospital stay and rapid recovery. The presence of infection may cause recurrence regardless of the surgical method used in the treatment. Close follow-up and early treatment of patients is important in terms of presence of postoperative infection in order to reduce recurrence rates.

Ethical Approval: This study was approved by the Harran University, Clinical Research Ethics Committee (approval number 2022/11-07*). All procedures performed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1964 and later versions. and written informed consent for surgery was obtained from all patients.*

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