



Comparison of Monopolar and Bipolar Electrocautery Excision Techniques in Pilonidal Sinus Disease: A Retrospective Clinical Study

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Abstract

Background: There is no standard method for the treatment of pilonidal sinus disease (PSD). Today, many different treatment methods are attempted. Some of the leading methods are surgical procedures with different flap techniques and less invasive methods, such as crystallized phenol, laser pilonidoplasty, radiofrequency excision, and monopolar electrocautery excision.

Objectives: This study aimed to compare the monopolar and bipolar electrocautery excision techniques that we performed in our clinic for PSD.

Methods: Patients who received pilonidal sinus treatment in our clinic between January 2018 and January 2021 were analyzed retrospectively. The exclusion criteria were diabetes mellitus, renal failure, immunosuppression, and children (<16 years of age). The study included a total of 36 patients who met the criteria. Data were retrospectively obtained from hospital archive records (operative notes, discharge summary, and outpatient dressing records). The patients were then divided into two groups, namely monopolar electrocautery excision (group 1) and bipolar electrocautery excision (group 2).

Results: The mean age of 36 patients included in the study was 22.9 years. There was no difference between the two groups in terms of predisposing factors (gender, obesity, hirsutism, and smoking). There was also no statistical difference in terms of mean healing time and recurrence rate. Monopolar and bipolar electrocautery excisions lasted 32.2±8.9 and 38.8±7.8 minutes, respectively (P<0.05). Accordingly, the operative time was significantly different between the groups, and it was shorter in the monopolar electrocautery excision group. Furthermore, the bipolar electrocautery group showed shorter wound infection duration, compared to the monopolar electrocautery excision group (P<0.05).

Conclusion: Both excision techniques were similar in terms of wound healing, hospital stay, and recurrence rates. The operative times were longer in bipolar cautery; however, the wound infection was less.

Keywords: Bipolar electrocautery, Monopolar electrocautery, Pilonidal sinus disease

1. Background

Pilonidal sinus disease (PSD) is a chronic inflammatory condition that usually presents with discharging, as well as inflammatory abscesses, in the natal cleft and sacrococcygeal area. PSD severely affects the patient's comfort in daily life, especially in young people (1). Many different techniques from surgical to less invasive techniques have been attempted for the treatment of the disease; however, no ideal technique has yet been found (2). This complication is most frequently seen in young men and peaks at 15-25 years of age. It is rare after the age of 40 years (3).

Congenital causes have previously been suggested to be responsible for the etiology of the disease and wide surgical excisions have been performed. Especially, as a result of long-term studies conducted by Karydakos, it has been stated that this disease is actually acquired (4). Therefore, different treatment

methods are attempted nowadays (5). Some of the leading methods are surgical procedures with different flap techniques, electrocautery excision, radiofrequency excision, and high-energy laser excision, as well as less invasive methods, such as chemical treatments with crystallized phenol, fibrin glue, and laser pilonidoplasty (6).

Although the cautery technique is widely used, the comparative effect of monopolar or bipolar cautery on recovery is unknown and not clear; accordingly, it was attempted to conduct this study. In monopolar cautery, the energy goes from the tissue to the plate attached to the patient, reducing its effect. In bipolar, the effect is more localized where the probe touches. In other words, bipolar cautery has less tissue effect than monopolar, which relatively reduces the depth effect.

2. Objectives

This study aimed to compare whether this

destructive effect, albeit millimetrically, affects parameters, such as bleeding and infection.

3. Methods

This retrospective clinical study retrospectively analyzed the patients who received pilonidal sinus treatment in our clinic between January 2018 and January 2021. The exclusion criteria were diabetes mellitus, renal failure, immunosuppression, and children (<16 years of age). Data were retrospectively obtained from hospital archive records (operative notes, discharge summary, and outpatient dressing records). During the period, 73 patients diagnosed with pilonidal sinus were treated in our clinic. The study included a total of 36 patients who met the criteria. Patients were followed up for 13 months on average. Demographic characteristics, duration of symptoms, and healing times were determined, followed by a comparison of the two methods.

Both techniques were performed under regional anesthesia. The surgical site was shaved and disinfected with 10% povidone-iodine, and a drain was used in all cases. Electrocautery is a device used for cutting and coagulation processes by burning the tissue in surgeries and has two types, namely monopolar and bipolar. Monopolar electrocautery has a single active lead and also uses a return electrode on the patient. In bipolar electrocautery, while the cutting process is applied with the two sides of the knife, the capillaries in the cut tissue are burned, coagulation occurs, and bleeding does not occur.

The patients were then operated on by two separate experienced teams and randomly proceeded in bipolar and monopolar cautery. Energy is generated at different frequencies, amplitudes, and durations to create different tissue effects (e.g., shearing and coagulation).

- **Cut:** In the electrosurgical cutting process, the tissue is cut by electrical jumps that focus high heat on the surgical area. The surgeon must hold the electrode slightly above the tissue to properly induce the electrical jump. This will produce excessive heat in a very short period and cause the tissue to evaporate.

- **Coagulation:** The coagulation effect is provided instead of sudden evaporation with a very low pulse rate (duty cycle=5%-6%) at high voltage.

- **Blend:** Different application forms are used for situations where the texture is neither desired to be cut completely nor to be etched. In this way, it is possible to create an intermediate effect (7).

3.1. Excision Procedure

After the skin of the area was excised, monopolar cautery was performed by cutting with the help of a scalpel, and the tissue was excised up to the presacral

fascia using electrocautery in cutting mode. Following hemostasis of the bleeding foci with cautery in the burning mode, the subcutaneous layer and presacral fascia were approximated with 1/0-3/0 absorbable Vicryl sutures. The skin was closed up primarily with 2-0 Prolene sutures.

In cases where bipolar cautery was used, the skin was cut with a scalpel. Then, with another scalpel, it was slowly descended to the presacral fascia. Hemostasis was performed with the help of bipolar cautery in these patients. Following hemostasis, the subcutaneous layer and presacral fascia were approximated with 1/0-3/0 absorbable Vicryl sutures. The skin was closed up primarily with 2-0 Prolene sutures.

3.2. Ethical considerations

The study protocol was approved by the Non-Interventional Clinical Research Ethics Committee of Malatya Turgut Özal University, Malatya, Turkey, on 06.02.2022 with session number 2 and decision number 2022/18.

3.3. Statistical Analysis

Statistical analysis was carried out using the computer software SPSS (Statistical Package for the Social Sciences v. 10.0, SPSS Inc, Chicago, Illinois, USA). Categorical variables were expressed as percentages (%). Following that, normally-distributed parametric variables between groups were compared with the student's t-test, while non-normally distributed parametric variables between groups were compared with the Mann-Whitney U test. Chi-square and Fisher's exact chi-square tests were also utilized for the comparison of categorical variables. A P-value of <0.05 was considered significant for all statistical analyses.

4. Results

The patients were divided into two groups, namely monopolar electrocautery excision (n=18) (Group 1) and bipolar electrocautery excision (n=18) (Group 2). The majority of the patients (n=30; 83.3%) were male, and the mean follow-up duration was 13 months. The median age was obtained at 22.9 years, and detailed data on the age, gender, and smoking history of the patients are shown in [Table 1](#). The comparison of the patient groups showed no statistically significant difference between the two groups in terms of age, gender, smoking history, and preoperative findings (P>0.05). In our study, recurrence rates were similar in both groups with one patient each. Likewise, there was no statistically significant difference between the two groups in the mean healing time and length of hospital stay. As shown in [Table 2](#), group 2 had a longer operative time, and it was statistically significant (P<0.05).

Table 1. Demographic characteristics and pre-treatment symptoms of patients

	Excision with monopolar electrocautery (n=18)	Excision with bipolar electrocautery (n=18)	P-value
Age (years)	24.12±2.21	23.18±3.12	>0.05*
Male/Female n(%)	16 (89%)/2 (11%)	15 (83%)/3 (17%)	>0.05**
Smoking history	9 (50%)	10 (55.5%)	>0.05**
Preoperative symptoms (most common)	Pain	10 (55.5%)	>0.05**
	Itching	7 (38.8%)	>0.05**
	Bleeding	1 (5.5%)	>0.05**
	Discharge	14 (70%)	>0.05**

* Independent sample t-test, ** Chi-square test

Table 2: Postoperative Follow-up and Complications

	Excision with electrocautery (n=18)	Excision with bipolar electrocautery (n=18)	P-value
Operative Time (minutes)	32.2±8.9	38.8±7.8	<0.05*
Length of hospital stay (hours)	1.3±0.3	1.2±0.9	>0.05*
Mean healing time (weeks)	6.1±1.3	5.8±0.8	>0.05*
Complications	Tissue infection	1 (5.5%)	0
	Hematoma	1 (5.5%)	1 (5.5%)
Follow-up (months)	13	13	>0.05**
Recurrence	1 (5.5%)	1 (5.5%)	>0.05**

* Independent sample t-test, ** Chi-square test

Although tissue infection was not observed in the bipolar cautery group, there was tissue infection in one case with monopolar cautery that was statistically significant ($P<0.05$).

5. Discussion

The patients in both groups were followed-up for 13 months. Predisposing factors, such as deep natal cleft, excessively hairy body structure, obesity, chronic traumas, skin prone to excessive sweating, positive family history, and poor hygiene play a role in the development of PSD (8). Such predisposing factors as age, gender, obesity, the severity of hirsutism, and tobacco use of the patients were similar in both groups in our study, with no statistically significant difference. In addition, patients in both groups had similar characteristics in terms of disease-specific complaints, such as preoperative pain, itching, bleeding, and discharge. The difference between the groups was not statistically significant in terms of these characteristics.

Although cautery techniques are widely used, the comparative effect of monopolar or bipolar cautery on recovery is unknown and not clear. The use of monopolar and bipolar cautery is cost-effective, and they are easy-to-reach equipment. Accordingly, this study attempted to evaluate the advantages and disadvantages of using both tools.

In our study, it was observed that the mean values of operation time in patients who underwent monopolar and bipolar electrocautery excisions were 32.2±8.9 and 38.8±7.8 min, respectively, and the duration was significantly longer in the bipolar electrocautery group. The difference between the two groups was statistically significant. Laser excision and electrocautery were compared in terms of

hospital stay in the literature, and it was stated that electrocautery took longer in this regard (9,10).

However, monopolar electrocautery was not compared with bipolar electrocautery. In our study, the hospital stay durations of the patients in the monopolar and bipolar electrocautery groups were 1.3±0.3 and 1.2±0.9 days, respectively, and the difference between these values is not statistically significant. As in other chronic wounds, one of the most important criteria in (PSD) is wound healing time. In the literature, this period is variable in treatments performed with excision using different methods (9-14). In a study, the mean wound healing time was found to be 55 days in minimal excision with electrocautery (15). In our study, the shortest wound healing time was 5.8±0.8 weeks in the bipolar electrocautery excision group, and in the monopolar electrocautery group, it was obtained at 6.1±1.3 weeks, which was not statistically significant.

Another problem in the treatment of PSH is the complications that occur in the postoperative period, and developing complications delay wound healing and increase recurrence (16). In our study, there were different results between the groups in terms of complication rates. However, wound infection was observed in one patient (5.5%), and the hematoma was noted in one patient (5.5%) in the monopolar electrocautery excision group. Although hematoma was observed in one patient who used bipolar electrocautery, no wound infection was observed. There was a statistically significant difference between the monopolar and bipolar electrocautery groups in terms of wound infection.

Depending on the technical characteristics of the devices, electrocautery temperatures are significantly high (750-900°C), resulting in significant heat dissipation above the desired therapeutic need

(9,17). Therefore, it is taught that monopolar electrocautery increases our complication rates. Electrocautery excision for PSH remains the most used method among surgeons today as it used to be (17-19). It is believed that the risk of wound infection is low due to less heat dissipation in bipolar electrocautery. In the bipolar electrocautery working mechanism, energy flows between the two ends of the cautery, and it does not spread to other tissues. It seems that the treatment of PSH should be planned for each patient, and all treatment options should be presented to the patient and decided together (19-21). For the ideal method in the treatment of PSH, there is a need for new studies, as well as the development of existing methods.

6. Conclusion

Monopolar and bipolar cautery was performed in this study, and it was found that tissue infection with bipolar cautery was less, which is an important result of the current study. In addition, the operation times of cases performed with bipolar cautery were evaluated as longer. There were two significant differences between monopolar and bipolar electrocautery excisions. Excisions lasted 32.2 ± 8.9 and 38.8 ± 7.8 min in the monopolar and bipolar electrocautery groups, respectively. Monopolar electrocautery excision and bipolar electrocautery excision were similar in terms of hospital stay and recurrence rates. Excision with bipolar electrocautery group wound infection is less than that with the monopolar electrocautery group ($P < 0.05$). The patient and the physician should decide together on this process, and the treatment should be planned accordingly. New multicenter studies with high patient volumes will provide more valuable information about these two methods.

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None.

Footnotes

Conflicts of Interest: The authors declare no conflict of interests.

Ethical Approval: This retrospective clinical study was approved by the Non-Interventional Clinical Research Ethics Committee of Malatya Turgut Özal University, Malatya, Turkey, on 06.02.2022 with session number 2 and decision number 2022/18.

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