

# Comparison of Cutting Diathermy and Scalpel in Terms of Delay in Wound Healing and Scar Appearance in Skin Incision: A Prospective Observational Study

Deri İnsizyonunda Yara İyileşmesinde Gecikme ve Skar Görünümü Açısından Bistüri ile Koterin Karşılaştırılması: Prospektif Gözlemsel Çalışma

Alpaslan Kaban, Ayça Küçükurt, Ayça Durmuş, İlk Kaban, Fatma Ferda Verit

İstanbul Training and Research Hospital, Clinic of Obstetrics and Gynecology, İstanbul, Turkey

## ABSTRACT

**Introduction:** Traditionally, a scalpel is used for surgical incisions. The aim of this study was to compare cutting diathermy and scalpel in terms of wound healing or cosmetic appearance in skin incision.

**Methods:** The study was performed in patients with Pfannenstiel incision in a gynecology and obstetrics clinic. Half of the skin incision of the same patient was made with cautery and the other half was made with scalpel. The part of the incision made with cautery was compared with the incision made with scalpel in terms of wound healing and cosmetic appearance. The assessments were based on the observer scale of the "The Patient and Observer Scar Assessment scale" (POSAS). Evaluations were performed as single blind (observer-blinded, but not surgeon) in the short term (postoperative 15<sup>th</sup> day) and long term (45<sup>th</sup> day).

**Results:** A total of 73 women with Pfannenstiel incision were evaluated. The median age of the patients was 33 (21-52) years. The total POSAS scores of the parts opened with scalpel were not statistically different from those opened with cautery both at the 15<sup>th</sup> and 45<sup>th</sup> days ( $27.3 \pm 5.2$  vs  $27.0 \pm 5.1$ ,  $p=0.88$  for 15<sup>th</sup> day;  $11.8 \pm 3.2$  vs  $11.0 \pm 4.1$ ,  $p=0.56$  for 45<sup>th</sup> day).

**Conclusion:** The study showed that using cautery in cutting mode had no effect on poor wound healing and cosmetic appearance in Pfannenstiel incisions compared to the use of scalpel. This result encourages surgeons to make a skin incision with cautery.

**Keywords:** Incision, scalpel, cautery, scar

## ÖZ

**Amaç:** Geleneksel olarak, cerrahi insizyonlar için bir bistüri kullanılır. Bu çalışmanın amacı, yara iyileşmesi ve deri insizyonunun kozmetik görünümü açısından koter ile bistüriyi karşılaştırmaktır.

**Yöntemler:** Çalışma kadın hastalıkları ve doğum kliniğinde Phannenstiel insizyonu olan hastalarda yapıldı. Aynı hastanın deri insizyonunun yarısı koterin kesme modu ile, diğer yarısı neşter ile açıldı. Koter ile açılan insizyon kısmı, yara iyileşmesi ve kozmetik görünüm açısından neşter ile açılan kısmı ile karşılaştırıldı. Değerlendirmeler POSAS (Hasta ve Gözlemci Skar Değerlendirme Ölçeği) puanlama ölçüğünün gözlemci kısmına dayandırılmıştır. Değerlendirmeler kısa vadede (postoperatif 15. gün) ve uzun vadede (45. gün) tek kör (gözlemci kör fakat cerrah değil) olarak yapıldı.

**Bulgular:** Pfannenstiel insizyonu olan toplam 73 hasta değerlendirildi. Hastaların ortanca yaşı 33 (21-52) idi. Bistüri ile açılan bölümlerin toplam POSAS skorları, 15. ve 45. günlerde koter ile açılanlara göre istatistiksel olarak farklı değildi (15. gün için  $27.3 \pm 5.2$  ve  $27.0 \pm 5.1$ ,  $p=0.88$ ; 45. gün için  $11.8 \pm 3.2$ ,  $p=0.56$ ).

**Sonuç:** Çalışma, bistüri kullanımı ile karşılaşıldığında, kesme modu koter kullanımının, Pfannenstiel insizyonlarında kötü yara iyileşmesi ve kozmetik görünüm olarak bir etkisi olmadığını göstermiştir. Bu sonuç, cerrahları koter ile deri insizyonu açmaya teşvik eder.

**Anahtar Kelimeler:** Insizyon, bisturi, koter, skar



Address for Correspondence/Yazışma Adresi: Alpaslan Kaban MD, İstanbul Training and Research Hospital, Clinic of Obstetrics and Gynecology, İstanbul, Turkey



Phone: +90 532 260 96 84 E-mail: alpaslankaban@gmail.com ORCID ID: orcid.org/0000-0002-3623-7240



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## Introduction

Today, electrosurgical instruments are widely used in surgical procedures. Many publications have reported that the use of electrocautery is acceptable instead of traditional scalpel, even for skin incision (1-7). On the other hand, there are concerns about the use of diathermy in the skin incision due to fear of causing large scars and improper tissue healing (8-10).

In this study, scalpel and electrocautery were compared in terms of wound healing and cosmetic appearance. The difference of this study from previous studies is that these two techniques are compared in the same patient, thus eliminating the patient-related parameters.

## Methods

This study was carried out between June 2018 and November 2018 in Gynecology and Obstetrics Clinic of Istanbul Training and Research Hospital. Local Clinical Research Ethics Committee approval was obtained for the study (decision no: 2011-KAEK-50). Patients scheduled for operation with a Pfannenstiel incision were selected as the study cohort. Exclusion criteria were a previous Pfannenstiel incision, morbid obesity, diabetes, patients aged 65 years and older, patients under 15 years of age, presence of any skin disease at the incision site. Informed consent was obtained from the patients for the study.

Half of the skin incision of the same patient was made with electrocautery in cutting mode (40-50 watt) and the other half was made with scalpel in order to obtain two identical observation sites. The part of the incision made with cautery (right side) was compared with the part made with scalpel (left side). Comparisons were made as single blind (observer-

blinded, but not surgeon) when the patient came for control on the 15<sup>th</sup> and 45<sup>th</sup> days. Evaluated parameters were delayed wound healing and scar appearance. Patient and Observer Scar Assessment scale (POSAS) v2.0 observer scale was used for these evaluations. The observer scale of the POSAS consists of six items (vascularity, pigmentation, thickness, relief, pliability and surface area). All items are scored on a scale ranging from 1 ("like normal skin") to 10 ("worst scar imaginable"). The sum of the six items results in a total score of the POSAS observer scale. All parameters should preferably be compared to normal skin on a comparable anatomic location. The total minimum score of the POSAS scale is 6 and the maximum score is 60. Observations were made by the same team throughout the study.

## Statistical Analysis

Mean and standard deviation for POSAS score, and median and minimum-maximum values for age of the patients were used for descriptive statistics. Shapiro-Wilk test was used for normality distribution of groups. Chi-square test was used for the analysis of qualitative independent data. SPSS 22.0 program was used in the analysis. A p value <0.05 was considered to indicate statistical significance.

## Results

A total of 73 patients with Pfannenstiel incision were evaluated. The median age of the patients was 33 (21-52) years. The total POSAS scores of the incision parts made with scalpel were not statistically different from those made with cautery both at the 15<sup>th</sup> and 45<sup>th</sup> days ( $27.3 \pm 5.2$  vs  $27.0 \pm 5.1$  p=0.88 for 15<sup>th</sup> day;  $11.8 \pm 3.2$  vs  $11.0 \pm 4.1$  p=0.56 for 45<sup>th</sup> day) (Tables 1 and 2) (Figures 1-4).

**Table 1. Comparison of short term (15<sup>th</sup> day) the patient and observer scar assessment scale scores (mean ± standart deviation) of cautery and scalpel**

	Cautery	Scalpel	p*
Vascularity	$6.4 \pm 2.0$	$5.3 \pm 1.6$	0.08
Pigmentation	$2.3 \pm 0.4$	$2.3 \pm 0.9$	0.98
Thickness	$4.6 \pm 1.8$	$4.8 \pm 1.0$	0.90
Relief	$4.5 \pm 0.2$	$4.6 \pm 0.9$	0.56
Pliability	$4.0 \pm 0.7$	$4.4 \pm 0.1$	0.27
Surface area	$5.5 \pm 1.0$	$5.6 \pm 0.7$	0.91
Total score of the POSAS	$27.3 \pm 5.2$	$27.0 \pm 5.1$	0.88

All items are scored on a scale ranging from 1 ("like normal skin") to 10 ("worst scar imaginable"), \*Chi-square test

POSAS: patient and observer wound scale rating scale

**Table 2. Comparison of long term (45<sup>th</sup> day) the patient and observer scar assessment scale scores (mean ± standart deviation) of cautery and scalpel**

	Cautery	Scalpel	p*
Vascularity	$1.4 \pm 0.3$	$1.3 \pm 1.1$	0.85
Pigmentation	$2.4 \pm 0.4$	$2.0 \pm 0.9$	0.08
Thickness	$1.6 \pm 1.7$	$1.1 \pm 1.0$	0.78
Relief	$3.1 \pm 0.4$	$2.7 \pm 0.9$	0.76
Pliability	$1.0 \pm 0.8$	$1.4 \pm 0.1$	0.27
Surface area	$2.3 \pm 1.0$	$2.5 \pm 0.7$	0.51
Total score of the POSAS	$11.8 \pm 3.2$	$11.0 \pm 4.1$	0.56

All items are scored on a scale ranging from 1 ("like normal skin") to 10 ("worst scar imaginable"), \*Chi-square test

POSAS: patient and observer wound scale rating scale



Figure 1. Appearance of skin incision at the 15<sup>th</sup> day



Figure 2. Appearance of skin incision at the 45<sup>th</sup> day



Figure 3. Long-term (45<sup>th</sup> day) appearance



Figure 4. Appearance of skin at the 15<sup>th</sup> day

## Discussion

In this study, half of the Pfannenstiel skin incision in the same patient was made with an electrocautery and the other half with a scalpel. These two halves were compared at the 15<sup>th</sup> and 45<sup>th</sup> days. According to the results of the study, the effects of cautery and scalpel on wound healing and cosmetic were not different.

In the literature, many studies have compared the scalpel with cautery in skin incision. These studies have shown that these two techniques have similar cosmetic and wound healing results (1-7). The difference of this study is that these two techniques are compared in the same patient. With this comparison method, the parameters affected by the differences between the patients were eliminated. This study, unlike the previous studies, is a self-controlled study. Each case is its own control, thus the conditions that could affect wound healing are equalized.

The stages of wound healing proceed in an organized way and follow four processes: hemostasis, inflammation, proliferation and maturation.. Angiogenesis, fibroplasia and re-epithelialization occur in the proliferation phase (11,12). The proliferation phase in a wound healing process is completed in the first two weeks (13). The maturation phase, also referred as the remodeling phase of wound healing, is

when the collagen is remodeled from type 3 to type 1 and the wound is completely closed. Generally, remodeling begins approximately 21 days after an injury and can last for months (11-13). In the present study, the surgical incision was evaluated at two separate times. The initial evaluation was performed at the 15<sup>th</sup> day when the proliferative phase was completed. In addition, patients were evaluated at the sixth week (45<sup>th</sup> day) when they were called for a follow-up examination.

## Conclusion

POSAS patient scale was not used. The patients had difficulty in evaluating both halves of the Pfannenstiel incision separately and did not provide any objective results. Therefore, POSAS observer scale was used for evaluations.

In this study, it was observed that the use of cautery in cutting mode in Pfannenstiel incisions had no effect on poor wound healing and poor cosmetic. In fact, surgeons have experienced that the use of cautery for incision is more advantageous for bleeding control. This result of the study encourages surgeons to make a skin incision with a cautery.

**Ethics Committee Approval:** İstanbul Training and Research Hospital, Clinical Research Ethics Committee (decision no: 2011-KAEK-50).

**Informed Consent:** Informed consent was obtained from the patients for the study.

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

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