

## Thermal injury due to electrosurgery

### Elektrokotere bağılı oluşan ısı hasarı

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Since the electrosurgical instruments are commonly used in a wide variety of surgical specialities, understanding of the properties of these instruments is very important to prevent the potential complications. We report the case of a patient who sustained a third-degree dermal burn caused by contact with the ground plate of the electrosurgical system. This burn healed with surgical treatment. Since electrosurgery causes serious complications, surgeon and operating suite personnel should pay attention to the electrosurgical system during the operation. Additionally, patients must be informed about these complications.

**Key Words:** electrosurgery, complications, thermal injury, electrocautery

Elektrocerrahi aletleri genellikle pek çok cerrahi uzmanlık dalında kullanılmakta olduğundan bu aletlerin özelliklerinin anlaşılması potansiyel komplikasyonları önleme açısından çok önemlidir. Elektrocerrahi donanımının topraklama plağıyla temas sonucu oluşan bir üçüncü derecede yanık olgusunu sunmaktayız. Yanık cerrahi tedaviyle iyileşmiştir. Elektrokoter aletleri ciddi komplikasyonlara neden olduğundan cerrah ve ameliyathane personeli cerrahi girişim sırasında elektrocerrahi donanıma dikkat etmelidir. Ayrıca, hastalara bu komplikasyonlar hakkında bilgilendirilmelidir.

**Anahtar Sözcükler:** elektrocerrahi, komplikasyonlar, termal hasar, elektrokoter

### INTRODUCTION

Electrosurgery is the most preferred technique for tissue cutting and hemostasis.<sup>[1-4]</sup> The basic components of the electrosurgical system are radiofrequency generator, active electrodes, dispersive electrode (ground plate).<sup>[5]</sup> In this system, the tissue is heated by an electrical current which passes through the body between the active electrode and the ground plate.<sup>[2]</sup> This current creates hazards in electrosurgery. It can be the cause of the unintended burns to nontargeted tissues, resulting from stray electrical currents associated with insulation failure.<sup>[6]</sup>

We present a case in which a patient sustained a third-degree burn while undergoing laparoscopic surgery.

### CASE REPORT

A 50-year-old woman was operated on for resection of endometriosis. A laparoscopy was performed with using a monopolar electrosurgery. At the first

post-operative day, the medical staff noticed that the skin at the infrascapular area which was in contact with the ground plate was erythematous. Resultant erythemas persisted for 2 days and then gradually faded. After 14 days, the line of demarcation between injured and intact tissue became evident and the lesion appeared necrotic. The average size of the necrotic area was 16 cm<sup>2</sup> (4cm x 4cm). Since the skin injury involved the subcutaneous fat tissue, it was considered as a third-degree burn (Figure 1). Under local anesthesia, the necrotic tissue was debrided together with excision of the erythematous skin around the lesion until healthy-appearing, bleeding tissue was found and the wound was closed horizontally using 4/0 non-absorbable sutures (Figure 2). The sutures were removed within 2 weeks. Recovery was uneventful.

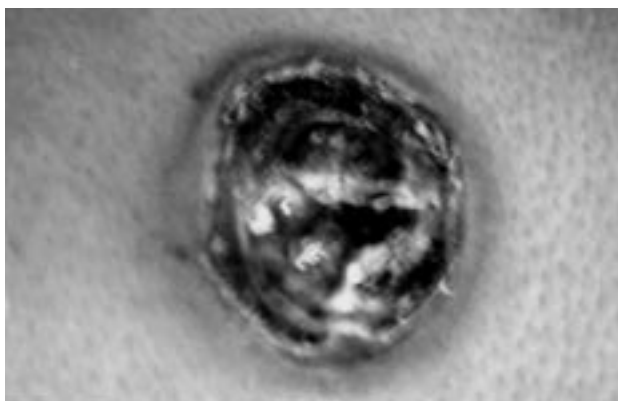
### DISCUSSION

Electrosurgical units operate on basic fundamental principles of physics. Understanding these prin-

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**Figure 1:** Preoperative appearance of the dermal burn.

ciples may prevent the potential complications of the electrosurgery. Electrical burns constitute the most common electric accidents in the operating room.<sup>[7,8]</sup> The ground plate (dispersive electrode) is responsible for the safe return of the electrical current to the radiofrequency generator.<sup>[9]</sup> It is very important to replace the plate against an area of clean, dry skin with uniform contact to allow uniform distribution of the current over the entire area. Additionally, ground plates must be covered with appropriate conductive jelly to obtain optimal contact with the patient. If there is a breakage in the connections between the unit and the patient ground plate or between the ground plate and the patient, it can cause serious burns at the skin area in contact with the ground plate just like in our case. In order to prevent this complication, alarm systems have been developed to warn of a break in the ground plate circuit.<sup>[10,11]</sup> Another important etiologic factor is the surface irregularities of the ground plate which result from repeated use. They cause localized tissue damage because of the increased pressure and current flow. Such ridges in the ground plate should always be smoothed out between procedures.

In this case, thermal injury due to electrosurgery was recognized on the first post-operative day. We had to wait a couple of days in order to make sure of the demarcation line between the injured and uninjured tissues. For this reason, instantaneous recognition of this complication in the operating room does not lead immediate treatment.

In conclusion, these unintended burn injuries due to electrosurgery are usually preventable. Conse-



**Figure 2:** Postoperative appearance of the same lesion.

quently, the hazards of electrosurgery should be well known by both the surgeon and the operating suite personnel and every attempt should be made for the prevention of these accidental injuries.

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