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The impact of the use of silicone dressings on reducing the extent of surgical intervention in the treatment of second- and third-degree burns

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ABSTRACT

A burn is the result of an injury caused by the action of energy (high temperature, electric current, ionizing radiation, or chemical substances). Assessing the extent and depth of a burn wound directly after the injury is difficult because the process of tissue destruction may progress and deepen. The presentation changes within several to several dozen hours after the thermal injury, and sometimes even after a few days. In this report, we present a clinical case of a 62-year-old patient. She was admitted to our Department of Plastic Surgery and Burn Treatment with burns located in the gluteal region and the posterior surface of the thighs. On admission, the patient presented with grade IIA/IIB burns covering approximately 10% of the total body surface area. In the initial phase, we applied conservative treatment using silicone dressings and antibiotic therapy. We observed burn progression and evident soft tissue necrosis between the 4th and 7th day of hospitalization. We decided to continue conservative treatment to cleanse the wound and potentially reduce the extent of the surgical procedure. Subsequently, we performed a necrosectomy and covered the defects with a free skin graft, which resulted in gradual local improvement. This case highlights the rationale and effectiveness of conservative treatment. Properly selected dressings can significantly limit the extent of surgical intervention. They protect burned areas, maintain optimal conditions for wound healing. As a result, we achieved accelerated tissue regeneration and reduced the area requiring surgical intervention.

Keywords: burn, burn treatment, burn wound, silicone dressings, wound dressings, skin graft.

1. INTRODUCTION

Jędryś (2017) stated that a burn is the result of an injury caused by the action of energy, such as high temperature, electricity, or chemical substances. It may also result from intense friction. Burn injuries are more often the result of several factors than of a single one (Kozłowska et al., 2014; Kozłowska et al., 2019).

The severity of a burn depends on different factors. The most important of these are the type of energy involved (explosion, flame, electricity), the duration of exposure, and the extent of the affected body surface area. We classify burns as superficial, intermediate depth (partial-thickness), or deep (full-thickness) based on the depth of tissue damage (McLaughlin end Paterson, 2012). A superficial burn involves damage to the epidermis only. It presents with erythema, is very painful, heals within approximately one week, and does not leave any residual changes.

A partial thickness burn involves the epidermis and part of the dermis. It causes the formation of serous vesicles, erythema, and significant pain. It heals within approximately 2–3 weeks and, if adequately treated, does not leave scars. The skin is pale and does not respond to pressure with a change in color at the deep burn. Due to damage to sensory nerve endings at the burn site, it is devoid of sensation. The healing process is lengthy, often requiring several weeks, and results in permanent scarring changes. It frequently leads to contractures, which require surgical treatment and rehabilitation in the future (Jeschke et al., 2020). Patients with severe burns require treatment in a hospital setting. Indications for admission to a burn department include:

- Second-degree burns covering more than 10% of the total body surface area (TBSA),
- Burns covering more than 5% TBSA in children,
- All third-degree burns,
- Burns involving the face, hands, feet, perineum, or major joints,
- Circumferential burns of the limbs and chest,
- Chemical burns,
- Electrical burns,
- Inhalation burns,
- Burns in elderly patients, those with internal medical conditions, as well as infants and newborns,
- Burns accompanied by other traumatic injuries (Strużyna et al., 2024).

The burn surface area is commonly calculated using Wallace's Rule, known as the Rule of Nines. According to this rule, the surface area of the patient's head and each upper limb is 9%; the patient's anterior torso, posterior torso, and each lower limb account for 18% each. Another method, the Hand Rule, estimates that the surface area of the patient's hand represents approximately 1% of the TBSA (Jędrys, 2017; McLaughlin end Paterson, 2012). Fluid resuscitation is performed based on the Parkland formula. We calculate the fluid volume for the first 24 hours by multiplying the body weight in kilograms by the % of TBSA and by 4 ml. We administered he first 50% of the total volume during the first 8 hours and the remaining 50% over the next 16 hours. The information mentioned above is publicly available, but its correct and timely use can be beneficial in the treatment of burns and may help save the lives of burn patients (Strużyna, 2006).

2. CASE PRESENTATION

A 62-year-old female patient was admitted to the Department of Plastic Surgery and Burn Treatment at the Multispecialty Hospital in Nowa Sol due to a second-degree (IIA/IIB) burn of the gluteal region and posterior thighs, covering approximately 10% TBSA. The patient burned herself with hot tea on a flight back from vacation. The patient had no chronic diseases, was not on permanent medication, did not smoke, and occasionally consumed alcohol. We placed the patient under close observation with continuous monitoring and initiated fluid resuscitation, along with analgesics, anticoagulants, and empirical antibiotic therapy. We obtained a microbiological culture sample from the burn wound. Upon admission, we classified the burn as an intermediate-depth burn. The patient reported pain and burning in the affected areas. Based on the initial assessment at admission and the intermediate depth of the wounds, we qualified the patient for conservative treatment using silicone dressings. Between 4 and 7 days after the burn trauma, we observed burn progression and evident soft tissue necrosis. Gradual wound cleansing and healing of the areas affected by superficial and partial-thickness burns were observed. As the patient did not consent to surgical treatment, conservative management was continued using the current silicone dressings.

Due to tissue necrosis and progression of the lesions, we decided to continue antibiotic therapy despite a sterile blood culture result. The depth of the burn in the gluteal area was extensive on the right side and partially on the left. Figure 1 shows preoperative photographs of the burn, with deepening and necrotic tissues.

Figure 1. Preoperative photographs demonstrating the deepening of the burn and necrotic tissues of the posterior surface of both thighs and buttocks.

Over the next few days, once the patient provided informed consent, a surgical procedure was carried out under general anesthesia, consisting of necrosectomy of the burn wounds on both gluteal areas and the right thigh, followed by coverage of the defects with a split-thickness skin graft obtained from the right hip. Figure 2 shows the condition of the burn wounds before surgery and immediately after surgical debridement and skin grafting. After the procedure, we observed proper healing of the grafted wounds and the donor site. The patient moisturized the well-adapted skin grafts and other healed post-burn areas and took part in physiotherapy treatments to promote scar mobilization. Figure 3 shows the condition of the burn wounds after healing and skin grafting.

Subsequently, we placed the patient under outpatient care, with recommendations for compression therapy using compression shorts, moisturizing the skin grafts, and protecting them from sun exposure.

3. DISCUSSION

Burn treatment in a specialized center involves complete care of the patient. Many specialists participate in the treatment team such as surgeons, anesthesiologists, nursing staff, and rehabilitation specialists. We classify burns as superficial, intermediate-depth, and deep, depending on the depth of tissue damage. A four-degree burn classification scale is also used (Jeschke et al., 2020). Assessment of the wound is challenging because the process of tissue destruction in a burn wound can progress and deepen. The appearance of the wound can change dynamically. It is because of the mechanism of tissue degradation developing over the time and involving the

deeper layers of the body. This process can last for several hours, and sometimes even after a few days (McLaughlin and Paterson, 2012).

Figure 2. Photographs demonstrating the condition of the burn wounds before surgery and immediately after surgical debridement and skin grafting.

Treatment of burns can be both surgical and conservative. It is very problematic to correctly evaluate the depth of a burn at the time of the patient's admission to the ward. Often, the deepening of the injury can be observed at 3-7 days (McLaughlin end Paterson, 2012; Strużyna et al., 2024).

Third-degree burns require more advanced treatment measures, which include comprehensive surgical debridement and skin grafting (Kozłowska et al., 2014; Kozłowska et al., 2019). The use of specialized dressings, systemic antibiotics, and extensive rehabilitation therapies is also employed (Jeschke et al., 2020). Of particular note are silicone dressings, which protect the wound from contamination and create a moist environment favorable to the wound healing process (Kozłowska et al., 2019). We can easily apply ointments and oils under the dressings mentioned above. Changing dressings is not painful. The structure of silicone dressings prevents adhesion to the wound and promotes the process of epidermal growth. Treatment options vary between individuals, based on their overall condition and the severity of the burn (McLaughlin and Paterson, 2012).

Figure 3. Postoperative photographs demonstrating the condition of the burn wounds after healing and skin grafting.

Necrosectomy prevents the development of infection and reduces the absorption of toxic substances resulting from the decomposition of the human body. The necrotic tissue should be excised as soon as possible, depending on the patient's condition (Strużyna et al., 2024). Necrosectomy must be performed promptly, but burns of intermediate thickness do not always necessitate surgery. Conservative treatment with ointments and dressings works well. Silicone dressings not only protect the wound, but also prevent scarring, contractures, and increase tissue elasticity, which has a positive effect on the functional capacity of the patient in the future.

4. CONCLUSION

Silicone dressings are a good option for treating burn wounds. Their primary advantage is their ability to provide excellent conditions for wound healing without compromising patient comfort. Thanks to their structure, they do not adhere to the wound, and their change does not devastate the epidermis, which supports the proper course of the epithelialization process.

Silicone dressings create a moist environment that promotes healing. The use of silicone dressings can positively impact the extent of the surgical procedure in the treatment of second- and third-degree burns, improve the quality of life of patients, and reduce their

fear of surgery and disability. The application of silicone dressings leads to both improved treatment outcomes and a tangible reduction in healthcare costs.

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Data and materials availability
All data sets collected during this study are available upon reasonable request from the corresponding author.

REFERENCES

1. Jeschke MG, van Baar ME, Choudhry MA, Chung KK, Gibran NS, Logsetty S. Burn injury. Nat Rev Dis Primers 2020;6(1):11. doi:10.1038/s41572-020-0145-5
2. Jędrys J. Burns. Medycyna praktyczna. 2017. https://www.mp.pl/pacjent/pierwsza_pomoc/165227,oparzenia.
3. Kozłowska E, Cierzniakowska K, Szewczyk MT. Local treatment of burns. Chirurgia po dyplomie. 2019;3:1-3. https://podyplomie.pl/chirurgia/32768,postepowanie-miejscowe-w-oparzeniach.
4. Kozłowska E, Szewczyk MT, Cierzniakowska K, Mościcka P, Cwajda-Białasik J, Popow A. Care, supervision and treatment of burn wound. Zakażenia. 2014;1:45-53.
5. McLaughlin ES, Peterson AO. Burns: Prevention, Causes and Treatment. New York: Nova Science Publishers; 2012.
6. Strużyna J, Surowiecka A, Korzeniowski T. Burns Basics Volume 1. 1st ed. Warsaw: PZWL; 2024.
7. Strużyna J. (ed.). Early treatment of burns. Warsaw: PZWL; 2006.