RFP Journal of Dermatology
Volume 9 Number 1, January - June 2024

Management of Perineal Scald Burn in a Tertiary Care Hospital: Our Experience

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How to cite this article:
Walunj Sachin Dnyaneshwar, Ravi Kumar Chittoria, Barath Kumar Singh P. Management of Perineal Scald Burn in a Tertiary care hospital: Our experience. RFP Jr of Drea 2024;9(1):13-18.

ABSTRACT

Burns to the perineum and buttocks are difficult to heal for a number of reasons, including the constant threat of contamination and shear stress. Pathogens can easily penetrate the wound bed and induce systemic infection. Patients' recovery is further delayed by lengthy healing times, which increases their pain and psychological stress as a result of the injury. Though they are rare, significant burns to the lower trunk and lower limbs can also involve the external urethra, penis, labial tissues, anal opening, and distal rectal mucosa. In this case report, we discuss the management of perineal burn wounds in our center.

Keywords: Management; Scald; Burns; Perineum.

INTRODUCTION

Burns to the genitalia and perineum have detrimental effects on a person's quality of life in terms of their physical, functional, sexual, and psychological well-being.[1] Because of the severity of these burns, both the patient and the treating surgeon are very concerned about them.[2] As the thighs and lower abdomen protect this area from severe burns, fortunately, these burns are not as common as they may be. These patients usually experience a lengthy hospital stay that is linked to high morbidity and elevated mortality. In essence, rather than the perineal burn specifically, the prolonged institutional stay and high mortality represent the severity of trauma.[3] The purpose of this study was to report our experience with the management and outcome of perineal burns at our burn center in a tertiary care hospital in Southern India.

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Received on: 21.09.2023

Accepted on: 01.11.2023

MATERIALS AND METHODS

This study was conducted in the Department of Plastic Surgery in a tertiary care center in South India after obtaining the departmental ethical committee approval. Informed written consent was taken from the patient. 3-year-old girl had scald burn injury when accidental self-fall into hot water where in she sustained injuries to perineum,

bilateral gluteal region and genitals (Fig. 1). Patient was admitted with the above symptoms and managed according to WHO burn protocol and IBSI protocol. She underwent Wound debridement

Fig. 1: Perinealscald burns at presentation

and hydrotherapy. The wound debridement was done with mechanical dermabrasion (Fig. 2). Feracrylum solution was used to clean the wound to prevent infection as the region is more prone for infection (Fig. 3). The wounds were managed with Regenerative therapies like Autologous Platelet Rich Plasma, collagen scaffold application with silver-based ointment, Negative Pressure

Fig. 2: Mechanical dermabrasion assisted tangential excision

Fig. 3: Feracrylum 1% in burn wounds

wound therapy (Fig. 4-6). Once wound showed promising signs of healing and epithelization was complete, we applied Silicone gel and silicon sheet over the healed wound to prevent the abnormal scarring. We also used low-level laser therapy and autologous platelet rich plasma every week for 3 weeks till complete healing of the burn wounds.

Fig 4. Autologous platelet rich plasma therapy

Fig 5. Collagen application

Fig 6. Negative Pressure Wound Therapy

Fig 7. Healed burn wound at discharge

Fig 8. Pressure garment at discharge

RESULTS

Patient burn wounds healed and there was minimal abnormal scarring and no hypertrophic scarring at the time of discharge (Fig. 7). Pressure garment was provided at the time of discharge (Fig. 8). Vancouver Scar Scale - 3/13 at the time of discharge.

DISCUSSION

Burns to the perineum and genitalia can potentially impair or destroy function, aesthetics, and the ability to maintain proper hygiene. The loss of normal tissue and scarring can limit movement, and cause pain, disfigurement, and social embarrassment. Surveillance for preservation of genitourinary and sexual function is a component of the treatment plan. The initial management of patients with superficial and deep burns to the perineum and genitalia prior to any potential surgical management is conservative, including cleansing, gentle gauze debridement of loose burned tissue if present, and coverage with topical antimicrobial agents and dressings. The wound healing rate with conservative measures ranges from approximately 80 to 96 percent.[2]

For patients with substantial burns involving the perineum and/or genitalia alone, or including the inguinal or lower truncal areas, the management is more complex. The thighs should be maintained at 15° abduction to facilitate healing and dressing changes. In addition to local topical agents and dressings, the initial management of the extensively burned patient also includes protecting the urethral meatus from obliteration due to swelling and protecting the burned skin from urinary and fecal contamination.[2,3]

Autologous platelet rich plasma is an upcoming and proven treatment modality for patients with burn injuries wherein concentrated platelet preparations are used which enhance body regenerative process. Several kinds of bioactive mediators, including immunological mediators, clotting factors, chemokines, integral membrane proteins, adhesion proteins, growth factors, and clotting factors, are stored and prepared to react to tissue injury inside the cytoplasmic granules of platelets. In wounds treated with PRP, the bioactive mediators have a favorable impact on cellular development, proliferation, differentiation, and re-epithelialization by promoting angiogenesis, mitogenesis, and controlling the endogenous inflammatory process.[4] The advantage of allogeneic PRP is that it can be obtained from willing blood donors, and its derivatives can be used right away without the requirement for clinicians to get a patient sample. In some clinical circumstances, such as those involving acute burns when patients may be fluid depleted and thrombocytopenic, this may be helpful. Other conditions that preclude

the creation of PRP include hemophilia, sepsis, or infection; related contraindications include the use of NSAIDs or corticosteroids, tobacco usage, malignancies, and anemia.

LLLT, which can trigger photochemical reactions in tissue and cells, is sometimes referred to as biological stimulation or photobiological regulation. Previous research has demonstrated that LLLT affects the photoreceptors on mitochondria, stimulates the electron transport chain of produced energy, enhances mitochondrial respiration, and boosts the synthesis of adenosine triphosphate (ATP). As a result, LLLT has the ability to change the cellular redox state and to trigger the activation of signaling pathways that drive transcription factors involved in proliferation, tissue repair, and regeneration.[5]

The various dressings and tissue-engineered constructions used in burn therapy depend heavily on biomaterials. The major goal of employing them is to mimic the skin's ECM, which is composed of laminin, elastin, collagen, and proteoglycans. Laminin gives the skin strength, while proteoglycans give it moisture and viscosity. Biomaterials of diverse origins are employed in skin grafts and substitutes, and the decision made during scaffold manufacturing is crucial because it can affect in situ regeneration. These materials' characteristics control cell behavior and facilitate the development of new tissue. Biodegradability, momentary mechanical support, and permeability are the primary needs. Scaffolds can be either with or without cells, and the latter can be further broken down into dermal, epidermal, and epidermal-dermal composites depending on the methodology.[6]According to theory, negative pressure might generate an interstitial gradient shift that can reduce oedema and, as a side effect, promote cutaneous perfusion, facilitating the evacuation of blood or serous fluid. Additionally, it is hypothesized that NPWT's capacity to generate a mechanical stress or force that directly influences cellular activity, particularly the growth of new blood vessels, may help slow the advancement of burn wounds. Additionally, it may be desirable to maintain a wet environment that offers ideal circumstances for epithelialization and prevents tissue desiccation.[7]

The skin surface temperature of hypertrophic burn scars under SGS is increased by 1.7°C, and temperature increases of this magnitude can significantly increase collagenase activity and could affect scarring. As a result, it is possible that an increase in skin surface temperature is involved in the mechanism of action of silicone based products for scar management. Because it has been suggested that the negative static electric field produced by friction between SGS and the skin may cause collagen realignment and lead to the involution of scars, the development of a static electric field may also be implicated.[8]

The way feracrylum works is by building water-insoluble multi-complexes with different proteins, including those found in blood. The hemostatic effect of feracrylum is given through the creation of a synthetic complex on the wound surface that consists of its adduct with plasma proteins, primarily albumin. The in-vitro mixture of feracrylum and serum albumin results in a substantial rubbery clot. The feracrylum-albumin combination degrades over time like all other biodegradable polymers. After that, these subunits are ejected. The benefit of feracrylum is that it combines antibacterial activity with little local toxicity or irritation, making it useful in preventing acute, chronic, and hospital infections, especially in post-operative wounds, and facilitating wound healing.[9]

CONCLUSION

With advent of newer technologies, treatment of scald burn wounds has been much more streamlined and produce better results in patients. In our experience we have seen better wound healing in patient with scald burns with minimal scarring. However large randomized control trials are necessary to establish association between the same.

Conflicts of interest: *None*

Disclosures: *None*

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