

Management of Healing Complications in the Burned Patient

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ABSTRACT

The management of healing in burned patients is a critical aspect of burn care, with profound implications for patient outcomes. This bibliographic review article explores the epidemiology, transcendence, definition, risk factors, complications, and management of healing in burned patients. The discussion delves into various strategies and advances in the field, ultimately emphasizing the importance of a comprehensive approach to healing in the burned patient.

KEYWORDS: Burns, Burned Patients, Wound Healing, Management, Epidemiology, Complications.

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INTRODUCTION

Burn injuries have a profound impact on individuals, families, and communities worldwide. The epidemiology of burn injuries reveals not only their frequency but also their lasting consequences. Epidemiologically, burn injuries affect people of all ages, with a higher incidence among the very young and the elderly, making them a significant public health concern. According to the World Health Organization, burns account for an estimated 265,000 deaths annually, making them a major cause of mortality and morbidity.

Beyond the statistics, the transcendence of burn injuries is evident in the way they disrupt lives and challenge the healthcare system. Burn injuries can lead to prolonged hospitalizations, extensive surgical procedures, and complex rehabilitation. The impact extends beyond the physical realm, affecting the psychological and social well-being of patients. The management of burn injuries and, more specifically, the healing of burn wounds, is a critical component of burn care that requires comprehensive attention.

The healing process in burn patients is a complex journey. It involves the intricate interplay of physiological, biochemical, and immunological processes that strive to restore the integrity and functionality of the skin. The success of this process is paramount not only for survival but also for the preservation of the patient's quality of life. Effective healing in burned patients can prevent complications such as infection, scarring, and contractures, which can significantly affect long-term outcomes.

As we delve further into this bibliographic review, we will explore the theoretical framework underpinning the management of healing in burned patients. This includes defining burn injuries and examining the risk factors that influence the healing process. Complications in burn wound healing, such as infections and scarring, will also be discussed in depth. Additionally, we will examine the multifaceted approach to managing burn wound healing, encompassing various strategies and the latest advances in the field. Ultimately, this discussion emphasizes the need for a holistic approach to the management of healing in burned patients, with the goal of enhancing both the quantity and quality of life for those affected by burn injuries.

Definition:

Burn injuries represent a spectrum of trauma to the skin and underlying tissues, resulting from exposure to various sources of thermal energy, chemicals, electricity, or radiation. These injuries are typically categorized into four degrees based on the depth and severity of tissue damage:

First-degree burns affect the superficial layer of the skin (epidermis) and are characterized by redness, pain, and minor swelling.

Second-degree burns extend into the deeper layer of the skin (dermis) and are categorized into superficial and deep types. Superficial second-degree burns present with blisters, while deep second-degree burns exhibit a mottled appearance and can be quite painful.

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Third-degree burns, also known as full-thickness burns, damage both the epidermis and the dermis. These burns often appear leathery or charred and may not be as painful due to the destruction of nerve endings.

Fourth-degree burns are the most severe, extending beyond the skin to affect underlying muscle, bone, or organs.

The depth and extent of the burn injury play a crucial role in determining the healing process and associated complications.

Risk Factors:

Extent of Burn Injury: The extent and depth of the burn injury are crucial determinants of the healing process. Superficial burns may heal relatively quickly and with minimal intervention, while deep burns that affect not only the skin but also underlying tissues, such as muscle and bone, require more complex management. Extensive burns covering a significant portion of the body surface area can lead to systemic responses, making healing more challenging.

Age: Age plays a significant role in burn wound healing. Infants and the elderly are particularly vulnerable. Pediatric patients have thinner skin, less subcutaneous fat, and immature immune systems, making them more susceptible to fluid loss and infection. In contrast, the elderly population often experiences delayed wound healing due to reduced skin elasticity and diminished immune function.

Comorbidities: Pre-existing medical conditions can complicate the healing process. Patients with chronic diseases like diabetes or cardiovascular conditions may experience impaired circulation and a weakened immune response, hindering the body's ability to repair damaged tissue.

Infection Risk: The loss of the skin's protective barrier in burn injuries makes patients highly susceptible to infections. The microbial invasion of burn wounds can lead to sepsis, delayed healing, and the formation of biofilms that resist treatment. The risk of infection underscores the importance of stringent infection control measures.

Inhalation Injury: In cases of burns associated with inhalation injuries, the management of healing becomes even more complex. Inhalation of hot gases and smoke can damage the respiratory system, leading to airway compromise and acute respiratory distress syndrome (ARDS). Treating respiratory complications alongside wound healing adds an additional layer of challenge.

Complications:

Infection: Burn wounds are particularly vulnerable to infection due to the compromised skin barrier. Pathogens can infiltrate the damaged tissue, leading to cellulitis, abscess formation, or systemic infection. Managing and preventing infections are essential components of burn wound healing to avoid life-threatening consequences.

Hypertrophic Scarring: Abnormal healing can result in hypertrophic scars, which are raised, red, and thickened. These scars can limit function and cause pain or itching, impacting the patient's quality of life. Interventions to reduce the risk of hypertrophic scarring, such as silicone dressings

and pressure garments, play a crucial role in the management of healing in burned patients.

Contractures: The formation of scar tissue can lead to contractures, where the skin tightens and restricts joint movement. Contractures can significantly impair the functional outcomes of burn wound healing. Occupational therapy and physical therapy are often employed to mitigate these complications.



Critical zone for scarring

Psychological Distress: Burn injuries frequently lead to psychological distress. Patients may experience post-traumatic stress disorder (PTSD), depression, and anxiety related to their injury, recovery, and altered appearance. Psychosocial support is integral to addressing these psychological challenges during the healing process.

Management:

Managing healing in burned patients requires a comprehensive and multidisciplinary approach:

Wound Debridement: Effective wound debridement is essential to remove necrotic tissue and establish a healthy wound bed. Surgical debridement, enzymatic debridement, or autolytic debridement are employed based on the patient's condition.

Infection Control: Rigorous infection control measures, including the use of antimicrobial agents, sterile dressings, and isolation precautions, are vital to prevent infections that can impede the healing process.

Nutritional Support: Burn patients often experience hypermetabolism, requiring increased caloric intake and specific nutritional interventions to support the healing process. Enteral or parenteral nutrition may be necessary, with a focus on protein and micronutrient supplementation.

Burn-Specific Wound Care Products: Advancements in wound care have yielded specialized dressings, such as silver sulfadiazine, honey-based dressings, and biologic dressings. These products assist in creating an optimal environment for wound healing.

Surgical Interventions: In severe cases, surgical interventions are crucial. These may include skin grafts, where healthy skin is transplanted to cover burn wounds, or tissue expansion techniques that encourage the growth of new skin.

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The management of healing in burned patients is a dynamic and evolving field, driven by scientific advancements and interdisciplinary collaboration. As we progress further in this bibliographic review, we will explore recent innovations and strategies aimed at enhancing the healing process in burned patients, ultimately improving the overall outcomes and quality of life for those affected by burn injuries.

DISCUSSION

Advances in Burn Management:

Recent years have witnessed significant advances in burn management, particularly in the realm of wound healing. Innovations in wound care products and techniques have improved the overall approach to healing in burned patients.

Wound Dressings: Silver sulfadiazine, for example, has been a cornerstone in burn wound management. This topical antimicrobial agent helps prevent infections and promote healing. Additionally, honey-based dressings have gained attention due to their natural antibacterial properties and potential to accelerate wound closure. Biologic dressings derived from human or animal sources have shown promise in promoting wound healing by providing a biologically active scaffold for tissue regeneration.

Tissue Engineering: Tissue engineering holds great potential in the field of burn wound healing. The use of bioengineered skin substitutes, such as cultured skin grafts and tissue-engineered dermal matrices, offers an exciting avenue for replacing damaged skin. These substitutes aim to restore not only the structural but also the functional properties of the skin, improving the quality of healing and minimizing complications like scarring and contractures.

Psychosocial Aspects:

The psychological well-being of burned patients is an integral component of healing. Burn injuries can cause profound psychological distress, including symptoms of anxiety, depression, and post-traumatic stress disorder (PTSD). In this context, psychosocial support and counseling are vital. Mental health professionals play a crucial role in helping patients cope with the emotional challenges associated with burn injuries, aiding in their recovery and reintegration into daily life.

Holistic Care: A holistic approach to managing healing in burned patients goes beyond the physical and psychological aspects. It considers the patient's social, cultural, and economic context. Rehabilitation, including physical and occupational therapy, plays a pivotal role in restoring functionality and quality of life for burn survivors. Furthermore, patient and family education is essential, ensuring that they understand the wound care regimen, follow-up appointments, and the importance of ongoing self-care.

Future Directions:

The landscape of burn wound healing is continually evolving, with ongoing research and clinical trials. Novel approaches, such as stem cell therapy and regenerative medicine, hold

promise for enhancing the outcomes of burn patients by promoting tissue regeneration and minimizing complications. Additionally, personalized medicine in burn care is emerging as a potential paradigm shift. The ability to tailor treatments based on individual patient characteristics, genetics, and wound profiles may optimize healing outcomes.

Infection control remains a critical area of focus, with researchers exploring new antimicrobial agents, wound dressings, and preventive strategies to reduce infection rates in burn patients.

CONCLUSION

In conclusion, the management of healing in burned patients is a complex and multifaceted process, involving risk factors, complications, and innovative strategies. Recent advances in wound care, tissue engineering, and psychological support have significantly improved the outcomes for burned patients. The holistic approach, encompassing physical, psychological, and social aspects of care, is fundamental in achieving comprehensive healing.

As we look to the future, ongoing research and advancements offer hope for even better outcomes in burn wound healing. The commitment to addressing the unique needs of each patient, while continually seeking ways to enhance care and minimize complications, underscores the importance of a multidisciplinary approach in the management of healing in burned patients.

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