

Role of Silver Alginate Dressings on Split Skin Graft Site to Prevent Post-operative Infection

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Abstract

Burn injuries can be devastating, not only causing physical pain and trauma but also increasing the risk of infections, which can further complicate the healing process. Therefore, finding effective methods to prevent postoperative infections is crucial for the successful treatment of burn patients. In this study we consider the effectiveness of silver containing alginate dressings for deep partial thickness burns in a patient with accidental thermal burns. Silver alginate dressings consist of a combination of silver and sodium alginate, a natural polysaccharide derived from seaweed. The silver in it has antimicrobial properties, making it an ideal choice for preventing infection. The dressings are available in various forms, such as sheets, dressings, and ropes, allowing for versatile usage in wound care management. They are able to maintain a moist environment as well as prevents wound infection. They are found to be useful in various conditions including burn wound, skin graft donor site and other conditions like pressure injuries. Silver alginate dressings are highly effective in managing burn wounds due to their unique combination of antimicrobial and wound-healing properties. The alginate interacts with wound exudate to form a gel, maintaining a moist wound environment that promotes tissue regeneration, while the silver provides broad-spectrum antimicrobial action, preventing infections caused by bacteria, fungi, and even antibiotic-resistant pathogens like MRSA. In burn care, silver alginate dressings are particularly beneficial for partial-thickness burns (second-degree burns) and donor sites after skin grafting. They are highly absorbent, making them suitable for burns with moderate to heavy exudate, while reducing the risk of maceration in surrounding skin. The gel formation also minimizes pain during dressing changes, as it prevents adhesion to the wound bed.

Keywords: Silver; Alginates; SSG site; Donor site; Post-op infection.

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INTRODUCTION

Burn injuries are among the most devastating and traumatic experiences individuals can endure. Once the initial trauma is over, patients are faced with the challenge of healing their wounds and preventing post-op infections. One effective solution that has emerged is the use of silver alginate dressings in the site of split-thickness skin graft (SSG) and donor site. Silver alginate dressings have been gaining attention in recent years due to their potential role in preventing postoperative infections and improving outcomes in burn patients.¹



Silver alginate dressings consist of a combination of silver and sodium alginate, a natural polysaccharide derived from seaweed. The silver component possesses antimicrobial properties, making it an ideal choice for preventing infection. The dressings are available in various forms, such as sheets, dressings, and ropes, allowing for versatile usage in wound care management.

MATERIALS AND METHODS

This study was conducted in a Tertiary Care Centre in the Department of Plastic Surgery after getting the departmental ethical committee approval. Informed consent was obtained. The subject was a 67-year-old female who suffered an accidental burn injury and developed 35 percent deep partial-thickness burn wounds (fig. 1). She was admitted to the JIPMER Tertiary Burn Centre and was hemodynamically stabilized for the first 4 days. She underwent dermabrasion-assisted tangential excision using Manekshaw's dermabrader and split skin grafting (fig. 2). The grafted (fig. 3) and the donor site (fig. 4) were then covered with silver alginate dressing. Dressing changed on postoperative day 5 (fig. 5)

RESULTS

The wound bed preparation of large burn wound area was done using blunt dermabrasion. She further underwent dressing with silver alginate dressings. This reduced the biofilm burden and hastened the process of wound healing. She underwent multiple sessions of regenerative therapy. The wound granulated well and patient has no evidence of post infection.



Fig. 1: Partial thickness burn wound



Fig. 2: skin graft site



Fig. 3: Silver alginate dressing at Split Skin Graft site



Fig. 4: Silver alginate dressing at donor Site



Fig. 5: Donor site after 5 days

DISCUSSION

Wound healing is a complex phenomenon that is divided conventionally into four phases- hemostasis phase, inflammatory phase, proliferative phase, and phase of maturation. Each phase overlaps with the other. Soon after the injury, the hemostasis phase begins leading to the formation of the platelet plug. Activation of platelets and the complement system leads to release of several growth factors that activate the inflammatory phase. Recruitment of leucocytes, initially neutrophil followed by lymphocytes and macrophages, is the hallmark of this phase.² Macrophages release several growth factors like- platelet-derived growth factor (PDGF), transforming growth factor (TGF-beta and TGF-alpha), basic fibroblast growth factor (bFGF) and vascular endothelial growth factor (VEGF)³ These growth factors are responsible for the proliferation, angiogenesis, deposition of collagen, and extracellular matrix (ECM) and the maturation phase. Non-healing wound is caused by an imbalance of growth factors so that these phases do not occur in a timely fashion or their progression is stopped at a different level.

Silver alginate dressings are a type of wound dressing made from natural fibers derived from brown seaweed. They have unique properties that make them highly effective in preventing infections. The addition of silver to the dressings has been found to enhance their antimicrobial properties, making them an ideal choice for wound care in burn patients.

One of the key benefits of silver alginate dressings is their ability to create a moist environment at

the site of the surgical site graft (SSG)⁴ or donor site.⁵ This moisture aids in the healing process by promoting the growth of new tissue and preventing the wound from drying out. Dry wounds are more prone to infections⁶ and can slow down the healing process. By maintaining an optimal level of moisture, silver alginate dressings create an environment that is conducive to healing.⁷

In addition to the moisture-retaining properties, silver alginate dressings also possess excellent antimicrobial activity. Silver ions released from the dressings have the ability to kill a wide range of microorganisms, including bacteria, fungi, and even some antibiotic-resistant strains. This antimicrobial activity helps to reduce the risk of infection at the SSG or donor site.

Postoperative infections at the SSG or donor site can have serious consequences for burn patients. These infections can lead to delayed wound healing, increased scarring, and even systemic infections that can be life-threatening. By using silver alginate dressings, healthcare providers can take a proactive approach to prevent such infections and improve patient outcomes.

Another advantage of silver alginate dressings is their versatility. They can be used on both partial-thickness and full-thickness burns, making them suitable for a wide range of burn injuries. The dressings can conform to the shape of the wound, ensuring a snug fit that provides continuous protection. This adaptability makes them a practical choice for wound care in burn patients.

It is worth noting that although silver alginate dressings have shown promising results in preventing postoperative infections, they should not be seen as a standalone treatment. Proper wound care, including cleansing and regular dressing changes, is essential for optimal healing. Additionally, healthcare providers should closely monitor the wound for signs of infection, such as increased redness, swelling, or drainage.

CONCLUSION

There are multiple modalities in wound bed preparation that include debridement, Autologous Platelet Rich Plasma, Amniotic membrane grafting, Regulated Oxygen Enriched Negative Pressure Wound Therapy, regenerative grafting and biological scaffolding. Each modality contributes in some way to make the wound fit for grafting and ultimately speeds up wound healing and patient discharge timing.

Silver alginate dressings have antimicrobial properties, and help in maintain a moist environment, and its non-adherent nature make it an optimal choice for wound care management. Silver alginate dressings reduce the risk of infection, promote faster healing, and improve patient outcomes. As the field of wound care continues to evolve, silver alginate dressings stand as an essential tool in the fight against post-op infections in burn patients

Conflict of Interest: None declared.

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