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Innovative Method of Filling Collagen Particles in Difficult Cavity Wounds

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Abstract

Difficult cavity wounds have undermined and tunnelling morphology of their edges or a location which is difficult to access. Collagen dressing is an interactive dressing designed for wound management. Collagen particles are designed for cavity wound management. Filling the difficult cavity wound with collagen particles has some practical problems. To overcome these problems, we have used an innovative method of filling collagen particles in difficult cavity wound. Innovative method of filling collagen particles is simple and effective solution of the problems faced in managing difficult cavity wounds.

Keywords: Difficult cavity wounds; Collagen particles; Wound bed preparation.

Key message: Innovative method of filling collagen particles is simple and effective solution of the problems faced in managing difficult cavity wounds.

INTRODUCTION

Definition of a 'wound' is: loss of continuity of the skin or mucous membrane with associated tissue loss.[1] A wound is called as 'cavity wound' if the tissue loss is beyond the subcutaneous tissue and underlying tendons, muscle, or bone are exposed.[1] 'Difficult cavity wounds' have undermined and tunnelling morphology of their edges or a location which is difficult to access. Collagen particles are designed specifically for cavity wound management.[2] Filling the cavity wound with collagen particles has a practical problem of spillage and difficult packing. Also significant amount of collagen particles get lost after application of secondary dressing over the collagen filled cavity wound. To overcome these problems we have used an innovative method of putting the collagen particles in cavity wound. Through this article, we share our experience of using this innovative method in a single case.

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MATERIALS AND METHODS

This is a case report of the use of Innovative Method of Filling Collagen Particles in Difficult Cavity Wounds in a electrical burn wound. This study was conducted in a JIPMER, tertiary care hospital in 2024, a case of 8 years old male child with electrical burns (35%). Informed written consent was taken from the patient. The patient

had a raw area with a cavity over the scalp following the electrical burn (Fig. 1). The patient was thoroughly investigated. Wound tissue culture was sent and appropriate antibiotic therapy was given. Regular cleaning and dressings were done for two weeks but the wound failed to show any healthy granulation tissue. To promote the healing, decision was made to give trial therapy of Innovative Method of Filling Collagen Particles (Fig. 2). Under all aseptic precautions, cleaning and draping was done. Collagen granules was sprayed uniformly over the raw area with a cavity along with collagen gel and a sterile dressing was applied (Fig. 3). The collagen granules with collagen gel was applied every time the dressing was changed (twice a week). The wound was assessed weekly by clinical examination.

RESULTS

With regular filling Collagen Particles in Difficult Cavity Wounds, the wound starts granulating and size also decreased. The wound area was measured using digital planimetry. Before the application of collagen granules, it was 5.7 cm2 (Fig. 1). After three weeks, no ulcer or cavity is noted (Fig. 3). The wound also developed red healthy granulation tissue. (Fig. 3)

Fig. 1: Showing condition of raw area following electrical burn at the time of presentation

Fig. 2: Showing the collagen granules used

Fig. 3: Showing application of collagen granules and collagen gel over the raw area in scalp

Fig. 4: Showing the result of the application of collagen granules

DISCUSSION

Principles of wound management are summarized by acronym 'SWCR':[4]

1. Systemic analysis of patient and wound
2. Wound bed preparation
3. Clinical decision making
4. Repair, reconstruct and rehabilitate Like any other wound, principles of wound management remain same for cavity wound also.

However, approach of management differs.[1] Wound bed preparation is a critical part of wound management before proceeding to reconstruction and rehabilitation. There are four components of wound bed preparation which can be summarized by acronym 'TIMES'[4]

1. Tissue debridement (of non-viable and infected tissue)
2. Inflammation and infection control
3. Moisture balance
4. Edge of the wound- epithelial advancement
5. Surrounding tissue (control of oedema, inflammation and venous stasis)

Once the tissue debridement is completed the focus of wound management shifts to other components of wound bed preparation. Role of wound dressing is to maintain the adequate moisture and provide favourable wound environment for epithelial advancement.

Simultaneously wound dressing should also control local infection and inflammation, while preventing further infection from outside the wound.[5]

Collagen dressing is an interactive dressing designed for wound management. It acts as a sacrificial substrate to deal with elevated levels of matrix metalloproteinases (MMPs).[6] This help the endogenous native collagen to continue normal wound healing.[6] Collagen dressings are available in various forms: sheet, foam, gel, particles etc. Medicated collagen particles are effective tool of cavity wound management.[2] Some cavity wounds are diff cult to access due to their location or morphology. Filling the cavity with collagen particles has some practical problems in such wounds:

1. Significant amount of particles gets spilled out of the margins of wound while filling.
2. Cavities located in antigravity direction are further difficult to fill.
3. Packing of particles in the cavity is also important to achieve contact of collagen with maximum wound surface area. Effective packing is difficult in such cavity wounds.
4. Once cavity is filled and packed with the collagen particles, it needs to be covered with secondary dressing. Significant amount of collagen gets lost in contact with the secondary dressing. Innovative method of collagen filling proposed in this article deals with all above problems. The method is simple, effective and reproducible. It can be used for other cavity wounds like pressure sores, diabetic foot, burst abdomen etc. Limitation of this method is that it increases cost of the dressing. This study does not compare various options of cavity wound management. Randomized control trials for validation of effectiveness of this method are required.

CONCLUSION

Innovative method of fi ling collagen particles is simple and effective solution of the problems faced in managing difficult cavity wounds.

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