

Role of Modified Egg Membrane in Wound Healing

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Abstract

Ulcer is a discontinuity in the lining of the skin. It may be acute or long standing. Non-healing ulcers are associated with delay in the healing process and a prolonged morbidity for the patient. There are providing wound coverage including flap coverage, skin grafting, temporary substitutes for dressing etc. In this article we have used modified egg membrane by boiling the egg application for healing of wound and have found it to be useful.

Keyword: Modified egg membrane; Non-healing ulcer.

Introduction

Chronic ulcers are a challenge for the plastic surgeon. There is a delay in wound healing due to various factors like foreign material, decreased growth factors, decreased nutrition, underlying infection etc. and coverage can be given to chronic wound after adequate wound bed preparation (WBP). Biological membranes are used in wound healing which include human amnion, porcine xenograft, alloderm etc.

Materials and Methods

This study was conducted in the department of Plastic Surgery at tertiary care center with the departmental ethical committee approval. Informed written consent was obtained from the patient. The details of the patient are as follows: 37 year old female without co-morbidities with h/o road traffic accident 4 months back, underwent right below knee amputation due to a vascular injury and a degloving injury of the left lower limb for which serial debridement was performed in cardiothoracic and general surgery department.

Now, the patient presented to plastic surgery department with extensive raw area over the left lower limb and non-healing ulcer over the right below knee amputation stump. The regular dressing did not lead to wound healing and had left raw areas which did not heal completely (figure 1). We used boiled egg for getting egg membrane for dressing for the raw areas.

Egg membrane was harvested by boiling the egg at 100-degree Celsius and making the outer shell of the egg sterile by immersing in 70% alcohol for 5 minutes. The egg was broken and the egg membrane between the egg shell and the contents was made sterile by immersing in penicillin or gentamicin. The egg membrane was applied over the non-healing ulcer (figure 2). Repeat dressings were done on post-operative day 5 and on the subsequent alternate days till 4 dressings.

Results

There was good wound healing of the recipient areas of the wound. (figure 3)



Fig. 1: Non healing ulcer.



Fig. 2: Egg membrane treatment.



Fig. 3: After egg membrane treatment.

Discussion

An ideal wound dressing can provide an environment suitable for rapid infection-free healing, cause minimal pain, require minimal care. Although some commercial synthetic or composite materials meet these requirements, they are costly and not very user-friendly. Among biological dressings, human amniotic membranes are useful in partial thickness skin wounds as a temporary dressing that can promote reepithelialisation. In clinical applications, amniotic membranes are fragile, difficult to use, become easily macerated, and are not readily available.¹ Porcine skin is another material that has been used as a biological dressing. However, as Salisbury et al.², porcine xenografts incorporated into the wounds of patients, caused pronounced inflammatory responses and a prolonged healing time. Finally, collagen sheets become easily macerated; excessive wound discharge occurs; and the material is useful for superficial donor site wounds.^{3,4} Egg membrane, the protective covering for chicken embryos, is a mixture of protein and glycoprotein. Egg membrane was first used in clinical trials in 1981, as described by Maeda and Sasaki.⁵ Maeda and Sasaki presented 3 cases with epithelialization and concluded that egg membrane is an inexpensive and a reliable biological dressing. Egg membrane is thin (60-70 μm), highly collagenized fibrous connective tissue comprised of both an inner and an outer layer. Egg membrane is comprised mainly of protein, making up 88%-96% of dry weight⁶, and its unique structure

provide adhesion and vapor transmission. Egg membrane is a cell membrane sheet that without a nuclear DNA. Theoretically, egg membrane has very less antigenicity. The advantage of using boiled egg membrane is that we can harvest larger area of membrane.

Conclusion

Egg membrane can be used as treatment of non-healing ulcers.

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