Regenerative Medicine: Urinary Bladder Matrix* assistance with High Risk Diabetic Limb Salvage

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INTRODUCTION AND BACKGROUND

Relatively recently, and in parallel with the understanding of the key role of ECM in wound healing, biomaterial science has evolved allowing the harvesting and processing of biological tissue into high quality biomaterials suitable for regular clinical use. For example, the acellular ECM isolated from the porcine bladder, or other similar materials isolated from the intestinal submucosa, are complex, multicomponent biomaterials that have potential for making transformational changes in the practice of wound healing. In the context of wound healing, of particular significance is the use of the Basement Membrane layer in the ECM material*. One of the best sources of an easily harvestable and reliable acellular Basement Membrane/ECM is the porcine urinary bladder matrix or UBM.

CASE 1

A 32 year-old male with a past medical history for poorly controlled Type II diabetes with peripheral neuropathy presented with a 1 week history of an abscess at the lateral aspect of his right heel. He could not recall any trauma to the area or any other inciting events. He stated that he recently noticed a red, swollen blister with pus draining. Upon presentation, his vascular status was intact and he had a deep, tunneling abscess, just anterior to the Achilles tendon on the lateral aspect of his heel. The wound measured 0.5cm x 0.7cm x 1.5cm. The abscess was initially drained and debrided. Membrane/ECM material was packed into the deep tunnel and covered with oil emulsion and a mildly compressive dressing. The patient was given a post-op shoe to wear. He returned weekly for serial debridements, at each visit the Basement Membrane/ECM was placed into the wound. At 4.5 weeks, the wound had epithelialized completely.

The Wound Center is developing a protocol of using this UBM derived Basement Membrane/ECM associated biomolecules to “fill” a tissue defect, hypothesizing that the complex interplay of the Basement Membrane components will provide the ability to recruit progenitor cells that may progress on to differentiate into a number of tissue types that fill the wound as nature intended.

In this study we used the Basement Membrane/ECM material on a series of diabetic wounds that had resisted all efforts in healing. Each patient had significant co-morbidities and associated problems, the objective of the study was to note if the Basement Membrane/ECM material would change the dynamics of wound that is stalled in a precarious state of equilibrium with no healing observed using other advanced treatment methods.

DISCUSSION OF RESULTS

A newly available Basement Membrane containing Extracellular Matrix (ECM) Wound Sheet** has properties that may augment the natural wound healing process which is severely compromised in patients with complex co-morbidities. In addition to modest wound healing practices, it is possible that such complex biomaterials, which have proven ability to recruit wound healing cells, can make a real difference in disturbing the non healing equilibrium associated with the chronic wounds. It is also possible that these technologies will be the used in the healing of chronic wounds of the future, now that the concept of “active” wound healing is possible in a large measure. We believe that the remarkable healing that was demonstrated on four patients with non healing venous insufficiency associated wounds through the use of the Urinary Bladder Matrix with Basement Membrane/ECM components saved significant resources, pain, and time. More research in this area is intended in future.

CONCLUSION

Urinary Bladder Membrane containing the Basement Membrane and other Extracellular Matrix (ECM) components is an effective product to assist in healing of all diabetic ulcers, including severe, limb threatening wounds.

REFERENCES


*Medline industries Inc., Mundelein, IL.

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