The Concurrent Use of Ovine Collagen Extracellular Matrix Dressing with Negative Pressure Wound Therapy on Three Acute Surgical Wounds

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Objective:
To observe progression on the concurrent use of ovine collagen extracellular matrix dressing (CECM) and negative pressure wound therapy (NPWT) as part of a wound management plan for three acute surgical wounds.

Introduction:
Creating an optimal environment for wound healing is critical to achieve positive outcomes in postoperative surgical wounds to heal by secondary intention. Optimizing wound healing conditions may help prevent infection, wound-stalling, and/or potential conversion into a chronic wound. Healthy granulation tissue within the wound bed will facilitate wound closure. The extracellular matrix (ECM) of a cell plays a role in encouraging and supporting the formation of granulation tissue growth and epithelialization. The intact natural structure of the extracellular matrix helps regulate intracellular communication, provides a scaffolding to support cell in-growth or granulation tissue formation, and may help inhibit matrix metalloproteinases (MMPs) that are not visible clinically in the wound bed. CECM retains the structure and function of the native ECM. The modes of action for NPWT are not completely understood, and different levels of evidence exist which establish that NPWT facilitates tissue growth by cell distortion, increasing cell mitosis, promoting angiogenesis and removal of wound exudate. One prospective case controlled showed that, when compared to using NPWT alone, the use of CECM and NPWT together showed a difference in time to wound closure in DFUs by average of 10 days.

Methodology:
As part of post-surgical wound management, three patients with complex medical histories had surgical wounds that were treated with CECM and NPWT. Dressings were changed two to three times a week per NPWT instruction for use. CECM was reapplied during NPWT dressing change.

Conclusion:
In this case series, the concurrent use of CECM and NPWT as part of a wound management strategy helped provide an environment conducive to wound healing. All wounds resulted in formation of granulation tissue growth necessary for wound healing. Two of these wounds were followed to closure.

Case Study 1
Patient: 55-year-old male
Post medical history:
- Diabetic, right foot Charcot, Post removal of hardware and debridement to right dorsal ankle secondary to osteomyelitis and infected hardware with Methicillin sensitive Staphylococcus aureus (MSSA)
Previous wound management:
- Antibiotic therapy and NPWT post-surgery
Wound management: CECM, contact layer placed under NPWT, maintained at 75mmHg dynamic pressure continuous (DPC). Dressings changed twice a week treatment plan during the remainder of the week.

Case Study 2
Patient: 44-year-old female
Post medical history:
- Stage II b poorly differentiated squamous cell CA of the cervix with distant metastasis
- Chemotherapy. Post-Hartmann’s procedure with end colostomy secondary to perforated sigmoid colon
Wound History:
- 1-month post-surgery, developed pain and cellulitis surrounding the stoma.
- Incision and drainage was performed
- Dehiscence midline abdominal incision with wounds on the peritoneal area
Previous wound management:
- Negative pressure wound therapy for 3 weeks
Wound management:
- CECM applied to wound bed with NPWT. Set at 50 mmHg continuous cycle.
Dressings changed twice a week

Wound Description: (after initial 3 weeks of NPWT)
- Midline incision: 6.1 cm x 2.5 cm x 2.2 cm with 6-0 suture tunneling at the 12 o’clock position with 100% wet real tissue. Periosteal wound: 3 s/dock: 1.6 cm x 1.6 cm x 1.4 cm; 4 to 11 o’clock: 4.7 cm x 3.0 cm x 1.3 cm

Case Study 3
Patient: 56-year-old male with midline midline incision
Post medical history:
- Crohn’s disease, ileocolonic resection and additional abdominal surgeries due to intestinal obstructions.
Wound management:
- Application of CECM to wound bed including undermined areas, contact layer and NPWT set at 100 mmHg continuous cycle.

Month 0
- Wound description: 10.8 cm x 3.1 cm x 0.2 cm with complete resolution of undermining. 100% granulating tissues

Month 3
- Wound description: 6.0 cm x 3.5 cm x 0.1 cm. Tissue continued to be red, moist and granular with complete resolution of undermining.
- CECM dressing changed fields a week.
- Wound closure at the end of month 5

**References**