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.[1] The intact natural structure of the extracellular matrix helps regulate intracellular communication,[2] provides a scaffolding to support cell in-growth or granulation tissue formation, and may help inhibit matrix metalloproteases (MMPs) that are not visible clinically in the wound bed.[3] CECM retains the structure and function of the native ECM.[4] 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.[5] 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.[6]

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

Past medical history:

- Diabetic, right foot charcot. Post removal of hardware and debridement to right dorsal ankle secondary to osteomyelitis and infected hardware with Methycillin sensitive Staphlycoccus 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.

Day 0
Wound measurement:
11.0 cm x 9.0 cm x 1.0 cm

Day 0
Wound management:
NPWT dressing

Day 0
Wound management:
CECM dressing

Day 10
Wound measurement:
11.2 cm x 8.0 cm x 0.4 cm

Case Study 2

Patient: 44 year-old female

Past medical history:

- Stage II B poorly differentiated squamous cell CA of the cervix with distant metastasis
- Diverticulitis. 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
- Dehisced midline abdominal incision with wounds on the peristomal 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 incisions: 6.3 cm x 2.3 cm x 2.2 cm with 6.2 cm tunneling at the 12 o'clock position with 100% red moist tissue. Peristomal wound at 3'oclock: 1.6 cm x 1.6cm x 1.4 cm; 4 to 11 o'clock: 4.7 cm x 3.0 cm x 1.3 cm

Month 0

Month 1
Wound description:
4.7 cm x 3.0 cm x 1.3 cm - peristomal wounds: granulating tissues

Month 2 - *By month 3 all wounds closed*

Case Study 3

Patient: 56 year-old male with dehisced midline incision

Past medical history:

- Crohn's disease. Ileocolic 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:
19.5 cm x 7.5 cm x 1.5 cm with undermining at 11-1 o'clock and 7-8 o'clock measuring 1.0 - 2.0 cm. Wound bed tissue was 70% red moist tissue and and 30% yellow moist adherent. CECM was applied to red moist tissue

Month 3
Wound description:
10.8 cm x 3.1 cm x 0.2 cm with complete resolution of undermining. 100% granulating tissues

Month 1
Wound description:
100% granulation tissues
14.8 cm x 4.8 cm x 0.5 cm. and undermining decreased to 1cm

Month 5
Wound description:
6.0 cm x 3.0 cm x 0.1 cm. Tissue continued to be red, moist and granular with complete resolution of undermining
Wound management:
CECM dressings covered with foam dressings. CECM dressing changed twice a week. Wound closure at the end of month 5

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* Endoform™ dermal template, manufactured for Hollister Incorporated.

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