Use of ovine collagen extracellular matrix (CECM)* dressing and gentian violet and methylene blue (GV/MB) antibacterial foam** dressing in the management of diabetic foot ulcers

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INTRODUCTION: Diabetic foot ulcers (DFU) are estimated to affect ~15% of all diabetic individuals during their lifetime. The management and treatment of DFU’s can be costly and complex. In 2008, the mean reimbursement for all Medicare related services for DFU’s was $35,100. DFU’s also have a negative effect in the quality of life on diabetic patients as a result of decreased mobility. Early intervention is important to prevent further complications and improve quality of life of patients with DFU’s. Chronic wounds represent a failure in the normally ordered sequence of wound healing. Changes in local pH, temperature, and amounts of chemical reactants are all factors influencing wound healing. The three main components of local wound management include: debridement, infection/inflammation, and moisture balance. Boilsur, or critical bacterial colonization, leads to persistently high levels of matrix metalloproteinases (MMP) being released from inflammatory cells that digested the normal collagen scaffold in the base of a healing wound. Using advanced wound care products may assist to achieve wound healing in a timely manner.

OBJECTIVE: To describe the use of CECM, and in combination with gentian violet and methylene blue (GV/MB) antibacterial foam, to manage MPMs and bioburden in DFU.

METHODS AND MATERIALS: Patients were selected with wounds of diabetic origin. The CECM and GV/MB antibacterial dressings were changed according to product instructions for use. Assessments and measurements were performed by the clinician weekly.

CONCLUSION: The use of the dressings in this case series were helpful in the management of these complex wounds. Both the CECM and GV/MB antibacterial foam dressings may have been instrumental in MPM and bioburden reduction with complete resolution of wounds without complication. Overall patient satisfaction and compliance were also observed by the clinician.

Case Study 1 - Diabetic Foot Ulcer - Right Plantar 5th metatarsal
Patient: 70-year-old male with 1 week old diabetic foot ulcer.
Past medical history:
- Diabetes with neuropathy, hypertension.

Previous treatment:
- None.

Wound treatment:
- Sharp debridement.
- CECM, non-adherent contact layer, GV/MB antibacterial foam dressing secured with rolled gauze. Dressing changed weekly.
- Post-op shoe with accommodative padding

Initial wound measurement: 1.2 cm x 1.4 cm x 0.4 cm

Wound Description: Partial debridement, loose palpable

Week 7 Wound measurement: 0.5 cm x 0.4 cm x 0.3 cm

Week 9 Wound measurement: 0.2 cm x 0.2 cm x 0.2 cm

Wound Description: Partial debridement, loose palpable

Week 10 Wound healed

Week 20 Wound measurement: 1.5 cm x 0.5 cm x 0.3 cm

Wound Description: 60% granulation tissue, 20% thinned tissue with moderate drainage

Week 24 Wound measurement: 1.0 cm x 1.2 cm x 0.3 cm

Wound Description: Clear red tissue with healthy serous-glycemic drainage with tendon exposed

Week 28 Wound measurement: 0.8 cm x 0.8 cm x 0.3 cm

Wound Description: Red granulating tissue with tendon visible

Week 31 Wound healed

Case Study 2 - Diabetic Ulcer Achilles
Patient: 70-year-old male with 8 month old diabetic ulcer over Achilles.
Past medical history:
- Uncontrolled diabetes, neuropathy, peripheral vascular disease, > 50 years of tobacco use.

Previous treatment:
- Recreational walking with shoes to left leg and angiography x 2.

Wound treatment:
- Failed Cellular tissue based dressing weekly, silver foam, and secure with roll gauze. Dressings changed weekly.

Initial wound measurement: 8.0 cm x 5.5 cm x 0.3 cm

Wound Description: Clean red tissue with healthy serous-glycemic drainage with tendon exposed

Week 2 Wound measurement: 8.5 cm x 3.6 cm x 0.3 cm

Wound Description: Clear red tissue with healthy serous-glycemic drainage with tendon exposed

Week 3 Wound measurement: 1.5 cm x 0.5 cm x 0.3 cm

Wound Description: Red granulating tissue with tendon visible

Week 5 Wound measurement: 1.0 cm x 0.5 cm x 0.2 cm

Wound Description: Wound separated into 2 wounds

Week 7 Wound measurement: 6.0 cm x 3.5 cm x 0.3 cm

Wound Description: Wound separated into 2 wounds

Week 9 Wound measurement: 8.5 cm x 2.0 cm x 0.3 cm

Wound Description: Granulating tissue with epidermalization on wound edge

Week 13 Wound healed

Case Study 3 - Diabetic foot ulcer: Right Dorsal Foot
Patient: 59-year-old male presented to emergency room with acute necrotizing gangrene with abscess of right dorsal foot with osteomyelitis.
Past medical history:
- Hypertension, uncontrolled diabetes.

Previous treatment:
- 2nd and 3rd day resection with incision and drainage of abscess.

Systemic antibiotic for 14 days.

Podiatric resection, began 1 week of Negative pressure wound therapy (NPWT) followed by an Amniodet stem cell graft for 2 weeks.

At week 4, CECM was applied once a week and discontinued due to copious amount of drainage.

Wound treatment:
- At week 5, the use of GV/MB antibacterial polyurethane alcohol (PWA) foam, 4% hyaluronic acid gel, secure in place with rolled gauze and elastic bandage. Dressings changed 2 times a week for one week. After one week, frequency was changed to daily due to copious amount of drainage. At week 20, drainage decreased. GV/MB antibacterial PVA foam was discontinued. Wound treatment changed to hydrogel, CECM, covered with non-adherent contact layer, 4% sterile gauze, secure with roll gauze and elastic bandage. Dressings changes were done once a week.

Initial wound measurement: 1.4 cm x 5.5 cm x 0.6 cm

Wound Description: Copious serous drainage with tendon exposed

Week 5 Wound measurement: 1.0 cm x 0.5 cm x 0.2 cm

Wound Description: Wound separated into 2 wounds

Week 9 Wound measurement: 0.8 cm x 0.4 cm x 0.3 cm

Wound Description: Wound separated into 2 wounds

Week 11 Wound measurement: 1.6 cm x 0.6 cm x 0.2 cm

Wound Description: Wound separated into 2 wounds

Week 13 Wound healed

Case Study 4 - Diabetic Foot Ulcer - Left Lateral Foot
Patient: 55-year-old female presented to emergency room with elevated white count, febrile with acute necrotizing gangrene to left lateral foot with osteomyelitis.
Past medical history:
- Uncontrolled diabetes, neuropathy.

Previous treatment:
- 4th and 5th day resection with incision and drainage of abscess.

Systemic antibiotic for 14 days.

Negative pressure wound therapy (NPWT) for one week post-surgery.

Cellular tissue based wound dressing was applied for 21 days.

Wound treatment:
- Application of hydrogel and CECM, covered by a non-adherent contact layer and GV/MB antibacterial PVA foam, and secured with roll gauze. Based on clinical preference, dressing changed weekly.

Initial wound measurement: 3.0 cm x 2.0 cm x 0.3 cm

Wound Description: Wound separated into 2 wounds

Week 2 Wound measurement: 8.0 cm x 3.4 cm x 0.3 cm

Wound Description: Wound separated into 2 wounds

Week 5 Wound measurement: 1.0 cm x 0.5 cm x 0.2 cm

Wound Description: Wound separated into 2 wounds

Week 9 Wound measurement: 0.5 cm x 0.3 cm x 0.3 cm

Wound Description: Wound separated into 2 wounds

Week 11 Wound measurement: 1.4 cm x 0.5 cm x 0.2 cm

Wound Description: Wound separated into 2 wounds

Week 13 Wound healed

* CE Collagen Extracellular Matric (CECM)
** GV/MB antibacterial foam