The Effects of Negative-Pressure Wound Therapy on Complex Extremity Wounds Requiring Coverage with a Meshed Bilayer Wound Matrix: A Retrospective Analysis

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Study Overview:

-In this retrospective review, we compare the use of Integra® Meshed Bilayer Wound Matrix (IMBWM) combined with negative-pressure wound therapy (NPWT) versus IMBWM alone for the treatment of complex extremity wounds.

-Records between January 2015 and December 2019, of patients undergoing extremity wound coverage with IMBWM at a single academic institution, University Medical Center El Paso, were queried using data obtained from electronic medical records.

-Data from 109 patients undergoing treatment with IMBWM for a complex extremity wound coverage were collected. Among them, 62 patients were treated with IMBWM and NPWT, and 47 with IMBWM alone. The most common etiology of these injuries was trauma.

Inclusion Criteria/Results:

-Patient age range was set between 18 - 80 years with complex extremity wounds requiring coverage with IMBWM. In this study, complex extremity wounds are defined as those with muscle, tendon or bone exposed. Patients were excluded if their wounds were non-complex wounds, not located on an extremity, or if IMBWM was not used for initial coverage. Patients meeting the inclusion criteria were stratified by the concomitant use of a wound VAC device.

-The combination of IMBWM and NPWT was superior to IMBWM alone in terms of success rate (96% vs 85.9%). The reapplication and complication rates were lower when IMBWM was used in combination with NPWT versus alone; 3.2% vs 14.9% (reapplication) and 3.2% vs 8.6% (complication), respectively. Our results show 11 patients treated with a combination of IMBWM and NPWT have fewer additional matrix reapplications prior to split-thickness skin graft (STSG), higher success rate, and fewer postoperative complications for the treatment of complex extremity wounds.

Study Conclusion:

-Our results show the combination of IMBWM and NPWT has a positive synergistic effect demonstrated by fewer reapplication of matrix, and lower postoperative complications when compared to use of IMBWM alone prior to STSG for the treatment of complex extremity wounds. This combination led to a high percentage of wounds healed.

-The use of IMBWM in combination with NPWT has the potential to improve both surgical procedures and patient outcomes in the setting of complex extremity wounds.

-Treatment with IMBWM and NPWT requires less technical skill than traditional methods, increasing the availability of complex wound treatment to more than just specialty surgery centers.

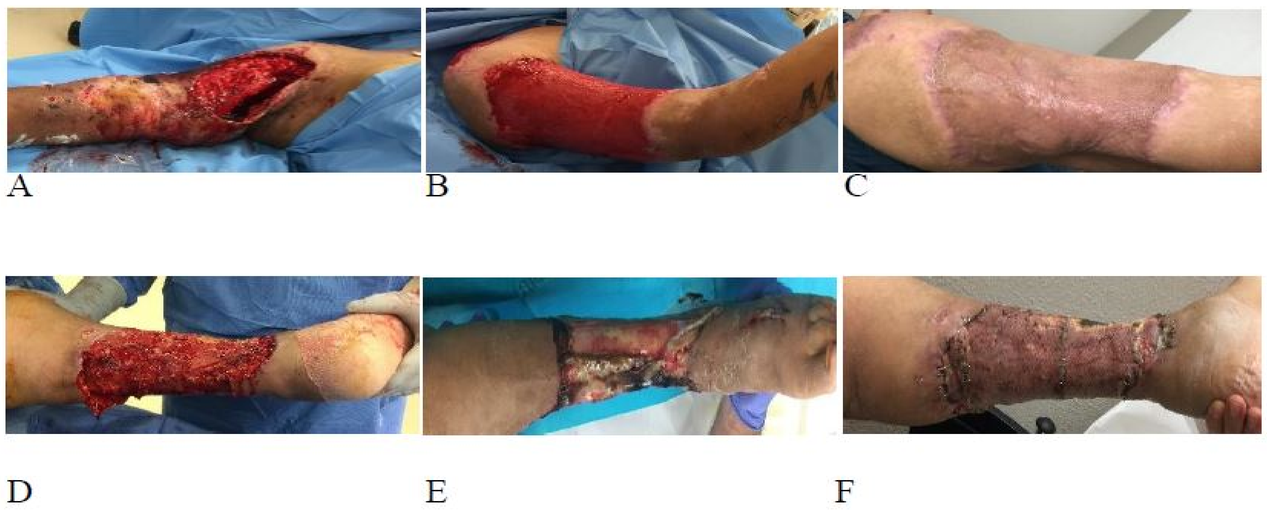

Table 1. Treatment of extremity wounds using IMBWM combined with NPWT vs IMBWM alone:

A-C: (A) Lower extremity wounds treated using IMBWM combined with NPWT, following debridement. (B) Removal of silicone layer 3 weeks after application revealing well granulated tissue bed. (C) STSG was applied to the neo-dermis, visualized here 3 months after matrix placement.

D-F: (D) Upper extremity wounds treated using IMBWM alone, following extensive debridement. (E) Removal of silicone layer 3 weeks after application revealing well granulated tissue bed. (F) STSG was applied to the neo-dermis, visualized here 3 months after matrix placement.

Table 2. Wound Characteristics and Treatment

Category	Wound VAC (n= 62)	No Wound VAC (n = 47)	*p* value
Etiology (Trauma)	60 (96.8%)	44 (93.6%)	0.44
Location			0.70
Arm	4 (6.5%)	5 (8.5%)	
Forearm	45 (72.6%	30 (63.8%)	
Thigh	3 (4.8%)	4 (8.5%)	
Leg	10 (16.1%)	8 (17.0%)	
Reapplications	2 (3.2%)	7(14.9%)	0.03
Complications	2 (3.2%)	4 (8.6%)	0.03
Exposed fascia	0	2 (4.3%)	
Exposed Tendon	2 (3.2%)	2 (4.3%)	
Infection	0	3 (6.4%)	