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Negative Pressure Wound Therapy Versus Bolster Dressing Post Split Thickness Skin Graft in Lower Extremity Wounds

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ABSTRACT

When complex wounds undergo surgical debridement and require coverage, split thickness skin graft (STSG) is a valuable limb salvage option. Although success of skin graft take requires mitigation of several important postoperative sequelae, the importance of postoperative dressing choice post split thickness skin graft should not be overlooked.

STATEMENT OF PURPOSE

A retrospective analysis was performed of 227 lower extremity wounds that underwent split thickness skin graft from a single institution. The purpose of this study was to compare percentage of success and failure post split thickness skin graft between negative pressure wound therapy (NPWT) versus bolster dressings.

METHODS

- Retrospective, IRB approved study of 227 lower extremity wounds in 191 patients requiring STSG between January 2014 through March 2016 from a single institution.
- Reviewed patient demographics and comorbidities (Table 1), wound measurements and postoperative dressings (Table 2), 30-day and 60-day outcomes (Table 3).
- Successful result was determined by graft take ≥ 80%.
- All wounds underwent surgical debridement prior to STSG.
- Vacuum assisted therapy device applied for 5 days at 125 mmHg at low-continuous suction.
- Bolster consisted of a 4-layer multi compression dressing.
- Continuous variables described by means and standard deviations and compared with two-sample t-test. Statistical significance was defined as P<0.05.

LITERATURE

While operative technique is important, postoperative care and protection of the graft is critical for successful outcome, especially during the plasmotic and angiogenesis phases of graft incorporation.[1] NPWT improves removal of fluids, increases oxygen and nutrient delivery to tissues, vascularity and granulation tissue, decreases bacterial colonization and removal of inhibitory factors from chronic wounds.[2] Current literature states NPWT may affect epithelial mitosis and upregulates growth and epithelial transcription factors.[3] Utilization of a NPWT device may reduce graft lift-off by edema, exudates, hematoma or seroma formation, reduce shear forces, and result in greater graft take and final outcomes following STSG.[4-6]

Patient Characteristics	N=191	%
Female	72	37.7
Male	119	62.3
Age	59.8±14.3	-
BMI	31.6±.8.4	-
A1c	6.85±1.8	-
DM	123	64.4
HTN	159	83.3
CHF	38	19.9
Renal	63	33.0
PAD	82	42.9
Venous Stasis	39	20.4
Organ Transplant	7	3.7

Table 1: Patient characteristics and comorbidities.

Wound Characteristics	N=227	%
Wound Size (cm)	72.9±169.9	-
Non Weight-Bearing	176	77.5
Weight Bearing	51	22.5
NPWT	108	47.6
Bolster	119	52.4

Table 2: Wound characteristics.

Dressing Type	Success (%) (N=60)	Failure (%) (N=152)	*p* - Value
30 Day – NPWT	31 (51.7)	69 (45.4)	0.4099
30 Day – Bolster	29 (48.3)	83 (54.6)	-
Dressing Type	**Success (%) (N=151)**	**Failure (%) (N=71)**	***p* - Value**
60 Day – NPWT	78 (51.3)	26 (36.6)	0.0363
60 Day – Bolster	73 (48.0)	45 (63.4)	-

Table 3: 30 and 60 day outcome with *p*-value.

Fig. 1: Dorsal right foot wound, pre debridement.

Fig. 2: STSG from right anterolateral thigh.

Fig. 3: Healed right foot wound at Day 49.

RESULTS

- Successful graft take was seen in 31/108 (28.7%) wounds that received NPWT and 29/119 (24.4%) wounds that received bolster dressing at 30 days. 60 day outcome for successful graft take were 78/108 (72.2%) for NPWT and 73/119 (61.3%) for bolster dressing.
- There was a statistically significant association between the use of NPWT and STSG success compared to bolster dressing (χ^2= 4.66, p=0.0363).
- **Odds of STSG failure in patients who underwent NPWT were approximately 80% less than those who had a bolster dressing, (OR = 0.203).**

DISCUSSION

- NPWT dressing is superior to compression bolster dressing following split thickness skin grafting in lower extremity wounds.
- This is the largest study population to date comparing STSG post operative dressing.
- NWPT resulted in 80% less odds of failure as compared to bolster dressing.
- The authors are unaware of any study comparing NPWT versus bolster dressing with this large of a sample size.

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