Vacuum-Assisted Closure for the Treatment of Acute Compartment Syndrome: Is It the Best Method for Wound Management?

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Purpose: In the setting of acute compartment syndrome (ACS), 4-compartment fasciotomies are the standard of care. The 2 most common methods of wound management are VAC (vacuum-assisted closure) dressing and retention suturing/vessel loops. The purpose of this study is to compare the methods of wound management.

Methods: From 2010 to 2020, retrospective chart review identified patients who underwent 4-compartment decompressive fasciotomies of the leg in the setting of ACS. Patients were grouped by method of fasciotomy wound management (wound VAC vs non-wound VAC). The wound VAC group had either isolated treatment with a wound VAC or combination with a vessel loop technique. Incisions in the non-wound VAC group were approximated via a vessel loop technique or with retention nylon sutures. Patient characteristics, procedural details, and outcomes including method of closure (split thickness skin graft [STSG] vs delayed primary closure) and time to definitive closure were compared between wound VAC and non-wound VAC groups.

Results: A total of 55 patients were identified (32 wound VAC, 23 non-wound VAC). Demographic data were similar, except more patients in the non-wound VAC group smoked (52.2% vs 25%). The wound VAC group largely used an adjunctive vessel loop technique (62.5%). In the non-wound VAC group, a larger percentage of patients had fasciotomies through 2 incisions as opposed to 1 incision compared to the wound VAC group (91.3% vs 65.6%, $P = 0.03$). There was a higher rate of STSG in the wound VAC group (31.2% vs 4.3%, $P = 0.02$). In the non-wound VAC group, 1 patient received STSG autograft while in the wound VAC group, 2 of the 10 patients requiring STSG required xenografting prior to this. There was a significantly faster time to definitive closure in the non-wound VAC group (5.0 ± 8.4 days vs 11.6 ± 13.0 days, $P = 0.04$). The wound VAC group also had a significantly higher number of total procedures (2.2 ± 1.4 vs 1.3 ± 0.8, $P<0.01$). There was no significant difference in the wound VAC versus non-wound VAC groups in debridement/closure attempts (1.8 ± 1.3 vs 1.3 ± 0.8) or days of hospital stay (16.0 ± 11.9 vs 20.6 ± 21.1).

Conclusion: In our study, the use of a wound VAC for fasciotomy management led to a higher rate of STSG, more procedures, and a longer time to definitive closure. This happened despite supplementing most wound VAC closures with a vessel loop technique for better wound edge approximation.