

A Comparative Study of Intermittent Indigenous Negative Pressure Wound Therapy and Conventional Gauze Dressing of Contaminated Soft Tissue Injuries in Cases of High Energy Trauma

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Background/Purpose: In the 21st century, with the emergence of high-speed transportation systems, a trauma patient commonly presents with large degloving injury, a compound fracture or severe crushing of soft tissues. After stabilizing skeletal injuries, management of soft-tissue injuries in high-energy trauma has proved unsatisfactory despite various wound management modalities available. A renewed interest has been seen in negative pressure wound therapy (NPWT) recently in orthopaedic trauma patients, but the cost remains a limiting factor in developing nations. The present study compared a low-cost indigenous negative pressure wound therapy (iNPWT) to conventional gauze dressings in high-energy soft-tissue trauma at a tertiary care center.

Methods: This prospective study was conducted from September 2012 to November 2014. The IRB approved all procedures. An ethical clearance was obtained from the ethical society of our institution. Out of all patients presenting due to high-energy trauma with open fractures/ soft-tissue injuries (n = 243), a total of 104 patients (101 men, 3 women) who fulfilled the inclusion criteria were enrolled. Among 104 patients, test (ie, iNPWT group [50 patients; mean age, 35 years; age range, 15-75 years]) and control (ie, control group [54 patients; mean age, 31.7 years; age range, 8-65 years]) were compared in terms of (1) total number of dressings needed, (2) time from injury to definitive management, (3) length of hospitalization, (4) number of operations to close wounds, (5) rate of infection, and (6) other wound complications. χ^2 test and Fisher's exact test (whenever applicable) were used to observe an association between the qualitative data and outcome variables. Unpaired *t* test and Mann-Whitney test were used for analysis of the quantitative data. A *P* value of less than 0.05 was considered statistically significant.

Results: Total number of dressings (mean) in test and control were 3.44 and 19 respectively (*P* <0.001). Comparing infection versus no infection in the two groups, difference was statistically significant (*P* <0.05). Total time between injury and wound coverage (12.5 vs 21.35 days) as well as hospitalization duration (17.26 versus 23.81 days) was significantly less in test (*P* <0.05). Single procedure was sufficient for closure in test in >90% patients (*P* <0.05).

Conclusion: The use of iNPWT in patients presenting with soft-tissue injuries due to high-energy trauma results in improved wound healing compared to conventional gauze dressings, reflected by reduced duration of hospitalization and a significantly smaller number of dressings required until coverage of the wound compared to conventionally treated wounds.