Role of Acute Negative-Pressure Wound Therapy Over Primarily Closed Surgical Incisions in Hip, Pelvis, and Acetabular Fracture Surgery: A Prospective Randomized Trial

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Purpose: This trial was conducted to determine the effectiveness of using negative-pressure wound therapy (NPWT) over primarily closed surgical incisions used for open reduction and internal fixation (ORIF) of hip, pelvis, and acetabular fracture surgery in decreasing postoperative surgical wound drainage, infections, and hospital stay in a cost-effective manner when compared to standard gauze dressings.

Methods: After IRB approval, 115 patients who underwent an open surgical exposure for hip, pelvis, or acetabular fracture ORIF were prospectively randomized to either receiving standard gauze or negative-pressure dressing applied over the primarily closed incision sterilely in the operating room. NPWT was left on for 2 days or longer if drainage continued. Patients were followed for 12 months. Prospective data points collected include patient demographics, mechanism of injury, fracture type, surgical approach, type of surgical closure, associated injuries and procedures, Injury Severity Score, body mass index (BMI), depth of subcutaneous adipose tissue, condition of soft tissue associated with surgical approach, deep venous thrombosis prophylaxis, ICU stay, antibiotic use, hospital stay, dressing changes, length of wound VAC (vacuum-assisted closure) use, superficial and deep infection, skin maceration/wound breakdown, and drainage. The primary end point was deep infection.

Results: 55 patients were randomized to the NPWT group and 60 patients randomized to the standard dressing group. The NPWT group included 49 patients and the gauze group included 42 patients who completed the 12-month follow-up. The rate of deep infection in the NPWT group was 5/49 (10.2%) and 2/42 (4.8%) in the gauze group ($P = 0.44$). The odds ratio showed that NPWT patients were 2.3 times more likely to develop a deep infection. BMI was not associated with an increased risk of infection ($P = 0.54$). Patients with eventual infections spent a significantly longer time in the ICU ($P = 0.015$) and had a longer hospital stay ($P = <0.001$) during their initial admission. All infections occurred in acetabular fractures that involved the posterior wall or column requiring a Kocher-Langenbeck surgical approach.

Conclusion: In a randomized prospective trial, NPWT use over a primarily closed surgical incision potentially increases the risk of deep infection when compared to gauze dressings in this patient population. This is contrary to a previously published retrospective case series. All deep infections occurred in patients with acetabular fractures involving the posterior wall or column that were treated with a Kocher-Langenbeck surgical approach regardless of BMI.

See pages 99 - 147 for financial disclosure information.