Higher Reoperation Rates in Planned Staged Treatment of Less Severe Open Fractures Compared to Fix- and-Close: A Propensity Score Matched Analysis

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Purpose: Initial surgical management of Gustilo-Anderson types I-IIIA open fractures varies from surgical fixation of the fracture with immediate closure of the traumatic wound to various combinations of staged fracture and wound management. The decision to choose staged management has been historically based on wound contamination and severity of the open fracture. The purpose of this study was to compare rates of surgical site infection (SSI) and 1-year reoperation in types I-IIIA open fractures between fix-and-close treatment versus planned staged treatment.

Methods: This is a secondary analysis of participants enrolled in the Aqueous-PREP and PREPARE-Open studies. We excluded types IIIB and IIIC open fractures. Participants were divided into fix-and-close or planned staged groups and matched using propensity scores, which were computed with multiple variables including age, gender, body mass index, functional comorbidity index, renal disease, Gustilo-Anderson classification, embedded wound contamination, injury mechanism, fracture location, workplace injury, the American Society of Anesthesiologists physical status, and ISS via conditional logistic regression.

Results: 3170 participants (staged: n = 872, fix-and-close: n = 2,298) with type I-IIIA open fractures were identified. 862 participants who underwent planned staged treatment were propensity score matched to 862 fix- and-close treated participants. Variables incorporated in propensity score calculation were balanced between the 2 groups, including Gustilo-Anderson classification (staged; type I: n = 99, type II: n = 267, type IIIA: n = 496 vs fix-and-close; type I: n = 105, type II: n = 268, type IIIA: n = 489, P = 0.89) and embedded wound contamination (n = 114 in each group, P>0.99). Staged treatment was significantly associated with increased odds of SSI (odds ratio [OR], 95% confidence interval [CI]: 1.40 [1.02-1.93], P = 0.04), unplanned reoperations (OR [95% CI]: 1.71 [1.28-2.29], P = 0.0003), and reoperation specifically for infection (OR [95% CI]: 1.65 [1.15-2.36], P = 0.006) within 1 year, but not with SSI at 90 days (OR [95% CI]: 1.65 [0.98-2.77], P = 0.057).

Conclusion: Fix-and-close treatment of type IIIA and lesser open fractures was associated with decreased 1-year SSI and reoperation rates and may be considered even in fractures with embedded contamination.