Are Infection Rates Increased After Sterilization of the External Fixator During Staged Internal Fixation of High-Energy Tibial Plateau Fractures?

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Purpose: The purpose of this study is to compare infection rates after second stage definitive surgery for high-energy tibial plateau fractures between groups of patients who had the external fixator prepped into the surgical field and those who did not. It is hypothesized that there will be no difference in rates of infection after sterilization of the external fixator. Secondarily, we sought to determine if maintenance of the external fixator is associated with a decrease in operative time.

Methods: This retrospective cohort study was conducted at 2 academic Level I trauma centers. Patients were divided into prepped and non-prepped groups based on sterilization and inclusion of the external fixator prior to definitive fixation. The primary outcome was rate of deep infection. Secondary outcome was operative time. Multivariate regression analysis included variables with $P<0.20$ on univariate analysis for infection (age, OTA classification, days spent in external fixator).

Results: 244 patients were included in the study: 162 in the prepped group and 82 in the non-prepped group. There were no significant differences in infection rates between prepped (11.7%) and non-prepped (18.3%) groups ($P = 0.162$). This held true after stratification for prepping of the entire fixator frame or just the fixator pins ($P = 0.190$). There were no differences in infection rates when analyzed by prep type (ChloraPrep, betadine, or chlorhexidine sterilization; $P = 0.535$). Patients in the prepped groups had significantly decreased operative time (168.2 minutes vs 221.9 minutes, $P<0.001$), even after controlling for confounders in regression analysis.

Conclusion: This is the largest study in published orthopaedic literature to investigate the rates of infection in patients who had the external fixator prepped into the sterile field during staged internal fixation and is the first to do so for high-energy tibial plateau fractures as compared to a control group within the same cohort. These data suggest that there is no increased risk of infection associated with prepping and maintenance of the external fixator during definitive internal fixation for high-energy tibial plateau fractures. This practice may lead to shorter operative time as well.