Prepping in the External Fixator to Facilitate Staged Open Reduction and Internal Fixation of Bicondylar Tibial Plateau Fractures Does Not Increase Infection Rates

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Purpose: Staged treatment of complex bicondylar tibial plateau (BTP) fractures using an external fixator is common. Some surgeons prep the entire external fixator into the surgical field during definitive open reduction and internal fixation (ORIF) or use existing external fixation pins to apply the femoral distractor. Other surgeons prefer to remove the external fixator and debride and exclude the pin sites from the sterile field to minimize contamination. Several studies have evaluated risk of infection related to external fixation pin site overlap, but to our knowledge no study has previously evaluated the safety of prepping in the external fixator during staged ORIF. The aim of this study was to compare infection and reoperation rates between patients who had their external fixation prepped in and those who did not during definitive ORIF of BTP fractures.

Methods: This was a retrospective cohort study of consecutive patients >8 years undergoing ORIF of an OTA/AO 41-C (Schatzker 6) BTP fracture at two Level I trauma centers between 2001 and 2018. Patients who had single-stage definitive fixation without the use of an external fixator were excluded. Surgical prep was betadine in all cases. Primary outcomes were deep infection and reoperation for any reason. $\chi 2$ analyses were used for categorical comparisons.

Results: 508 AO/OTA 41C BTP fractures were identified. 162 fractures (31.9%) underwent staged treatment using an external fixator (mean follow-up 3.42 years, standard error [SE] 101 days). 14 fractures were excluded because operative notes did not clearly indicate whether the external fixator was prepped in; one additional fracture was excluded due to pin removal for pin site infection. This narrowed the final cohort to 147 fractures: 78 with retained external fixation elements (REF) during surgery for definitive fixation and 69 with no retained external fixation elements (NEF). Comparing the REF to NEF groups, there was no difference in deep infection (26.9% vs 25.7%, $P = 0.868$) or reoperation (30.8% vs 34.3%, $P = 0.648$). Within the REF group, there was no difference in infection with retention of the entire external fixator (28.1%, n = 32) compared to only the external fixator pins (26.1%, n = 46) ($P = 0.842$).

Conclusion: The practice of prepping in the external fixator to facilitate ORIF of BTP fractures did not increase the risk of deep surgical site infection in this cohort. The relatively high infection rate in both groups is likely the result of an institutional tendency for early ORIF, resulting in selection of the most severe BTP fractures for staged ORIF. This study may reassure surgeons who prefer to use the existing external fixator frame or pins as a tool to facilitate ORIF that they are not placing their patients at higher risk of infection with this practice, assuming thorough prepping of retained elements. These findings do not apply to patients for whom there is an obvious pin site infection at the time of ORIF.