Overlap of Plates with External Fixator Pin Sites after Staged Management of Lower Extremity Fractures – Is it Safe?

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INTRODUCTION:

Trauma patients with fractures of the tibial plateau, tibial plafond, and distal femur are often treated with a staged management technique if immediate open reduction with internal fixation (ORIF) is deemed to be unsafe. Patients receive temporizing treatment with knee- and/or ankle-spanning external fixation, often for a couple of days and up to three or four weeks, followed by external fixator removal and definitive ORIF. Historically, using plate-and-screw constructs that overlapped with external fixator pin sites was discouraged because of concerns about infection risk associated with having a plate under one or more external fixator pin sites. We hypothesized that we would not see any increase in infection for patients receiving plate-and-screw constructs that overlapped with one or more external fixator pin sites.

METHODS:

After IRB approval, we identified all patients who received staged management of tibial plateau, tibial plafond, and distal femur fractures at our institution during a 12-year period. Definitive fixation was performed by one of seven trauma fellowship-trained orthopaedic surgeons. We identified patients through billing and coding records, searching for current procedural terminology (CPT) code 20690 and for all ORIF codes for the included fracture types. We included patients who had both code types and after a medical records review indicating that the fracture(s) of interest were treated in a staged fashion. We then performed a complete medical records review for all included patients to identify whether an infection occurred in the 12-month postoperative period. We reviewed all pertinent radiographs for each included patient to document whether plate-and-screw constructs overlapped with prior external fixator pin sites, and we measured the distance between the closest external fixator pin site and the closest plate in those patients that did not have overlap. We excluded patients if adequate radiographs were not available for review.

RESULTS:

We identified 255 patients with adequate radiographs who received staged management of tibial plateau, distal tibia, and distal femur fractures during the collection period. Of these patients, 99 had plate-and-screw constructs which overlapped one or more external fixator pin sites. Of the 156 patients who did not have plate overlap with pin sites, the mean distance from plate to closest pin site was 42 mm. In patients without plate-pin site overlap, we observed 22 infections (14.10%). In patients with plate-pin site overlap, we observed 14 infections (14.14%). This difference was not significant (p=0.8604, χ^2 with Yates correction). For patients without plate overlap, the mean distances between plate and closest external fixator pin site were noted to be 41.5 mm in those that did not develop an infection and 46.7 mm in those that did develop an infection. This difference was not significant (p=0.4161, two-tailed student's *t*-test assuming unequal variances).

DISCUSSION AND CONCLUSION:

In patients requiring staged management of high-energy periarticular lower extremity fractures, with initial spanning external fixation followed by definitive ORIF with plate-and-screw constructs, overlap of the definitive fracture-fixation construct with prior external fixator sites does not appear to be associated with an increased risk of infection.