

The Association of Surgical Sequencing with Septic Complications in Bicondylar Tibial Plateau Fractures with Compartment Syndrome

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Purpose: Bicondylar tibial plateau fractures are the consequence of high-energy mechanisms. It has been shown that tibial plateau fractures that require fasciotomies have a high incidence of infection, which has not been conclusively explained. This retrospective review evaluated the effect of surgical sequencing on infection associated with open reduction and internal fixation (ORIF) of bicondylar tibial plateau fractures with associated compartment syndrome.

Methods: Between January 1996 and December 2015 inclusive, all patients sustaining a bicondylar tibial plateau fracture were identified from a single institution. The initial search identified 758 patients with 41C3 fractures, 129 of which required 4 compartment fasciotomies. Patients were excluded if the fasciotomy was performed at an outside institution prior to transfer, were treated with amputation during their initial hospitalization, were lost to follow-up, or the fracture was treated entirely with external fixation. 89 patients out of the 129 satisfied the inclusion criteria. External fixation was performed in all patients, and an urgent 4-compartment fasciotomy was performed either through single or dual incisions. Wounds were managed with wound VAC (vacuum-assisted closure), underwent repeat debridements every 2-4 days, and underwent either delayed primary closure, split-thickness skin grafting (STSG), or flap coverage dependent on the degree of soft-tissue injury. Septic complications were defined as a surgical site infection that required at least 1 return to the operating room.

Results: Analysis was conducted to determine the effect of timing of fixation relative to wound closure, type of wound closure, open fracture, single versus 2-incision fasciotomy, ISS, and vascular injuries. Out of the 89 patients who met inclusion criteria, 20 were diagnosed and treated for a deep infection. 15 patients had an open fracture, and there were 14 vascular injuries that required repair. Both open fractures ($P = 0.004$) and vascular injury ($P = 0.001$) were predictive of infection. We found no significant difference in infection rates between patients who had definitive ORIF before the soft-tissue envelope was completely closed ($P = 0.064$). Single incision fasciotomy decreases the need for STSG ($P = 0.001$).

Conclusion: Treatment of 41C3 fractures is challenging and in the presence of fasciotomies the timing of definitive fixation becomes more complex. In our study, while open injuries and vascular injuries were highly associated with deep infection, timing of ORIF in relation to definitive wound soft-tissue coverage was not. Single incision fasciotomy can decrease the need for STSG.