Paper - Annual Meeting

Paper Session: Upper Extremity/Lower Extremity

Outcomes of Primary Wound Closure of Open Tibia and Fibula Fractures (Including Tibia Plateau and Ankle) With a Combined Orthopaedic and Plastic Surgery Approach

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Purpose: Gustilo-Anderson (GA) Grade I, II, and IIIa lower-limb injuries should be amenable to primary closure; however, controversies still remain. The purpose of this study was to determine the outcomes of primary closure ± fixation in open fractures of the tibia/fibula (including tibial plateau and ankle) treated in a unit where a combined orthopaedic and plastic surgery assessment and treatment is the standard of care.

Methods: A consecutive cohort of patients with open fractures sustained between January 1, 2016 and December 31, 2018 were treated in a major trauma center (Level I) with a combined orthopaedic and plastic surgical approach. The co-primary outcome measures were infection and nonunion.

Results: 101 fractures of the tibia and/or fibula, including tibial plateau and ankle, met the inclusion criteria. Minimum follow-up was 12 months and maximum was 36 months. There were 4 GA-I, 23 GA-II, and 74 GA-IIIa fractures. OTA classification of the fractures was: 41A = 1, 41B = 1, 41C = 4, 42A = 28, 42B = 11, 42C = 8, 4F2A = 1, 43A = 6, 43B = 3, 43C = 4, 44A = 3, 44B = 23, and 44C = 8. The age range of the patients was 16-96, median 45, and inquartile range (IQR) 26-74. The majority of injuries were a result of propelled vehicle injury (motor or bicycle) or a fall. Eight patients were diabetic, 32 were smokers, 7 ex-smokers, 5 drug users, 4 on any immunosuppressive medication, 22 respiratory disease, and 62 had at least 1 comorbidity. 27 had associated injuries. The median ISS was 9 (IQR, 9-9; range, 9-50). The ISS was 9-15 in 90 patients and >15 in 11 patients. There were 5 deep infections (5%), affecting 1 each of OTA types 42B2, 43C2, 42A1, 42C2, and 43A2. One was treated with long-term antibiotics, 3 required soft-tissue coverage, 1 had an amputation as the patient was deemed unsuitable for soft-tissue reconstruction. There were no cases of nonunion (0%). There were 6 superficial infections, and all of them resolved with a week of oral antibiotics without the need for further intervention at a minimum follow-up of 12 months.

Conclusion: In this cohort of open lower-limb fractures, despite a high proportion of GA-IIIa fractures, high rates of comorbidity, frailty, and polytrauma, a deep infection rate of 5% was achieved, which is acceptable by contemporary standards. If open fractures are planned to be closed primarily, we recommend that the final decision is made intraoperatively following thorough assessment by surgeons with orthopaedic and plastic surgical soft-tissue reconstruction expertise. The appropriate management of the soft tissues is essential for a successful outcome.