Elderly Open Lower-Limb Trauma: How to Salvage the Unsalvageable

Thomas Cloake, MBBS*; Patrick Lancaster, MBBS; Claudia Kate Au-Yeung, MSc; William Flett, BS; Joseph Hardwicke, FRCS; Michael Kelly, MBBS; Andrew Riddick, MBBS; Jayne Ward, FRCS (Ortho), MD*
University Hospitals Coventry and Warwickshire, Coventry, UNITED KINGDOM

Purpose: Low-energy, open lower-limb fractures represent an increasing problem in current orthopaedic practice. Traditional open fracture management algorithms involving aggressive debridement and staged reconstruction may not be appropriate in elderly patients with multiple comorbidities. Moreover, poor bone and soft-tissue quality make managing these injuries difficult. This study evaluates the management of elderly open lower limb fractures and offers strategies to aid limb salvage in this challenging patient group.

Methods: All low-energy, open ankle (AO44) and tibia (AO41-43) fractures in patients over 65 years of age treated at 2 Level I trauma centers in the UK between 2015 and 2020 were eligible for inclusion in this study. Patient demographics, comorbidities, injury characteristics, management strategy, and outcome data were collected using local open fracture databases. Patients received combined orthopaedic and plastic surgery input. All patients had a minimum follow-up of 12 months. The outcomes measured included infection, fracture union, limb salvage, return to theater, and 30-day mortality.

Results: A total of 113 patients were included in this study; 92 (81.4%) were female with a mean age of 80 years (range, 65-99 years). Mean follow-up was 41 months (range, 12-83 months). The majority of injuries involved the ankle (81, 71.7%). Over half (57.5%) of patients suffered a Gustilo-Anderson (GA) IIIb injury; there were 31 (27.4%) grade IIIa, 15 (13.3%) grade II, and 2 (1.8%) grade I fractures. Free tissue transfer was required in 16 patients (14.2%), and this group had significantly fewer comorbidities (mean Charlson Comorbidity Index [CCI] 3.94) than those treated with local coverage, primary closure or dressings (mean CCI 5.0, P = 0.013). There was no difference in outcome in terms of infection (P = 0.70), fracture union (P = 0.56), or wound complications (P = 0.14) when the free tissue transfer group was compared to the remaining population. Only 4 patients' injuries (3.5%) were deemed unsalvageable and required an amputation.

Conclusion: This study agrees with existing work in suggesting suitable elderly patients should receive soft-tissue reconstruction with free tissue transfer. In high-risk patients not appropriate for major reconstructive surgery, orthopaedic procedures such as acute shortening or minimal fixation may be used alongside plastic surgery techniques like local soft-tissue coverage or dermal substitutes to provide an alternative strategy with no significant difference in the outcome. We have demonstrated that limbs previously deemed unsalvageable may be effectively treated with novel, "orthoplastic" techniques.