

Open Versus Closed Geriatric Ankle Fractures: Sentinel Event or Sign of Good Health*Mathew Bowers, MD; Canhngghi Ta, MD; Rajiv Siddhartha Vasudevan, BS;**Conner Dean Trimm, BS; William T. Kent, MD**University of California San Diego, San Diego, California, UNITED STATES*

Purpose: Ankle fractures are the third most common fracture in the geriatric population. Some studies suggest these injuries signal good health, as they tend to occur in the most active of elderly patients. Others have likened them to the geriatric hip fracture, with high associated morbidity and mortality. There is a paucity of literature available to guide expectations and management within this rapidly growing group. The purpose of this study was to evaluate open versus closed geriatric ankle fractures. We hypothesized these cohorts would have distinctly different patient characteristics and outcomes.

Methods: 279 patients over the age of 60 years who underwent operative fixation of an ankle fracture at our Level I trauma center between 2013 and 2021 were reviewed. Patient demographics, treatment course, and outcomes were analyzed on 205 patients with isolated rotational ankle fractures (OTA / AO 44A, 44B, 44C). Patients were separated into 2 cohorts based on open fracture (O) versus closed (C). Univariate and multivariate regression analyses were performed.

Results: The open cohort was older (75 O vs 68 C; $P = 0.003$) and predominantly female (44% O vs 29% C; $P = 0.09$). They had similar Charlson Comorbidity Index (CCI) scores (4.6 O vs 4.0 C; $P = 0.323$). Open fractures were more likely to have staged treatment with initial external fixation (41% O vs 3% C; $P < 0.001$) but also more likely to undergo definitive fixation within 48 hours of injury (59% O vs 34% C; $P = 0.003$). Univariate analysis demonstrated higher 1-year mortality (11% vs 0%). Multivariate regression identified open fracture as an independent predictor of 90-day reoperation (odds ratio [OR]: 13.4; $P = 0.004$) and loss of function (OR: 5.1; $P = 0.011$).

Conclusion: The epidemiology, treatment, and outcomes of open geriatric ankle fractures were distinct from their closed fracture counterparts. Open fractures tended to occur in older females and became increasingly prevalent with age. They were more likely to undergo early definitive fixation. Patients with open fractures experienced higher 1-year mortality, as well as much higher odds of loss of function and complications requiring reoperation. Surprisingly, the difference in CCI between our cohorts did not reach statistical significance, although there was a trend toward open fractures affecting sicker patients. Overall, the patient characteristics, morbidity, and mortality of open ankle fractures in the elderly closely resembled other geriatric lower extremity fractures, whereas closed ankle fractures did not.