

Malnutrition Is Associated with Nonunion, Infectious Complications, and Mortality After Geriatric Distal Femur Fracture

Gele Moloney, MD; Daiji Kano, MD¹; Ivan Seth Tarkin²

¹New York-Presbyterian/Queens, Flushing, New York, USA

²University of Pittsburgh Medical Center, Pittsburgh, Pennsylvania, USA

Purpose: There is a growing understanding of the high rates of morbidity, mortality, and nonunion after geriatric distal femur fracture. Limited studies in other cohorts have demonstrated a relationship between malnutrition and mortality; however, this relationship has not been investigated in the geriatric distal femur fracture population. The purpose of our study was to determine the relationship between malnutrition, as evaluated by serum parameters, and mortality, complications, and nonunion following open reduction and internal fixation (ORIF) of the low-energy geriatric distal femur fracture.

Methods: We conducted a retrospective review of patients over the age of 60 years who sustained a distal femur fracture (AO/OTA 33) following a low-energy injury and were treated with ORIF over an 11-year period (2004-2015) at 3 affiliated institutions. Albumin, prealbumin, total protein, and total lymphocyte count (TLC) during the initial hospitalization were collected from the medical record. Patients were excluded if laboratory data were not available. Primary outcomes were nonunion, defined as need for secondary surgery to promote fracture union, mortality, and infectious complications including pneumonia, urinary tract infection (UTI), and surgical site infection (SSI).

Results: 72 patients were identified for inclusion. The average age was 77 years. 59 patients (82%) had albumin <3.5 mg/dL and met established criteria for malnutrition. 18 patients (25%) were deceased at 1 year. Decreased serum albumin (2.8 mg/dL vs 3.2 mg/dL, $P < 0.03$) and decreased total protein (5.3 mg/dL vs 6.1 mg/dL, $P < 0.02$) were significantly associated with increased 1-year mortality. 11 patients developed nonunion (15%). Albumin was significantly lower in the group that developed nonunion (2.7 mg/dL vs 3.1 mg/dL, $P < 0.05$). There were 21 infectious complications (2 SSI, 4 pneumonia, 13 UTI, and 2 *Clostridium difficile* infections), and albumin <3.5 was associated with a significantly increased risk of postoperative infectious complications ($P < 0.02$).

Conclusion: Malnutrition, specifically hypoalbuminemia, is associated with a significant increase in 1-year mortality, nonunion, and postoperative infectious complications following ORIF of geriatric distal femur fracture. The majority of patients who sustain this injury demonstrate objective markers of protein malnutrition. Measurement of serum albumin may help provide prognostic information prior to distal femur ORIF. Additionally, while many patient-related factors are nonmodifiable, especially in the acute fracture setting, nutritional status may represent a modifiable risk factor for poor outcomes and deserves further study.