Evaluation of Vitamin D Levels and Outcomes After Ankle Fracture Fixation

Stephen Warner, MD, PhD*; Matthew R. Garner, MD; Joseph Nguyen, MPH;*
Dean G. Lorich, MD;
Hospital for Special Surgery, New York, New York, USA

Purpose: Optimal vitamin D levels are critical for bone health and muscle function, and hypovitaminosis D is common in patients undergoing orthopaedic trauma surgery. While previous studies have shown that vitamin D levels correlate with functional outcome after hip fracture surgery, the significance of vitamin D levels on outcomes after surgery in other orthopaedic trauma patients is unknown. The purpose of this study was to determine if vitamin D levels correlated with outcomes in ankle fracture patients.

Methods: We reviewed a prospectively collected database of patients who underwent operative treatment for ankle fractures from 2003-2012. Preoperative serum 25-hydroxyvitamin D (25[OH]D) levels were measured, and the primary and secondary outcomes included Foot and Ankle Outcome Scores (FAOS) and ankle range of motion (ROM). Data wrtr also collected on patient comorbidities, articular malreductions, and wound complications. Included patients had at least 12 months of clinical outcome data.

Results: 98 patients operatively treated for ankle fractures met our inclusion criteria. Mean patient age was 55.8 years (range, 18-91), and length of follow-up for outcome scores averaged 21 months (range, 12-77 months). Of these 98 patients, 36 (37%) were deficient in vitamin D (<20 ng/mL) and 31 (32%) had vitamin D insufficiency (<30 ng/mL, ≥20 mg/mL). Patients with vitamin D deficiency were similar with regard to age, gender, and comorbidities compared to patients with vitamin D levels ≥20. Univariate analysis revealed that patients with vitamin D deficiency had significantly worse FAOS with regard to symptoms ($P = 0.031$) and worse average scores in the FAOS quality-of-life domain than patients with vitamin D levels ≥20. Multivariate regression analysis suggested that vitamin D deficiency was a factor in inferior FAOS with regard to symptoms, activities of daily living, and quality of life. Vitamin D levels were not significantly correlated with postoperative ROM, articular malreductions, or wound complications.

Conclusions: Several studies have demonstrated that patients with deficient vitamin D levels have increased fracture risks, yet the significance of vitamin D levels on postoperative outcomes is less known. In our group of patients with operatively treated ankle fractures, preoperative vitamin D deficiency correlated with inferior clinical outcomes at a minimum of 1-year follow-up. Our study suggests that deficient vitamin D levels may result in worse outcomes in orthopaedic trauma patients recovering from fracture fixation.

- The FDA has not cleared this drug and/or medical device for the use described in this presentation (i.e., the drug or medical device is being discussed for an "off label" use). For full information, refer to page 600.