Characterization of Vitamin D Deficiency and Use of a Standardized Supplementation Protocol in Orthopaedic Trauma Patients
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Purpose: Vitamin D deficiency has been associated with unwanted outcomes in hospitalized trauma patients such as a longer length of stay, increased infection rates, and higher rates of fracture nonunion. The primary objective of this study was to determine the prevalence of vitamin D deficiency among trauma patients with fractures and to assess the incidence of fracture nonunion in those treated with a standardized vitamin D protocol.

Methods: Through a retrospective chart review, rates of nonunion were compared between populations pre-and post-implementation of a standardized vitamin D supplementation protocol (patients with any fracture except those of the hands, feet, or head). All adult patients with a tibia and/or fibula fracture who underwent any form of operative intervention were identified via ICD-10 codes. Exclusion criteria included patients who were pregnant or incarcerated, patients receiving vitamin D supplementation prior to admission, and history of bone disease. A total of 152 patients were included in the pre-protocol (July 1, 2013-June 30, 2015) and 218 in the post-protocol (July 1, 2015-June 30, 2017) groups.

Results: Groups were well-matched at baseline for age, weight, and number of risk factors for nonunion (eg, smoking, diabetes, etc). Statistically significant differences were noted in the number of Caucasian patients (66% vs 54%; P = 0.018) and median ISS (4 vs 8.5; P = 0.003) in the pre- versus post-protocol groups. In patients with an initial vitamin D level, 210 (98%) presented with vitamin D deficiency (defined as < 30 ng/mL). Patients in the post-protocol group had a median initial vitamin D level of 9.9 ng/mL with a median follow-up level of 31.8 ng/mL (P = 0.001). The median treatment duration was 7.5 weeks, which fits with the institution’s replacement protocol. There were no cases of vitamin D toxicity or supratherapeutic levels. Overall percentage of patients with nonunion did not differ between the pre- versus post-protocol groups (11% vs 11%; P = 0.958).

Conclusion: The results of this study demonstrate the safe and effective use of a standardized protocol for vitamin D supplementation in trauma patients. Preliminary results indicate vitamin D supplementation did not impact nonunion rate. Limitations include significant differences in ISS and race between the 2 groups. Future directions include cohort matching of ISS, race, fracture location, and age to further assess vitamin D supplementation impact on nonunion rates.