

# Do Patient Factors Predict Adherence with IV Bisphosphonates for Osteoporosis Management?

Haley Dutcher Smith, Spencer James Smith, Sarah Rogers, Darin M Friess, Zachary Mark Working, Graham John Dekeyser, Jung U Yoo, Dane Jensen Brodke

**INTRODUCTION:** Current literature and AAOS Clinical Practice Guidelines support the use of bisphosphonates after hip fracture to prevent secondary fragility fracture. Despite this, osteoporosis remains underdiagnosed and inadequately managed in patients who sustain fragility fractures. Adherence to oral bisphosphonates is relatively low, particularly for certain patient populations, including those with lower income and educational attainment. To address this challenge, our institution implemented a protocol for intravenous (IV) zoledronate administration during hospitalization following fragility fractures and surgical interventions. This study investigates whether patient factors, such as Area Deprivation Index (ADI) and patient comorbidities, influence the likelihood of receiving protocol-based therapy.

**METHODS:** We conducted a retrospective cohort study between January 2021 and September 2023. Patients 50 years and older who sustained proximal hip fragility fractures requiring immediate surgical intervention and were eligible for zoledronate therapy were included. Patient records were reviewed to collect data on comorbidities, history of osteoporosis evaluation and treatment, zip codes, and additional demographics information. Statistical analysis was performed with univariate methods as well as multivariable logistic regression. Compound annual growth rate (CAGR) was used to assess the change IV zoledronate administration overtime.

**RESULTS:** Among 157 patients who met inclusion criteria, 90 (57.3%) received zoledronate within six weeks of fragility fracture, while 67 (43.7%) did not. Multivariable analysis between the two groups showed no significant association between ADI and zoledronate administration, even when patients were categorized into ADI quartiles. Similarly, no significant predictors of zoledronate administration were found among demographic factors (age, gender) or comorbidities, including hypertension, congestive heart failure, coronary heart disease, dyslipidemia, obesity, and diabetes. The total number of patient comorbidities also showed no significant relationship with zoledronate administration. Logistic regression analysis identified the year of fragility fracture as a significant predictor of zoledronate administration, with a CAGR of 22.47% in compliance observed from 2021 to 2023, reflecting increased adherence overtime (OR=2.47; 95% CI=[1.60-3.81]).

**DISCUSSION AND CONCLUSION:** This study demonstrates that patient-related factors, including ADI and comorbidities, do not significantly influence the administration of IV zoledronate in our institutional protocol. Given the relationship between oral bisphosphonate adherence and socioeconomic disadvantage, IV zoledronate may not only improve adherence, but also help reduce socioeconomic barriers to treatment when compared to oral bisphosphonates. Since patient-related factors appear to play a limited role, these findings suggest that other influences, such as provider or administrative barriers, may be more critical to improving bisphosphonate adherence and our institution's IV zoledronate administration protocol success. Future research should focus on identifying these barriers and developing strategies to improve timely osteoporosis treatment for all eligible patients.

