Fragility Fracture Reduction with Consistent Osteoporosis Pharmacotherapy: Findings from a Large Healthcare Database with Cost Analysis

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INTRODUCTION:

Osteoporosis is a common condition in the United States that increases patient risk of fragility fracture and subsequent patient morbidity, stress, and mortality, while increasing cost to the healthcare system. Despite these risks, many patients do not receive appropriate pharmacotherapy for osteoporosis, either before or after fragility fractures.

This study utilizes a large single-insurance healthcare database to establish patients with new diagnoses of osteoporosis and a) identify members who are receiving appropriate osteoporosis-related pharmacotherapy, b) establish subsequent fracture rates in these newly diagnosed osteoporotic members, and c) determine potential cost savings from fracture reduction in these patients. We hypothesize that patients adherent to osteoporosis pharmacotherapy over 3-years will have reduced fracture risk and decreased healthcare cost compared to osteoporosis patients receiving either no or inconsistent pharmacotherapy.

METHODS:

This study is a retrospective de-identified combined healthcare system/single-insurance carrier internal database review.
Patients with osteoporosis were defined by 3 groups. Group 1a were members aged over 18, receiving their first ICD-10 osteoporosis diagnosis in 2019, and experiencing a fracture the week of their osteoporosis diagnosis. Group 1b were members over 18, receiving their first ICD-10 osteoporosis diagnosis in 2019, and without a fracture on the week they received an osteoporosis diagnosis. Group 2 were members aged 50 or above with no prior osteoporosis diagnosis, sustaining a fracture in 2019 per ICD-10/CPT codes, and meeting Frailty Indicator from ICD-10 codes per the Johns Hopkins Adjusted Clinical Groups Tables. Members were identified in calendar year 2019 and followed for 3 consecutive years (2020-22).

Fractures were captured from the healthcare database utilizing selected CPT/ICD-10 codes. Fractures were compiled into body parts and ranked on code priority “a-h” with “a” receiving highest priority (e.g “a” were hip fractures demonstrating highest priority). If members had 2 fracture codes within one week for different body parts, the fracture would be consolidated into one event and coded as the highest priority type. Patients were excluded if they had a) prior osteoporosis diagnoses or osteoporotic fractures, b) hospice in the prior 2 years, c) diagnosis of metastatic cancer within the prior 2 years, d) enrolled within Insurance carriers’ plan for less than two years, e) no prescription benefits, or f) fractures classifyingas high-energy trauma/polytrauma.

Osteoporosis therapy adherence was defined based on dosing regimen and route of administration. Consistency of intravenous antiresorptives were evaluated by the number of medication administrations members received per year in correlation with the medications’ typical dosing regimen. Oral antiresorptives and subcutaneously injected anabolics met adherence criteria if the member met an 80% threshold of days supplied with the medication. The osteoporosis cohort was divided into 3 groups based on osteoporosis medication adherence: a) No treatment (NT), b) Inconsistent treatment (ICT) receiving pharmacotherapy less than the threshold for consistent pharmacotherapy, and c) Consistent treatment (CT) reaching the threshold of consistent pharmacotherapy. Each member from the osteoporosis cohort was designated to one of the three adherence groups for years 1-3 (2020-22) after their index osteoporosis diagnosis in 2019.

Index or repeat fracture was defined as members sustaining a fracture based on ICD-10 and CPT codes as utilized prior. For patients whose initial osteoporosis diagnosis included fracture, there was a required 6-month clean period between the 2 fractures at the same location to ensure they were 2 distinct episodes.

Fracture rate for each population was identified with Fracture Risk Reduction and 95% Confidence Intervals calculated yearly with significance at $p<0.05$. Cost savings from fracture reduction was computed yearly comparing the CT group to the ICT + NT group utilizing the yearly average cost per fracture from Medicare data (Millman, 2021).

RESULTS:

Year 1 after osteoporosis diagnosis, the CT group had a fracture rate of 3.8% (95% CI, ±0.9%), ICT group 7.0% (±1.0%) and NT group 8.6% (±0.6%) The ICT + NT groups combined had a fracture rate of 8.3% (±0.5%). Fracture reduction at

year 1 between the CT and ICT + NT group was 54.4% (95% CI, 39.9%-67.3%). Gross savings based on fracture reduction for the osteoporosis cohort receiving CT was estimated at $18,046,949 (USD) for calendar year 2023.

Year 2 after osteoporosis diagnosis, the CT group had a fracture rate of 3.4% (±1.1%), ICT group 6.9% (±1.0%), and NT group 7.4% (±0.6%). The ICT + NT groups combined had a fracture rate of 7.3% (±0.5%). Fracture reduction at year 2 between the CT and ICT + NT group was 52.9% (95% CI, 33.0%-70.4%). Gross savings based on fracture reduction for the osteoporosis cohort receiving CT was estimated at $14,436,506 (USD) for calendar year 2024.

Year 3 after osteoporosis diagnosis, the CT group had a fracture rate of 3.8% (±1.5%), ICT group 6.8% (±0.9%), and NT group 7.3% (±0.6%). The ICT + NT groups combined had a fracture rate of 7.1% (±0.5%). Fracture reduction at year 3 between the CT group and the combination ICT + NT group was 47.3% (95% CI, 21.6%-69.7%). Gross savings based on fracture reduction for the osteoporosis cohort receiving CT was estimated at $11,628,641 (USD) for calendar year 2025.

DISCUSSION AND CONCLUSION:

Appropriate osteoporosis medication treatment in newly diagnosed osteoporosis patients can significantly decrease the rate of fragility fractures in this patient population over 3 years. Cost savings from reduction in fracture rates in this patient cohort is significant and healthcare systems and insurance carriers should consider increasing resources to such programs that encourage osteoporosis diagnosis and treatment.