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Effect of osteoporosis medications on fracture healing.

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Abstract

Antiosteoporotic medications are often used to concurrently treat a patient's fragility fractures and underlying osteoporosis. This review evaluates the existing literature from animal and clinical models to determine these drugs' effects on fracture healing. The data suggest that these medications may enhance bone healing, yet more thorough prospective studies are warranted. Pharmacologic agents that influence bone remodeling are an essential component of osteoporosis management. Because many patients are first diagnosed with osteoporosis when presenting with a fragility fracture, it is critical to understand how osteoporotic medications influence fracture healing. Vitamin D and its analogs are essential for the mineralization of the callus and may also play a role in callus formation and remodeling that enhances biomechanical strength. In animal models, antiresorptive medications, including bisphosphonates, denosumab, calcitonin, estrogen, and raloxifene, do not impede endochondral fracture healing but may delay repair due to impaired remodeling. Although bisphosphonates and denosumab delay callus remodeling, they increase callus volume and result in unaltered biomechanical properties. Calcitonin increases cartilage formation and callus maturation, resulting in improved biomechanical properties. Parathyroid hormone, an anabolic agent, has demonstrated promise in animal models, resulting in accelerated healing with increased callus volume and density, more rapid remodeling to mature bone, and improved biomechanical properties. Clinical data with parathyroid hormone have demonstrated enhanced healing in distal radius and pelvic fractures as well as postoperatively following spine surgery. Strontium ranelate, which may have both antiresorptive and anabolic properties, affects fracture healing differently in normal and osteoporotic bone. While there is no effect in normal bone, in osteoporotic bone, strontium ranelate increases callus bone formation, maturity, and mineralization; forms greater and denser trabeculae; and improves biomechanical properties. Further clinical studies with these medications are needed to fully understand their effects on fracture healing in order to simultaneously treat fragility fractures and underlying osteoporosis.

KEYWORDS: Fracture healing; Medication; Osteoporosis; Pharmacology

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