

Evaluation and Medical Management of Fragility Fractures of the Upper Extremity

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KEYWORDS

• Osteoporosis • Fragility fracture • Bone mineral density • DEXA • Bisphosphonates

KEY POINTS

- Osteoporosis is a silent and painless disease until a fracture occurs from a low-energy injury.
- The goal of treatment is early diagnosis and prevention.
- Diagnosis is made through bone mineral density testing, most commonly through dual-emission x-ray absorptiometry (DEXA) scanning.
- The Fracture Risk Algorithm (FRAX) tool (World Health Organization Collaborating Centre for Metabolic Bone Diseases, University of Sheffield, UK) uses clinical grounds to assess one's 10-year fragility fracture risk.
- Prevention is provided through avoiding alcohol and tobacco, performing regular weight-bearing exercises, dietary supplementation, and pharmacologic management when indicated.
- DEXA scanning is indicated in women aged 65 years and older and men aged 70 years and older. Testing can be performed earlier in postmenopausal women of any age or men with higher risk profiles.
- Adequate daily calcium intake consists of at least 1200 mg and vitamin D of 800 to 1000 IU, each per day. Dietary supplementation should be used accordingly.
- Pharmacologic management is indicated in those who have incurred a hip or vertebral fracture or in those with a DEXA scan T-score of less than or equal to -2.5 standard deviations (osteoporosis) at the femoral neck or spine.
- Pharmacologic management is also indicated in those with a DEXA scan T-score of between -1.0 and -2.5 standard deviations (osteopenia) with a FRAX 10-year fracture probability of more than 20%.
- Current Food and Drug Administration–approved pharmacologic agents for osteoporosis prevention and treatment include bisphosphonates, parathyroid hormone, calcitonin, and hormone therapy.

INTRODUCTION AND EPIDEMIOLOGY OF FRAGILITY FRACTURES

Osteoporosis is a silent and painless disease until a fracture occurs with minimal trauma (ie, a fragility fracture) (Fig. 1). The mainstay of treatment is detection and prevention. Osteoporosis is

endemic in aging patients, with up to 50% of all men and women aged 80 years and older meeting the diagnostic criteria.¹ By definition, osteoporosis is diagnosed and quantified by bone mineral density. However, deficient bone mineral density (BMD) in itself is not as great a burden on patients and the American health care system as its

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Fig. 1. Distal radius fracture occurring as result of minimal trauma in osteoporotic bone, the definition of a fragility fracture.

manifestation in a fragility fracture because BMD is only a surrogate parameter for an impending fracture (comparable with blood pressure for stroke). Osteoporosis poses a major health problem both clinically and economically because it currently has no cure and leads to an alarming increase in bone's propensity to fracture.

The World Health Organization defines a *fragility fracture* as a fracture caused by injury that would be insufficient to fracture normal bone: the result of reduced compressive and/or torsional strength of bone.² These injuries are most often seen in the hip, distal forearm, proximal humerus, or vertebrae (compression) as result of low-energy trauma (ie, a fall from a height of less than 1 m). These low-energy mechanisms represent 53% of all fractures in patients aged 50 years or older and 80% in patients aged 75 years and older.³ Nearly half of all American women will sustain a fragility fracture in their lifetime, and distal radius fractures are particularly considered to be a harbinger of future

fragility fractures because they are frequently the first to occur as osteoporosis develops.⁴ The distal radius fracture is the most frequently diagnosed fracture in women, and the mean age of women with fractures of the distal radius is 64 years old. Women who are 60 years of age with a residual life expectancy of more than 21 years have a 17% chance of incurring a fracture of the distal radius and an 8% chance of incurring a fracture of the proximal humerus.⁵

Risk factors for distal radius fractures include family history of fragility fracture of the hip or distal radius, obesity in men, early menopause in women, and less menopausal discomfort during menstruation.⁴ Protective factors have been shown to include moderate daily activity level, late menopause, and hormone replacement therapy. No effect on risk has been noted with body mass index in women, smoking habits, oral contraceptive use, medical comorbidities, education level, visual capacity, hand dominance, or physical

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