Secondary Prevention After an Osteoporosis-Related Fracture

An Overview

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KEYWORDS

• Fragility fracture • Postfracture secondary prevention • Fracture risk • Osteoporosis • Interventions • Models of care

KEY POINTS

- Having a prior fracture is a major predictor of future fractures.
- There is strong evidence to support the rationale for postfracture secondary prevention programs.
- It is believed that a systems approach, with dedicated personnel, bone mineral density (BMD) testing within a program, or both, performs better whereas programs offering only education, awareness, and medication coverage are less effective.
- Gaps in care still exist despite the improvements demonstrated by postfracture secondary prevention programs; however, many barriers to care are modifiable.

BURDEN OF FRAGILITY FRACTURES

One in 2 women and 1 in 5 men have a fragility (sometimes referred to as a low trauma or osteoporotic) fracture after age 50.[1–3] The risk of fracture in a 1-year period for women over age 50 is higher than the risk of any cardiovascular disease event in that year.[4] Having a prior fracture, whether it is a confirmed fragility fracture[5–7] or not,[8–10] is a major predictor of future fracture,[5–10] especially in the first 5 years after the initial fracture.[8,10] According to one review, peri- and postmenopausal women with prior fractures had 2 times the risk of subsequent fractures compared with women with no prior fractures, and women with a preexisting vertebral fracture had

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4 times the risk of a subsequent vertebral fracture than those without prior fractures.[9] A subsequent fracture can be particularly devastating if it is a hip fracture. Individuals who subsequently sustain a hip fracture are at increased risk of death compared with individuals who do not refracture within 5 years of their index fracture.[11] Approximately 25% of patients who sustain a hip fracture die within 5 years[11] and only 50% of hip fracture patients regain their prefracture status as judged by the ability to walk and the need for aids at home.[12]

Fractures are associated with

- Increased mortality risk[11,13–15]: in the geriatric population, one study demonstrated that the presence of vertebral fractures and number of prevalent fractures at baseline both independently increased the mortality risk within a 3-year follow-up[16]
- Significant length of hospital stay[17,18]
- Disability-adjusted life years[19]
- Admission to extended care facilities and nursing homes[18]

Fracture patients at risk for future fracture pose a significant cost to the health care system:

- In Canada, the mean attributable cost in the first year after a hip fracture in patients $\geq$65 years is approximately $37,000 for women and $40,000 for men.[20]
- The economic impact of hip fractures alone in Canada is projected to rise to $2.4 billion annually by 2041.[21]
- Loss of mobility associated with hip fractures results in indirect costs to the health care system when factors, such as assistive devices, family support, and home care, are considered.[21,22]
- The cost of a second fracture in Medicare patients 50 years of age and older is estimated to be as much as $1.3 billion annually in the United States.[23]

THE EVIDENCE FOR PHARMACOLOGIC AND NONPHARMACOLOGIC AGENTS ON FRACTURE RISK REDUCTION

Evidence gained from rigorous study designs, such as randomized controlled trials, supports the use of both pharmacologic and nonpharmacologic agents in preventing fractures.

Pharmacologic Agents

Therapy for fracture risk reduction includes bisphosphonates (alendronate, etidronate, risedronate, and zoledronic acid), other antiresorptives (hormone therapy, raloxifene, calcitonin, and denosumab), and anabolic agents (teriparatide).[24]

According to one meta-analysis, alendronate and risedronate reduce the risk of fracture by approximately 25% to 50%.[25] Similar values for antifracture efficacy of other major pharmacologic treatments of osteoporosis (OP) are reviewed by Kanis and colleagues.[26]

Pharmacotherapy reduces risk but does not eliminate it. Approximately 23%[27] to 34%[28] of fragility fractures occur in patients who are on OP pharmacotherapy. These fractures do not necessarily occur because treatment has failed. Whether or not these fractures are due to other factors that could be influencing refracture risk requires further research.

Two systematic reviews on the efficacy of bisphosphonates for secondary prevention demonstrated absolute risk reductions ranging from 1% to 6%, depending on the type of fracture prevented.[29,30] There are few data, however, on the efficacy of