

MANAGEMENT OF OSTEOPOROSIS IN POST-MENOPAUSAL WOMEN WITH HISTORY OF FRAGILITY FRACTURE

Dr Santhosh Kumar Seetharaman

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INTRODUCTION

Fragility fracture: Definition

A fracture occurring spontaneously or following minor trauma such as a fall from standing height or less –Excluding craniofacial, hand, ankle and foot fractures^{1,2}

CONSEQUENCES OF FRACTURE

Quality of life matters the most

Fractures can decrease quality of life:

- Physical: pain, compressed abdomen, spinal deformity
- Functional: decreased mobility, and
- Psychosocial: depression.

Quality of life – not the same person as before!

If one survives the hip fracture – 50 percent with hip fractures will never walk without assistance, and 25 percent will require long term care.

Fracture is a predictor of future fractures

- The risk of experiencing another fracture in the year following a hip fracture in men and women: 5 to 10 percent³
- The risk of experiencing another vertebral fracture in the year following a vertebral fracture in postmenopausal women: 20 percent⁴
- Prevalent vertebral fractures also predict hip fracture in men and women,⁵ and
- History of fragility fracture is more predictive of future fracture than bone density.

SANTHOSH KUMAR SEETHARAMAN
 Consultant,
 Division of Geriatric Medicine,
 University Medical Cluster,
 National University Hospital

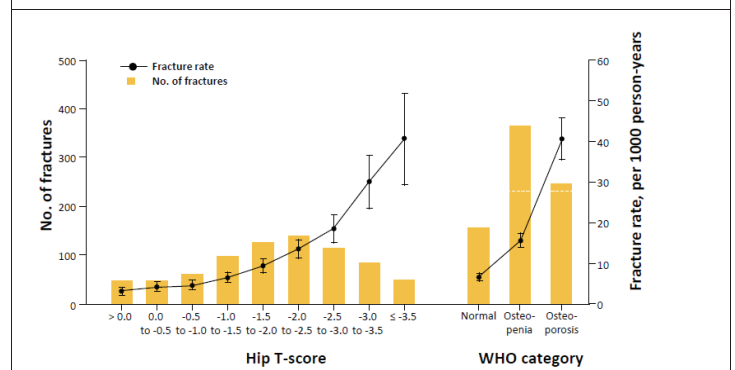
MISSING THE CONNECTION

Fragility fractures occur in osteopenia patients

Most fragility fractures in postmenopausal women occur with low bone mass (“osteopenia”) and NOT osteoporosis. Hence, over-reliance on Bone Mass Density (BMD) will miss out the opportunity to prevent fractures.

Figure 1 shows the number of fractures and fracture rate (per 1000 person-years, with 95% confidence). Note that by T-score intervals or WHO category of osteopenia-osteoporosis, there are more people with osteopenia than osteoporosis.

Figure 1. Fragility fractures in older women occur with low bone mass (“osteopenia”)



Source: Cranney A et al CMAJ 2007, 177(6):575-580⁶

Why does this happen?

The answer lies in the mechanism of fracture. Risk of fracture is a balance between bone strength vs force applied. See Table 1.

Table 1. Risk of fracture		
Bone strength	vs	Force applied on the bone
<ul style="list-style-type: none"> • Bone density • Bone quality (mineralization) • Bone architecture (connectivity) • Bone turnover (high in Paget’s disease) • Geometry of skeleton (postural changes with age, racial differences) 		<ul style="list-style-type: none"> • Postural instability, Body sway • Frailty • Slow response time • Environment • BMI

Undertreatment of osteoporosis post fracture in women

A fracture is to osteoporosis what a heart attack is to cardiovascular disease. Unlike in cardiovascular disease, there is a far wider treatment gap post fracture compared to post myocardial infarction.² The results are shown in Table 2. This care gap is even wider in men and those who reside in long-term care.⁷ This is a world-wide phenomenon, and the care gap is now beginning to be recognized, and intervention was done.

Table 2. Percentage of patients given treatment post fracture and post myocardial infarction

Post fracture anti-osteoporosis treatment		Post infarction beta-blocker treatment	
Prescribed treatment for osteoporosis	15.5%	Prescribed beta-blockers	80%
Diagnosis of osteoporosis only	5.5%	No treatment is given	20%
No diagnosis or treatment of osteoporosis	79.0%		
Total	100.0%		100.0%

Source: Bessette et al., 2008²

OSTEOPOROSIS AND AGEING – ASSESSMENT

Postmenopausal fractures

There are a number of risk factors for postmenopausal fractures. They are listed below.

- Age
- Gender
- Previous fracture
- Family history
- Low BMI
- Physical activity
- Currently smoking
- Rheumatoid arthritis
- Alcohol use
- Steroid use

Importance of low weight

In men more than 50 years and postmenopausal women, the following are associated with low BMD and fractures⁸ :

- Low body weight (<60 kg)
- Major weight loss (> 10% of weight at 25 years of age)

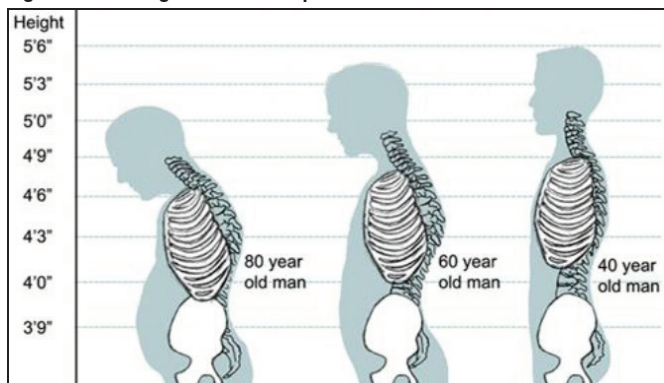
Importance of height loss

Increased risk of vertebral fracture:

- Historical height loss (>6 cm)⁹
- Measured height loss (>2 cm)¹⁰

Significant height loss should be investigated by a lateral thoracic and lumbar spine X-ray.

Fig 2. Loss of height due to osteoporosis



Screening

DXA is done for all women 65 years or older. Table 3 shows the diagnosis of osteoporosis based on T score in ROI (region of interest – spine, hip, femur). Note: False positive is obtained with compression fractures.

Table 3. Screening for osteoporosis

Diagnosis	T-score
Osteoporosis	≤ -2.5
Osteopenia	--1.0 -- 2.4
Normal	> -- 1.0

Footnote: False positive with compression fractures

Treatment algorithm

If the fracture is not due to major trauma – do baseline DXA and treat according to Table 4’s recommendations.

Table 4. Treatment algorithm for osteopenia and osteoporosis

No fracture
DXA better than minus 1 – no need treatment
DXA less than minus 2.5 – treat
DXA minus 1 to minus 2.4 and
≥ 3% FRAX Hip fracture – treat
≥ 20% FRAX Osteoporotic related fracture – treat

TREATMENT

Calcium and Vitamin D

All patients with bone loss or the potential for bone loss should be educated on the appropriate intake of calcium and vitamin D.

Exercise

Physical activity makes bones and muscles stronger and helps prevent bone loss. All types of physical activity contribute to bone health. High impact exercise programs may be the most effective at preventing fragility fractures.

Fall prevention

Three factors contribute to fractures – fall, force, and fragility.¹¹ There is a need to be mindful of the fracture risks described in Table 1.

Who needs to be treated?

- History of hip fracture
- Other prior fractures and T-score is between minus 1.0 to minus 2.5 at the femoral neck, total hip , or spine
- T-score minus < 2.5 at the femoral neck, total hip or spine.
- T-score between minus 1.0 and minus 2.5 at the femoral neck, total hip or spine
- Secondary cause increases the risk of fracture
- Steroid use, total immobilization, and
- T-score between minus 1.0 to minus 2.5 at the femoral neck, total hip or spine AND 10-yr probability of hip fracture > 3% or any major osteoporosis-related fracture > 20% (FRAX).

Treatment options

Bisphosphonates

Oral

- Alendronate 70 mg weekly
- Risedronate 35 mg weekly

Intravenous zoledronic acid 5 mg infusion over no less than 15 minutes, once a year.

Calcitonin

- Short term for pain after a vertebral fracture.

Teriparatide

- 20 mcg sc daily
- Recombinant human PTH (not more than 2 years)
- Contraindicated in cancer patients.

Denosumab

- 60 mcg sc/q 6 monthly
- Humanised monoclonal antibody
- Usually as the second agent
- Calcium (1200-1500 mg) + vitamin D (800 – 1000 IU) daily.

Specific challenges in the elderly:

- Medication adherence
- Polypharmacy
- Dental health
- Malnutrition, sarcopenia, frailty
- Falls risk
- Poor posture, GERD – PO bisphosphonates are not appropriate
- CKD – may need to consider SC denosumab
- Dysphagia – may need to consider parenteral, e.g. sc denosumab, iv zoledronic, sc teriparatide, and
- Financial constraints.

Approaches for optimizing adherence

- Reminders
- Patient information
- Counselling
- Simplification of the dosing regimen, and
- Self-monitoring.

Types and rates of nonadherence in osteoporosis therapy

Types of non-adherence¹²⁻¹⁴

- Frequently missed doses
- Failing to take the medication correctly to optimize absorption and action, and
- Discontinuation of therapy.

Reported one-year adherence rates: 25 – 50 percent^{12,14} and marginally better with less frequent dosing regimens.

Poor adherence to therapy leaves patients at a higher risk of fracture

At 50 percent adherence, patients will be at approximately the same fracture risk as no therapy.

WHEN TO REFER FOR SPECIALIST CARE:

Factors to consider

There are four factors consider in the decision to refer the patient for specialist care:

- Fracture on first-line therapy with optimal adherence
- Significant loss of follow-up BMD on first-line therapy with optimal adherence
- Intolerance of first and second-line agents, and
- Complex individuals with multiple co-morbidities, such as those with frequent falling, Alzheimer's disease, stroke, and Parkinson disease.

General geriatric clinic in Alexandra Hospital

Available services for patients with osteoporosis and related problems:

- A general geriatric clinic that provides a one point comprehensive assessment and management for patients 65 years and older, and
- Falls and/or gait balance clinic – one stop multidisciplinary assessment and management.

A Physiological profile assessment is conducted as a baseline.

- Vision
- Sensation
- Balance
- Speed, and
- Strength.

CONCLUSIONS

The following are take home messages based on the content covered:

- Fragility fractures affect the function and quality of life of the elderly
- Fracture begets fracture and strong predictor for future fractures
- Vertebral fractures can be silent necessitating specific screening (posture / height)
- Early identification and treatment are key to prevention
- BMD alone does not tell the whole story about fragility fracture risk
- Specific challenges in the elderly, e.g. falls, frailty, poor social support, poor vision, and
- A comprehensive evaluation is the key to deliver person centered care.

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LEARNING POINTS

- **Fragility fractures affect the function and quality of life of the elderly.**
- **Early identification and treatment are the key to prevention.**
- **BMD alone does not tell the whole story about fragility fracture risk.**