# OSTEOPOROSIS

A condition characterized by decreased bone mass and microarchitectural deterioration of bone tissue causing increased bone fragility and susceptibility to fracture.

**Etiology**

- Primary Osteoporosis - Due to post-menopausal decline in estrogen and/or increased age

- Secondary Osteoporosis

* GI - malabsorption (previous gastric surgery, IBD, celiac ds), poor nutrition, chronic liver and renal disease
* Bone - multiple myeloma, lymphoma, leukemia, immobilization
* Endocrine - Cushing’s, hyperthyroidism, hyperparathyroidism, DM, acromegaly, estrogen deficiency (hypogonadism, premature ovarian failure)
* Inflammatory: rheumatoid arthritis, SLE
* Drugs *–* corticosteroids(#2 reason to cause OP), phenytoin, heparin, androgen deprivation Rx
* Psych – Anorexia nervosa, alcohol abuse

**Screening**

* \*Canadian clinical practice guideline focuses on prevention of fragility # and their consequences, rather than treating low BMD
* All patients over 50 years of age should be screened for osteoporosis and fracture risk factors AND fall risk at their periodic health examination
* Assess 10 yr fracture risk with FRAX or CAROC
* Hx – prior fragility #, parental hip #, glucocorticoid use, smoking, high EtOH intake, rheumatoid arthritis, falls in past year, gait and balance
* PE – weight, height (historical loss >6cm or prospective loss >2cm), rib to pelvis distance < 2 fingers breadth, occiput to wall distance > 5cm, fall risk – Get-Up-and-Go Test
* Based on Hx and Px, look at indications for a Bone Mineral Density (BMD). Wide-spread BMD screening for those under 65 is not recommended.

**Indications for measuring BMD**

- All patients aged 65 yrs

- If age 50-64 yrs and

* Fragility fracture after age 40
* Prolonged use of corticosteroids\*
* Use of other high risk meds \*\*
* Parenteral hip fracture
* Vertebral fracture or osteopenia seen on Xray
* Current smoking
* High EtOH intake
* Low body weight (< 60 kg) or major weight loss (> 10% of body weight)
* Rheumatoid Arthritis
* Other disorders strongly asst’d with OP

- If age < 50 yrs and

* Fragility Fracture
* Prolonged use of corticosteroids\*
* Use of other high risk meds\*\*
* Hypogonadism or premature menopause
* Malabsorption syndrome
* Primary hyperparathyroidism
* Other disorder strongly associated with rapid bone loss and/or fracture

\* corticosteroid *>7.5mg prednisone ODx3months*

\*\* aromatase inhibitor, androgen deprivation therapy

**Clinical Features**

* Commonly asymptomatic
* May have pain, especially back
* Height loss or thoracic kyphosis
* Fractures – hip, vertebrae, humerus and wrist are most common

**Investigations**

* Usually have normal Ca, PO4, ALP
* Check CBC, Cr, TSH, vit D, SPEP/UPEP, 24 hr urinary Ca excretion, PTH.
* Lateral thoracic and lumbar spine X-rays if clinical suggestion of vertebral #

**Bone Mineral Density:**

* Dual-energy X-ray densitometry (DEXA) is gold standard
* Measure density at lumbar spine and femur, then compared to gender and ethnicity-matched controls

BMD 1.0 - 2.5 SD below mean = ***Osteopenia***

BMD > 2.5 below mean = ***Osteoporosis***

**Management**

* Council all patients about primary prevention of osteoporosis

- Weight bearing endurance exercise (20-60 min 4-7 x/wk), balance & strengthening (2-4x/wk) exercises

- Smoking cessation

- Caffeine and EtOH reduction

- Dietary or supplemental calcium (1200mg/d) and vitamin D (400-2000 IU/day)

* Institute a fall prevention program for those at risk

- Address mobility and sensory impairments, dizziness, urinary frequency, hazards in the home

- Consider hip protectors if high risk and residing in long term care

* Prevent prescribing meds that increase fall risk

- Oral hypoglycemic agents, diuretics, anti-cholinergic, anti-hypertensive, psychotropic meds etc

* Correct a reversible cause if there is one
* Discontinue osteoporosis-inducing medication if possible

**Treatment**

Pharmacotherapy reduces risk of vertebral fracture by 30-70%

Canadian guidelines recommend treatment based on FRAX or CAROC 10 yr fracture risk:

* *High Risk* (>20%) or >50yrs with fragility fracture of hip/vertebra or >1 fragility fracture = pharmacological treatment
* *Mod Risk* (10-20%) – decision to treat with pharmacotherapy based on patient preference and additional risk factors (additional vertebral #, prev wrist # if >65 and T-score < -2.5, T-score lumbar spine <<femoral neck, rapid bone loss, men on androgen-deprivation therapy for prostate CA, women on aromatase inhib therapy for breast CA, long term/repeated systemic steroid use, >2 falls in past year, other d/o strongly associated with osteoporosis, rapid bone loss/#’s)
* *Low Risk* (<10%) – lifestyle measures are sufficient

For menopausal women,

* Bisphosponates (alendronate or risendronate) - prevents hip, nonvertebral and vertebral fractures
* Selective estrogen-receptor modulator SERM (raloxifene) - prevents hip fractures
* HRT – if woman has vasomotor Sx – prevents hip, nonvertebral and vertebral fractures
* If intolerant of first line therapies – calcitonin or etidronate – prevents vertebral fractures
* PTH or calcitonin – if has had previous fracture

For men,

* Bisphosphonates
* Testosterone not recommended

**Sources:**

1. Papaioannou et al.2010 clinical practice guidelines for the diagnosis and management of osteoporosis in Canada: summary. CMAJ *November 23, 2010 vol. 182 no. 17*

2. Toronto Notes 2010

3. BC Guidelines – Osteoporosis: Diagnosis, Treatment and Fracture Prevention. 2011