Management of low BMD in young adults

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Premenopausal Women and Osteoporosis

In younger women:

- Osteoporosis is rare
- Osteoporosis is less clearly defined
- Secondary causes are often identified
- Treatment options are less evidence based
  - Focus on those with fractures or ongoing severe bone loss
Premenopausal Women and Osteoporosis

Diagnosis of osteoporosis more secure if:

- Low trauma fractures present
  - Fracture after fall from standing height or less
  - Absence of malignancy or osteomalacia

Premenopausal fractures predict risk of postmenopausal fractures
Bone Mineral Density Testing in Premenopausal Women

- Cross sectional studies only
- Women with distal radius fracture v controls
  - Lower BMD
- Female military recruits with stress fractures
  - Lower BMD
Bone Mineral Density Testing in Premenopausal Women

• No longitudinal studies relating BMD by DXA to incident fractures
• So relationship between BMD and short term fracture risk less clear
• ISCD* recommend T scores should not be used
  – Z scores should be used

* International Society for Clinical Densitometry
Bone Mineral Density Testing in Premenopausal Women

Young women with BMD Z scores < -2.0:

- “below expected range for age”

T scores should **not** be used for diagnostic categories of osteoporosis nor osteopaenia
Figure 2. Probability of hip fracture in Swedish women.

* Kanis J 2001 Osteoporosis International
Bone Mineral Density Testing in Premenopausal Women

• Majority of bone mass acquired in adolescence
• But BMD may increase between ages of 20 and 30
• So women in early 20s may not have achieved peak bone mass
• Beware delayed bone age
Bone Mineral Density Testing in Premenopausal Women

- Expected changes in bone mass during pregnancy and lactation
- 5% BMD decrease during pregnancy
- 10% BMD decrease during lactation
- Recovers over next 12 months
- Timing of recent pregnancies and lactation important when interpreting BMD result
Pregnancy and Lactation Associated Osteoporosis

• Osteoporosis may present as low trauma fracture eg hip or spine
  – in 3rd trimester of pregnancy
  – during lactation
• Still need to exclude secondary causes
• If BMD remains low 12 months after cessation of breast feeding
  – “Idiopathic osteoporosis”
Causes of Secondary Osteoporosis in Young women

- Oestrogen deficiency
- Inflammatory diseases
- Collagen diseases
- Gastrointestinal diseases
- Glucocorticoids and other drugs
Causes of Secondary Osteoporosis in young women

- Many diseases of childhood and young adults can lead to osteoporosis
- Mutifactorial
  - Malnutrition
  - Systemic inflammation
  - Oestrogen deficiency/delayed puberty
  - Medications
Cystic fibrosis causes of bone loss

Multifactorial

- Inflammatory cytokines
- Calcium and vit D deficiency
- Steroids
- Other nutritional deficiencies/malabsorption
- Low BMI
- Hypogonadism
Causes of secondary osteoporosis

Endocrine
- Thyrotoxicosis
- Hypogonadism
- Primary Hyperparathyroidism
- Cushing’s disease

Gastrointestinal
- Malabsorption
- Inflammatory bowel disease
- Liver disease

Respiratory
- Severe COPD/asthma

Connective tissue disease
- Osteogenesis Imperfecta
- Marfan Syndrome
- Ehlers Danlos syndrome

Malignancy
- lymphoma

Prolonged immobility
Causes of secondary osteoporosis

**Inflammatory conditions**
- Rheumatoid arthritis
- SLE
- Other inflammatory conditions

**Other conditions**
- Renal disease
- HIV infection
- Thalassaemia
- Mastocytosis
- Gaucher’s disease

**Drugs**
- Glucocorticoids
- Alcohol
- Anticonvulsants
- Antidepressants
- PPIs
- Chemotherapy
- Thiazololedinediones
Causes of secondary osteoporosis

Premenopausal amenorrhoea / oestrogen deficiency
- Pituitary or hypothalamic disease
- Chemotherapy
- GnRH agonists

Anorexia nervosa
- Complex nutritional and hormonal abnormalities
- Low BMI

Any cause will be associated with bone loss
- Low BMI
Osteoporosis in Premenopausal women

If no cause is found:

• “Idiopathic osteoporosis”
Osteoporosis in Premenopausal women

NICE CG146

- Assess osteoporosis risk in those under the age of 50 if they have a major risk factor
Osteoporosis in Premenopausal women

NICE CG146 – assessing the risk of fracture

• Measure BMD to assess fracture risk in people < 40 y/o who have a major risk factor
  – multiple fragility fractures
  – major osteoporotic fracture
  – use of high-dose glucocorticoids (> 7.5 mg prednisolone per day for 3 months or longer)
Management

• Lifestyle modifications, nutrition, exercise etc
Management

• Pharmacological treatment rarely justified in absence of fractures and if no identifiable cause
  – Esp if Z score > -3.0

• BMD can recover in these patients
  – Peris Clinical Rheumatol 2007
Management

In women with low BMD or low trauma fractures and known cause

• Address underlying cause if possible
  – Eg gluten free diet for coeliac
  – Weight gain for anorexia nervosa
  – Stop steroids
  – Some recovery of bone loss can occur

• Not always possible of course
Management

Bisphosphonates

• No large RCTs
• No fracture data
• Several studies show BMD increases
  – Steroids
  – Thalassaemia
  – Cystic fibrosis
Management

Bisphosphonates

• Premenopausal women included in
  – steroid studies
  – anorexia nervosa
• Contraindicated in pregnancy and lactation
Management

Bisphosphonates

In general:

• Use shortest duration of treatment possible
• Reserve for fractures or ongoing bone loss
Management

Teriparatide

- Good bone density responses
- Small trials
- Some preMP women in steroid studies
Management

Teriparatide

- Ensure epiphyses fused in those < 25 y/o
- Stop if pregnancy planned
- Reserve for highest risk patients
- Sometimes used for stress fracture healing
Management

Denosumab

- Use with caution
- Reproductive toxicity in animals
- Avoid pregnancy for 6 months after injection
Management

Denosumab

- Duration of use
- Steroids
- Case series demonstrate efficacy in anorexia nervosa

Case Presentation 1

- 23 y/o Asian lady
- Tiredness
- Bone pains ribs, legs and spine
- Proximal muscle weakness
- 2 recent pregnancies
Case Presentation 1

DXA scan:

- Z score -4.5 hip
- Z core -2.9 spine
Case Presentation 1

- Serum calcium 2.04 (low)
- ALP = 430 (high)
- Vit D level undetectable
- Anti tTG antibodies positive
Case Presentation 1

- Diagnosis of osteomalacia due to vitamin D deficiency due to Coeliac disease
- Treated with vitamin D supplements and gluten free diet
- Bone loss should be reversible
Case Presentation 2

- 31 y/o lady
- Severe sacral pain
- SLE diagnosed 4 years earlier
- On high dose prednisolone 30 mg od
Case Presentation 2
Case Presentation 2

Z score -3.1 hip
Z score -2.8 spine
Case Presentation 2

- Treated with Teriparatide
  - ongoing
Summary

In younger women:

- Osteoporosis is rare + less clearly defined
- Use Z scores
- Secondary causes are often identified
- Treatment options are less evidence based
  - Focus on those with fractures or ongoing severe bone loss
Any questions?