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Osteoporosis

- Risk Factors
  - Slender; smoker; alcoholic; prolonged rest; old age; HyperPTH; vertebral deformity; >5mg pred
  - Late menarche; early menopause; Cushing's; malabsorptive syndrome; thyroidtoxicosis; myeloma; amenorrhoea
  - Family history; RA; hypogonadism; past low trauma fracture
- Osteomalacia
  - Normal amount of bone but low mineral content (excess uncalcified osteoid and cartilage)
  - Rickets in children, osteomalacia after the fusion of the epiphyses
  - Vit D Deficiency (malabsorption, poor diet, lack of sunlight)
  - Forms
    - Renal (1,25 dihydroxy deficiency)
    - Drug induced
    - Vitamin D resistance
    - Liver disease (25 hydroxy deficiency)
  - Signs and symptoms
    - Rickets: knock kneed, bow legged, ill
    - Osteomalacia: bone pain, fractures
  - Treatment: depends on underlying cause but calcium and vitamin D
- Paget's Disease
  - Pathology
    - Increased bone turnover, due to increased osteoclasts and osteoblasts
    - Remodelling, bone enlargement, deformity and weakness
  - Risk factors
    - Incidence rises with age
    - Commoner in temperate areas and Anglo Saxons
  - Signs & Symptoms
    - Marked raised Alk Phos, normal calcium, vit D and liver enzymes
    - Pain
      - Nerve endings in periosteum
      - Pressure effects on other tissues
      - Often asymptomatic
    - Enlargement of skull, femur or clavicle, and sabre tibia
  - Complications
    - Bone sarcoma (1% if those affect for > 10 yrs)
    - Nerve compression e.g. deafness
  - Management
    - Analgesia
    - Alendronic acid to reduce pain / deformity)
- Diagnosis
  - Purpose of Investigations
    - Confirming the diagnosis
    - Exclude causes of secondary osteoporosis
    - Provide measurement, so that the efficacy of therapy may be assessed in the future
  - Confirmation
    - T-score < -2.5
    - Following pathological / fragility fracture
  - Primary
    - Age related / post menopasual
  - Secondary
    - Due to steroids, hypogonadism
  - FRAX
    - Calculates 10 year risk of fracture
    - Age, sex, weight, height, previous spontaneous adult fracture
    - Smoking status, steroid status, alcohol status
    - RA diagnosis, other diagnosis associated with osteoporosis (DM, hypogonadism), BMD
- Management
  - Prevention
    - Exercise
    - Good diet
    - Avoid smoking and excess alcohol
    - Bisphosphonates for at risk pts (> 3 months steroid treatment)
    - HRT - only with relevant symptoms
  - Treatment
    - Bisphosphonates
      - Alendronic acid
        - SE: abdo pain, nausea, photosensitivity, oesophageal ulcers
        - Weekly, monthly, bimonthly, annual dose is available
      - Swallow with water on empty stomach, remain upright for 30 mins
      - Important to supplement vitamin D and calcium
      - Zoledronate is an IV option (once yearly)
      - Mode of action
        - Encourage osteoclasts to undergo apoptosis
        - High affinity for bone surface and rapidly absorbed
    - Vitamin D / Calcium
      - Of little use a single therapy
      - Can be used in elderly institutionalised
    - Raloxifene
      - Selective oestrogen receptor modulator
      - Also reduces breast cancer risk
      - Does not reduce incidence of long bone fractures
    - Strontium
      - Same periodic group as calcium
      - Increases bone formation and reduce reabsorption
      - Effective in reducing fractures
    - Recombinant PTH
- Dexa Bone Scan
  - Typically examines lumbar spine and hip
  - Bone mineral density is compared with that of a young healthy adult (t-score)
  - Z-score is an age and sex matched value
  - T-Score
    - 0 to -1: BMD is in top 84% (no evidence of osteoprosis)
    - -1 to -2.5: Osteopenia - at risk of osteoporosis and consider preventative measures
    - -2.5 or worse: Osteoporosis
  - Who not to scan
    - Women on HRT with no complications
    - Those who won't accept treatment
    - Elderly patients with spondylosis in whom spine bone density measurements may be difficult to interpret
    - Within a year of previous measurement