OSTEOPOROSIS

ACOI BOARD REVIEW 2015

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EPIDEMIOLOGY OF OSTEOPOROSIS IN THE UNITED STATES

- 44 Million Americans
  - 80% women (35.2 million)
  - 20% men (14.8 million)
- 1.5 million fractures/year
- 10 million with established Osteoporosis
- 34 million with low bone mass
- Lifetime risk
  - Men 30%
  - Women 40%
OSTEOPOROTIC FRACTURES IN THE UNITED STATES

- Hip 300,000
- Spine 700,000
- Wrist 250,000
- Other 350,000
FREQUENCY OF COMMON DISEASES IN THE UNITED STATES

- Osteoporotic Fractures > 1,500,000
- Myocardial Infarction 513,000
- Stroke 228,000
- Breast Cancer 182,000
- Uterine Cancer 49,000
RISK FACTORS FOR OSTEOPOOROSIS

Nonmodifiable
- Age
- Female sex
- Asian/Caucasian
- Prior fracture
- Family history
- Small frame
- Thyroid disease

Modifiable
- Low body weight
- Calcium deficient
- Vitamin D deficient
- Inadequate physical activity
- Excessive alcohol
- Tobacco use
- Long term steroid use
- Estrogen/testosterone deficiency
RISK OF REFRACTURE

- 86% Increased fracture risk
- 1 Year risk  26.1%
  - 17.4% New vertebral fracture
  - 1.6% New wrist fracture
  - 7.1% New hip, pelvic, leg  fracture
CLINICAL PRESENTATION

- Asymptomatic
- Low trauma fracture
- Loss of height
- Increased thoracic kyphosis
- Back pain
VERTEBRAL FRACTURE

- Loss of height
- Loss of Mobility
- Loss of function
- Acute pain
- Chronic pain
- Decreased functional vital capacity
- Decreased life expectancy
A 50 year old woman has a 2.8% lifetime risk of death from hip fracture
  - Equal to breast cancer
  - 4x higher than endometrial cancer
20% Die within 1 year
75% of survivors require assistance with ADL’s
  - 40% unable to walk without assistance at 1 year
  - 60% require some assistance 4 years later
20% require long term nursing home care
MEDICARE INDICATIONS FOR DEXA

- Estrogen deficiency
- Vertebral abnormality
- Hyperparathyroidism
- Long term steroid use
- Assessment of therapy
- Screening

NOF Guidelines For DEXA

- All women over age 65
- Younger postmenopausal women with one or more risk factors
- Post menopausal women with fractures
**DIAGNOSIS**

- **Normal**: T score higher than -1.0
- **Osteopenia**: T score -1.0 to -2.4
- **Osteoporosis**: T score -2.5 or lower
- **Severe Osteoporosis**: T score -2.5 or lower with a fracture
TREATMENT GUIDELINES

- Normal BMD
  - Appropriate calcium and vit D
  - Weight bearing exercise
  - Risk factor review
  - Periodic monitoring

- Osteopenia
  - FRAX Analysis using 10 year fracture probability
  - Nation specific
  - Race specific
  - Includes men over the age of 50
NOF TREATMENT GUIDELINES

- Postmenopausal women or men over 50 with a hip or spinal fracture
- T score of -2.5 or lower in the hip or spine
- T score lower than -1.0 with a FRAX analysis
  - 10 year probability of hip fracture > 3%
  - 10 year probability of other osteoporotic fracture > 20%
OSTEOPOROSIS TREATMENT

- Prevention
- Nutrition
  - Calcium
  - Vitamin D
- Exercise
  - Fall prevention
  - Pain control
  - Surgery
CALCIUM

- Accounts for 2% of an adult's weight
- 1984 NIH consensus 1500mg/day recommended
- RDA 1000mg/day
- Current recommendations
  - Post menopausal women 600mg bid
  - Men RDA
    - under age 71 1000mg
    - Over age 71 1200mg
## OSTEOPOROSIS TREATMENT

| Estrogen   | Actonel |
| Evista     | Fosomax |
| Calcitonin | Boniva  |
| Forteo     | Reclast |
ESTROGEN

- Decreases bone resorption
  - Decreases osteoclastogenic cytokine production in T-cells and osteoblasts
  - Increases apoptosis of osteoblasts
- Used alone only after hysterectomy
- Used with progesterone if no hysterectomy
SERM

- **Evista** (Raloxifene)
- **Estrogen agonist/antagonist**
- **Decreases bone resorption by**
  - Estrogen agonist
  - Decreased IL-6 bone resorptive activity
  - Decreased TNF-alpha bone resorptive activity
  - Increased transforming growth factor beta 3 (decreases osteoclasts)
CALCITONIN

- SQ or Nasal spray
- Well tolerated
- No drug interactions
- Good long term safety

- Nasal irritation
- Rash
- G.I.
- No hip data
- Poor long term data
BISPHOSPHONATES

- Decrease bone turnover
- Increased BMD spine, hip, other
- Decreased fracture risk spine, hip, other
- Sustained effect with continued treatment
PROLIA (DENOSUMAB)

- Human IgG2 monoclonal antibody
- Affinity for RANKL
- 6 month SQ injection
- Hip fracture 0.7 vs 1.2% (3 years)
- Spinal fracture 2.3 vs 7.2% (3 years)
- Indications
  1) High risk
  2) Bisphosphonate failures
FORTEO (TERIPARATIDE)

- Recombinant human parathyroid hormone
- Treatment duration 2 years
- Indications: 1) High risk
  2) Treatment failures
- Osteosarcoma
- Hypercalcemia, Hypercalcuria
- Hyperuricemia
- Orthostatic hypotension