# Exploring The Gray Zone: Osteoporosis

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Today's speaker has no conflict of interest to disclose.

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# Participants

- Moderators:
  - Analia Castiglioni
  - Erin Snyder
- Primary Care: Teri Bryan, MD
- Endocrinology: Amy Warriner, MD
- Nutrition: Sarah Morgan, MD
- Nutrition: Beth Kitchin, RD, PhD
- Orthopedics: Jason Lowe, MD
- Rheumatology: Ken Saag, MD

# Learning Objectives

- To think critically about common management dilemmas that have little or conflicting evidence in the literature.
- Review the details about osteoporosis screening, diagnosis, and management that DO have evidence in the literature

# Osteoporosis

- Compromised bone density that predisposes a person to fracture
  - 12 million Americans older than 50
  - Increased mortality after suffering fragility fracture
- Need to identify and treat high risk patients

# Osteoporosis

- Diagnosed by DXA scan
  - T score: your patient's BMD compared to BMD of 30 year old woman
  - Z score: your patient's BMD compared to BMD of age matched controls (use this for patients <50 yo)
- Normal: T score -0.1 and higher
- Osteopenia: T score below -1.0 and above -2.5
- Osteoporosis: T score -2.5 and below

# Ms. Inside

- 62 year old establishing care
  - Recently moved from Boston to Alabama
- No medical problems
  - Postmenopausal age 55, never took HRT
  - Never broken a bone
- No medicines

- **How would you address her bone health?**
  - **Bone density, Vitamin D level?**
  - **Supplements?**

# Ms. Inside

- You decide to order a serum 25-OHD level and it is 17 ng/ ml.

- **How would you manage this?**
- **What regimen would you use?**
- **What is your target ?**

# Ms. Inside

- You recommend Calcium and Vitamin D replacement
- She says, “I heard something on the news about calcium causing heart attacks.  Is it safe to take?”
  - Family history: MI in Father at age 65, Brother age 60, and sister age 70
  - Social history: nonsmoker

- **What would you tell her about Calcium and Vitamin D supplementation?**

# Mrs. Repeat

- 70 year old routine follow up
- No medical problems
  - Postmenopausal age 55, never took HRT
  - Never broken a bone
  - Non-smoker
  - BMI 20
- Only medicines are appropriate Calcium and Vitamin D supplementation
- Last DXA age 65, normal bone density

- **Should you repeat her DXA?**
- **What is the ideal interval for screening?**

# Mrs. Penia

- 65 year old follow up visit
- No medical problems
  - Postmenopausal age 55, never took HRT
  - Never broken a bone
- No medicines
- DXA with T score -2.0

- **Would you treat her osteopenia?**
- **Are your Calcium and Vitamin D recommendations different?**

# Mrs. Thin

- 65 year old follow up visit
- No medical problems
  - Postmenopausal age 55, never took HRT
  - Never broken a bone
- No medicines
- DXA with T score -2.7

- **What medication would you start?**
- **When would you consult a specialist?**

# Ms. Thin

- You offer Alendronate weekly, calcium, and Vitamin D supplementation
- She reports that she is going to get dental implants in the next month

- **What is the risk of jaw osteonecrosis in bisphosphonate use?**
- **How do you counsel patients who need (or have) dental implants?**
- **Are there other risks of bisphophonate use?**

# Ms. Longterm

- 75 year old with osteoporosis
  - Last DXA this year with T score -2.7 (stable)
  - Has been on Bisphosphonate 10 years
- No fractures

- **Should she take a “holiday” from her bisphosphonate?**
  - **How should you monitor during the holiday?**
- **When should this patient be seen by a specialist?**
- **Should you try another agent?**

# Mrs. Fragility Fall

- 71 yo WF admitted to your service after a fall and low trauma hip fracture.
- While awaiting surgical intervention you want to address her osteoporosis.

- **Does she have osteoporosis? Does she need more testing?**
- **When is it safe to use bisphosphonates after a fracture?**
- **Would they delay fracture healing?**

# Osteoporosis Screening

- USPSTF: Screen Women age 65
  - Earlier if risks are similar to age 65 woman
  - No recommendation for screening men
- National Osteoporosis Foundation (NOF):
  - Women > 65, Men > 70
  - Younger if risk factors
    - Adults with fracture after age 50
    - Adults with certain conditions or medications

# Risk Factors for Osteoporosis

- Age
- Female Sex
- Estrogen deficiency
- Personal history of Fracture
- Family history of fragility fracture
- Steroid use > 3 months
- Low body weight
- Poor health overall, inadequate physical activity
- Smoking
- White, Asian race
- Low calcium intake
- Alcoholism
- Dementia
- Recurrent falls
- Impaired eyesight despite correction
- NH patients
- Medicines: long term heparin, anticonvulsants, aromatase-inhibitors, androgen deprivation therapy

# FRAX

- Decide which patient under age 65 to screen
  - 10 year Risk for osteoporotic fracture > 9.3%
- Decide which patient with osteopenia to treat
  - 10 year risk for hip fracture is >3%
  - Overall fracture risk is >20%

# FRAX®

WHO Fracture Risk Assessment Tool

Home | Calculation Tool | Paper Charts | FAQ | References | English

## Calculation Tool

Please answer the questions below to calculate the ten year probability of fracture with BMD.

Country: US (Caucasian) Name/ID:

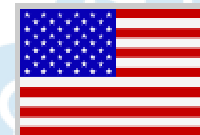
About the risk factors

### Questionnaire:

1. Age (between 40-90 years) or Date of birth
   Age: Date of birth: Y: M: D:
2. Sex ○ Male ○ Female
3. Weight (kg)
4. Height (cm)
5. Previous fracture ◉ No ○ Yes
6. Parent fractured hip ◉ No ○ Yes
7. Current smoking ◉ No ○ Yes
8. Glucocorticoids ◉ No ○ Yes
9. Rheumatoid arthritis ◉ No ○ Yes
10. Secondary osteoporosis ◉ No ○ Yes
11. Alcohol 3 or more units per day ◉ No ○ Yes
12. Femoral neck BMD (g/cm²)

Select DXA

Clear | Calculate



### Weight Conversion

Pounds ➜ kg

Convert

### Height Conversion

Inches ➜ cm

Convert

**00609927**

Individuals with fracture risk assessed since 1st June 2011

# Screening Interval

- Not known
  - Medicare will pay for DXA every 2 years
- If bone density normal, progressing to osteoporosis is slow
  - Gorlay 2012: ~5000 women with normal BMD or osteopenia
    - Took >15 years for 10% of women with nl BMD to develop osteoporosis
    - ~5 years for women with moderate osteopenia to develop osteoporosis

Gorlay ML, et al., NEJM 2012

# Calcium

- Conflicting data regarding MI risk and Calcium intake
  - Meta-analysis of 15 trials Ca vs Placebo
    - Increased risk MI in patient with Ca intake >805mg/day
- IOM: 1000-1200mg daily for adults
- NOF: 1200mg daily for postmenopausal women and men over 50

Bolland BMJ 2011 342

# Vitamin D Controversy

- Vitamin D role in many conditions (cancer, autoimmune, CV disease, infections, etc)
- IOM artificial "epidemic" of vitamin D inadequacy
- Concept that "more is better" seems to have emerged for both calcium and vitamin D

IOM Report: J Clin Endocrinol Metab, October 2011, 96(10):2987–2996

# Vitamin D

- Some debate about target 25-OH vitamin D levels and when to screen

- Endocrine Society Task Force (2011)
  - Screen individuals at risk for deficiency
  - Do not recommend population screening
  - 25(OH)D level by a reliable assay
    - Vitamin D deficiency < 20 ng/ml
    - Vitamin D insufficiency < 30 ng/ml

J Clin Endocrinol Metab, July 2011, 96(7):1911–1930

# Vitamin D Intake Recommendations: IOM and the Endocrine Practice Guidelines

| Age Group | IOM Recommendations | | Committee recommendations for patients at risk for vitamin D deficiency | |
|---|---|---|---|---|
| | RDA | UL | Daily Requirement | UL |
| 51-70yr | 600 IU | 4000IU | 1,500-2,000IU | 10,000 |
| >70yr | 800 IU | 4000IU | 1,500-2,000IU | 10,000IU |

RDA- Recommended daily allowance, UL, tolerable upper intake level.

J Clin Endocrinol Metab, July 2011, 96(7):1911–1930

# Vitamin D Replacement

- All adults who are vitamin D deficient
  - 50,000 IU D2 or D3 weekly or 6000 IU of D2 or D3 daily x 8 wks
  - Target 25(OH)D >30 ng/ml
  - Maintenance therapy of 1500–2000 IU/d
- Obese, malabsorption syndromes, medications affecting vitamin D metabolism
  - Higher dose (two to three times higher)
  - Maintenance therapy of 3000–6000IU/d

J Clin Endocrinol Metab, July 2011, 96(7):1911–1930

# Osteoporosis Treatment

- Antiresorbtive:
  - Bisphosphonates
    - Daily, weekly, monthly, IV formulations
  - Calcitonin
  - Estrogen
  - Raloxifene
- Anabolic: Teriparatide

# Bisphosphonates and Osteonecrosis

- 2003-2009: 2400 cases published
  - 88% associated with IV treatment
  - 89% associated with cancer treatment
- More common in patients with previous invasive dental treatment
  - 67% preceded by tooth extraction
- Do the dental work first
  - Stop the bisphosphonate for several months around the time of dental work

# Effect of Bisphosphonates on Fracture Healing

- Intravenous zoledronic acid given after a hip fracture reduces secondary fracture rates and mortality in patient with osteoporosis
- Concern bisphosphonates may affect healing if given soon after a fracture

# HORIZON Recurrent Fracture Trial

- Within 90 days of low-trauma hip fracture
  - Randomized once-yearly ZOL (n = 1,065) or placebo (n = 1,062)
  - Mean f/u 1.9yrs
- No clinical effect on fracture healing, even in the immediate postoperative period
  - no interaction by timing of infusion
  - nonunion rates were similar even when ZOL given within 2 weeks of hip fracture repair
  - NSAIDs assoc with delayed fracture healing (OR, 2.55; 95% CI, 1.49-4.39; $p < 0.001$).

Osteoporosis Int. 2011 Aug;22(8):2329-36. Epub 2010 Dec 9

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