Do you know the answers??

1. The most common clinical presentation of osteoporotic compression fractures is

a. Discoloration at the fractured areas
b. Pain at the fractured areas
c. Swelling at the fractured areas
d. Warmth at the fractured areas

2. What is the following considered the gold standard diagnostic test for compression fracture?

a. CT scan of the spine
b. MRI of the spine
c. Plain frontal and lateral X-ray the spine
d. Physical examination

Lumbosacral Compression Fracture in an Elderly Female with Osteoporosis

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Practicum II

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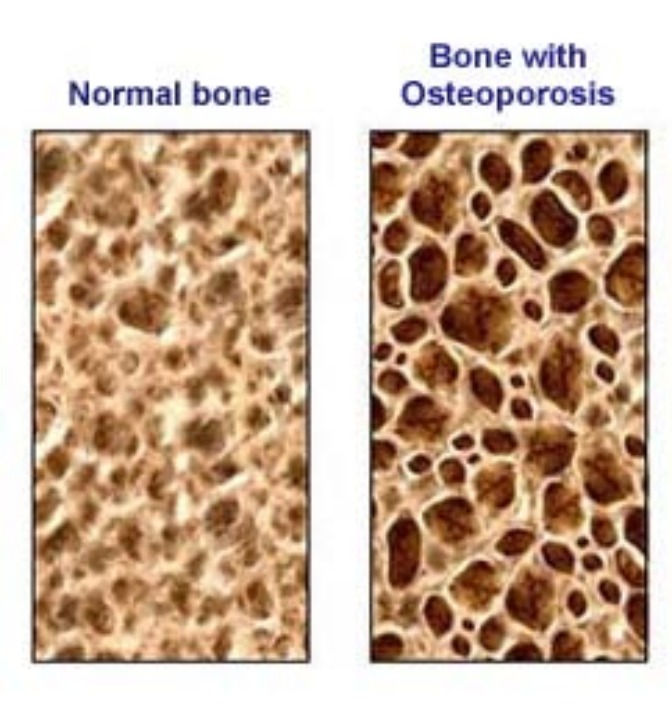
What is Osteoporosis



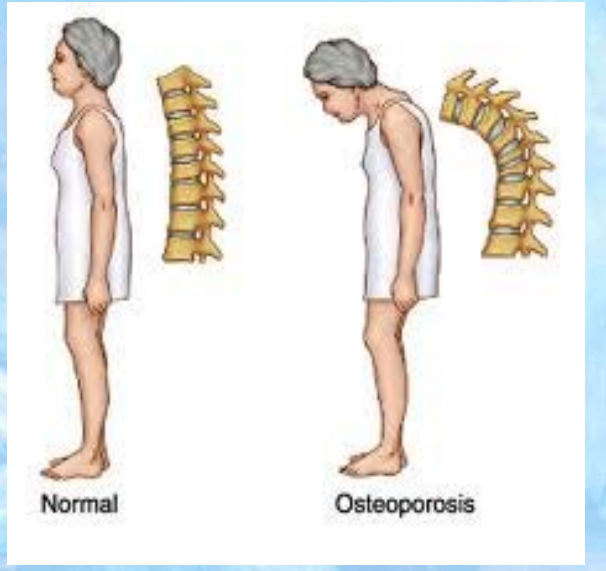
WHO's criteria, DEXA BMD value:

- T Score > -1.0 SD→ normal bone mineral density
- T Score -1.0 and -2.5 SD→ osteopenia
- T Score <= -2.5 SD → osteoporosis
- T Score <= -2.5 SD with 1 or more fragility fracture→ severe osteoporosis

(WHO, 2007)

Incidence and Prevalence

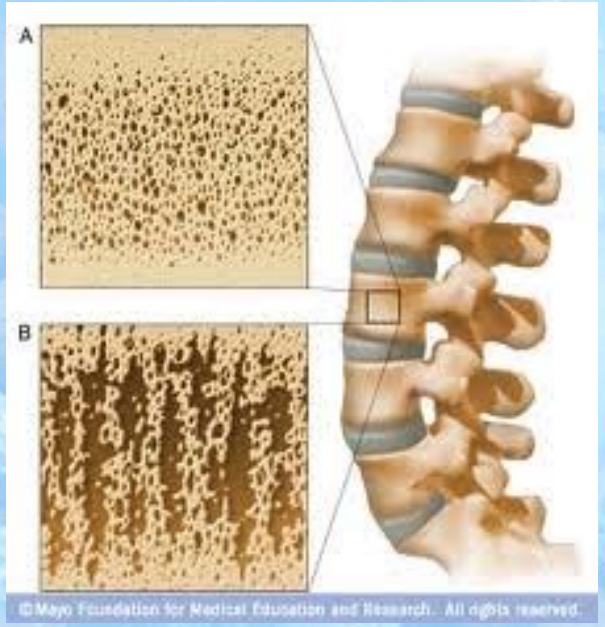
- 8 million women and 2 million men have osteoporosis in U.S.
- By 2012, about 12 million Americans older than 50 years will have OP
- More than 700,000 osteoporotic compression fractures each year, affecting almost one-quarter of all postmenopausal women
- About 40% women aged 80 years and above suffer from vertebral compression fractures (VCF)
- About one-fifth of the women who have had a VCF will have a further fracture the following year



(Cooper et al., 2011; Marcus, Lee, & Fish, 2008; Old & Calvert, 2004; Sweet, Sweet, Jeremiah, & Galazka, 2009; U.S. Preventive Services Task Force, 2011))

Risk factors of Osteoporosis

- Older age
- Female gender
- Race
- Family history of OP
- Long-term use of systemic corticosteroid medications
- Cigarette smoking
- Low calcium intake
- Poor nutrition
- Physical inactivity
- Excessive alcohol/coffeine intake
- Low BMI
- Eating disorders



(Davis, Sachdeva, Goeckeritz, & Oliver, 2010)

Screening Tests

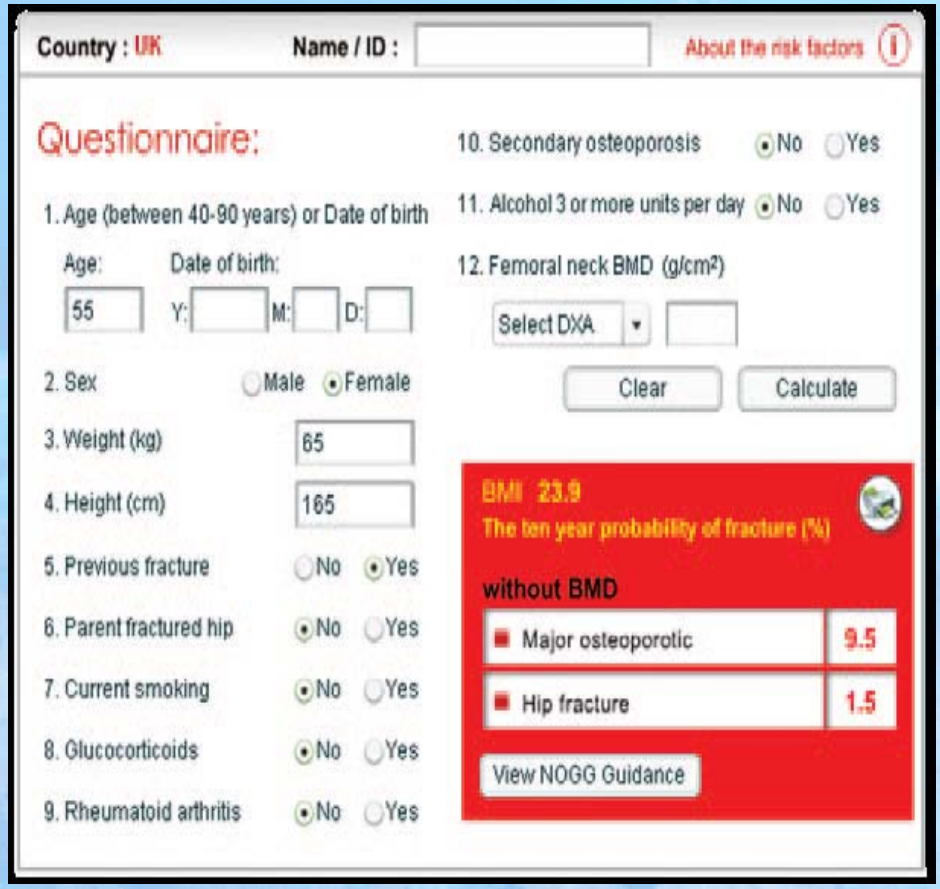
- A dual-energy x-ray absorptiometry (DEXA) of the hip and lumbar spine- Gold standard for diagnosis of OP (expensive)
- Quantitative ultrasonography of the calcaneous (less expensive, no ionizing radiation exposure)- predicts fractures of femoral neck, hip and spine

(U.S. Preventive Services Task Force, 2011)

The FRAX Tool

- Developed by WHO
- Used to guide decisions about treatment in people who meet the following conditions:
  - ❖ Postmenopausal women or men aged 50 and older
  - ❖ People with low bone density (osteopenia)
  - ❖ People who have not taken an osteoporosis medication
- Can be used with or without previous DXE results

(McCloskey, Stenmark, Misteli, & Lontro, 2009; U.S. Preventive Services Task Force, 2011)



Subjective data

Patient profile

- 90 years old Caucasian female
- Admitted to this facility from the local hospital with a diagnosis of UTI for rehabilitation

System analysis of site

- Services- assisted living, long-term care, skilled nursing
- Decision making- weekly team conference
- Care delivered-reasonable nurse to resident ratio; more licensed vocational nurses and new graduates
- Supportive to medical team

Subjective data

Background information

- CC- “My back hurts very bad”
- HPI- has been complaining of lower back pain for three days. Was able to ambulate with a rolling walker with physical therapy, but now refused to reposition herself. No fall or other external physical injury witnessed while in the facility

Background information

- PMH
  - ❖ Pneumonia
  - ❖ Hyperlipidemia
  - ❖ CHF
  - ❖ Syncope
  - ❖ GERD
  - ❖ Hypothyroidism
  - ❖ Dementia
  - ❖ Osteoporosis

Subjective data

Background information

- Surgical history
  - AICD placement 2001,
  - partial colectomy
  - Cholecystectomy
  - Appendectomy
- FH
  - Positive for HTN, heart disease, OA, OP and dementia

Background information

- Social history
  - Lives alone
  - Has a day-time helper
  - Able to ambulate with a rolling walker
  - denies cigarette smoking, alcohol drinking or illicit drug use.
- Allergies- valium, morphine and Darvocet

Subjective data

Review of systems

- **General-** pain in her back. Unable to label on 1-10 pain scale. No headache, nausea, vomiting, or diarrhea, shortness of breath or chest pain.
- **Skin/hair/nail-** no new skin break down, skin lesions, excess sweating, dryness, hair loss, or nail changes.

Review of systems

- **HEENT-** no problems with swallowing, thyroid dysfunctions, recent vision change, double/ blurred vision, earaches, sore throat, nasal congestions, or mouth pain.
- **Chest/Lungs-** denies cough, difficulty in breathing or shortness of breath.
- **Cardiovascular-** no chest pain or edema.

Subjective data

Review of systems

- **Gastrointestinal-** denies abdominal pain or discomfort, nausea, vomiting, or diarrhea, indigestion or heart burn, constipation.
- **Genitourinary- i**ncontinent urine, wears adult brief. No burning or bloody urine or abd pain.
- **Endocrine-** denies heat or cold intolerance.

Review of systems

- **Musculoskeletal-** no chronic lower back pain. Denies joint swelling. Denies pain, numbness or tingling in both legs. *States that she has lower back pain but unable to label her back pain level on the pain scale. States that she does not want to move because of the back pain.*
- **Neurological-** denies dizziness, numbness or tingling in his feet. Denies headache.
- **Psychological-** denies excessive sleeping or feeling nervous.

Objective data

Physical examination

- *Pertinent Positive*
  - ❖ Tenderness at T10 and L1 with palpation
  - ❖ Increased pain with flexion and extension of her spine
- *Pertinent Negative*
  - ❖ No skin bruises, edema, or redness lower back areas
  - ❖ No other external physical injuries
  - ❖ No witnessed fall
  - ❖ No fever

Rationale

- For acute fracture, tenderness directly over the area of acute fracture may be present, and an increased kyphosis may also be noted.

(Marcus, Lee, & Fish, 2008; Old & Calvert, 2004)

Objective data

Diagnostic tests

- *Pertinent positive*

❖**Calcium:** 8.5 (8.5-10.1)

❖**25-hydroxy vitamin D:** 25 (32-100)

❖**Lumbar-spine x-ray**: positive acute compression fracture at T10 and L1

Rationale

- 25-hydroxy vitamin D and serum calcium to estimate overall nutritional status and calcium absorption
- Lumbar-spine x-ray is the gold standard. MRI and CT scan can also be used if x-ray result is negative

(Brusch et al., 2011; Marcus, Lee , & Fish, 2008; Przybelski et al., 2008; Swislocki et al., 2010; Yamauchi et al., 2011)

Objective data

Diagnostic tests

- *Pertinent negative*
- **Urine analysis:** clean catch- normal results
- **WBC:** 7.2 (4.5-11.0)
- **HGB:** 12.3 (12.0- 16.0)
- **HCT:** 36.2 (36.0- 47.0)
- **Albumin:** 3.5 (3.5-5.0)
- **BUN:** 14 (7-18)
- **Creatinine:** 1.0 (0.6- 1.3)
- **TSH** : 3.10 (0.36- 3.74)
- **Alk Phosphatase:** 88 (30-126)
- **Parathyroid Hormone (PTH)**: 49 (10.0-55 pg/ml)

Rationale

- Urine analysis is to rule out UTI
- Overall nutritional health, some malignancies, infections, and renal diseases can be estimated by complete blood count and routine chemistries
- Total alkaline phosphatase and some bone-active hormones, such as testosterone, parathyroid hormone (PTH), thyroid-stimulating hormone (TSH), and free thyroxine are also tested in order to find out the cause of poor bone density

(Brusch et al., 2011; Marcus, Lee , & Fish, 2008; Przybelski et al., 2008; Swislocki et al., 2010; Yamauchi et al., 2011)

Assessment

Differential diagnosis

- Coccyx pain
- Lumbar degenerative disk disease
- Lumbar facet arthropathy
- Lumbar spondylolysis and spondylolisthesis
- Mechanical low back pain
- Osteoporosis

(Sherman et al., 2010)

Assessment

Acute diagnosis

- **Acute compression fracture (secondary to osteoporosis) (733.13)**

Rationale

Spine x-rays are considered the gold standard when suspecting a patient with a compression fracture. Lumbar-spine x-ray shows that this patient has acute compression fracture at T10 and L1.

(Berg et al., 2011; Old & Calvert, 2004)

Assessment

Acute diagnosis

- **Acute lower back pain (secondary to lumbosacral compression fracture) (724.**2)

- **Vitamin D insufficiency (268.9)**

Rationale

- Pain is a common clinical presentation in patients with compression fractures because the vertebral body is anatomically collapsed, and/or microtrabecular bones are fractured

- 25-hydroxy vitamin D levels between 21 and 29 nanogram (ng)/ml are considered vitamin D insufficiency. Vitamin D deficiency is defined when 25-hydroxyvitamin D levels are below 20 ng/ml .

(*BMJ Centre, 2011 ;* Marcus, Lee, & Fish, 2008)

Assessment

Chronic diagnosis

- Pneumonia (482.9)
- Osteoporosis (733.0)
- Hyperlipidemia (272.4)
- Congestive heart failure (428.0)
- Syncope (780.2)
- Gastric reflux disease (530.11)
- Dementia (294.8)
- Hypothyroidism (244.9)

Plan with Rationale

Plan – Non-surgical

- **Physical therapy- apply heat to lower back and a structured exercise program two times a day by certified physical therapist (PT) and occupational therapist (OT)**

Rationale

Applying heat to lower back may provide symptomatic relief. A structured exercise program by certified PT and OT may enhance axial muscle strength. Early mobilization can prevent secondary complications of immobility, such as thromboembolic event. Back strengthening exercises may decrease further vertebral fractures and back pain. Weight bearing exercises are beneficial to prevent the worsening of osteoporosis .

(Cooper et al., 2011; Old & Calvert, 2004)

Plan with Rationale

Plan- nonsurgical

- **Change Norco to 5/325 mg 1 tablet by mouth every 6 hours routinely and discontinue Norco 5/325 prn order (observe for constipation)**

Rationale

Pain relief is an important concern. Oral analgesics should be used for pain control. Since certain oral analgesics can cause constipation, it is important to monitor the patients' regularity of their bowel movements . Pain medications may be used for a short period, usually about one to two months. This patient is also on Colace 100 mg once a day routinely to prevent constipation.

(Cooper et al., 2011; Old & Calvert, 2004)

Plan with Rationale

Plan-nonsurgical

- **Calcium 1200 mg and Vitamin D3 supplement 800 IU by mouth daily**

Rationale

- Low calcium intake is associated with bone mass, fast bone loss and increased fracture risks and rate. 1200 mg per day of calcium is recommended for people over 70 years.
- Vitamin D deficiency is most common in the older adults, and it can lead to muscle weakness, bone loss, falls and fractures in elderly people

(Przybelski et al., 2008; The National Institute of Health [NIH], 2011; USPSTF, 2011)

Plan with Rationale

Plan-nonsurgical

- **Fosamax 70 mg by mouth once a week on Mondays**
- **Dietitian consult for protein intake**
- **Nursing staff education- monitor for falls, medication side effects, and effective pain control assessment**

Rationale

- Alendronate (Fosamax) can prevent fractures caused by osteoporosis in postmenopausal women. It slows down the cells that break down the old bone
- Increased protein intake has been reported to be associated with increased bone density
- Vitamin D deficiency and previous osteoporotic vertebral compression fractures can lead to an increased fall risk and disability, mainly through muscle weakness, poor performance of the lower extremities, and impaired balance. It is important to monitor for falls, medication side effects.

(Jesudason & Clifton, 2011; Medline Plus, 2011; Swift, 2011; Yamauchi et al., 2011)

Plan with rationale

Referral

- **Contact this patient's medical power of attorney (POA), inform multidisciplinary team in the facility (Director of Nursing, Social worker, assistant director of nursing, patient's primary care nurse, and administrator, and transfer this patient to hospital for further evaluation if her POA agrees**

Rationale

- If the Patients do not respond well to conservative treatments and continue to have severe pain, surgeries such as vertebroplasty or kyphoplasty may be considered
- vertebroplasty - to stabilize and strengthen the vertebral body by injecting acrylic cement or polymethylmethacrylate into the fractured vertebra
- Kyphoplasty- to expand the fractured vertebra to create a cavity by using a high-pressure balloon and then inject cement into a cavity

(Cooper et al., 2011; Old & Calvert, 2004)

Follow up- telephone

- had L1 vertebroplasty
- Transferred to the skilled nursing facility closed to her son for rehabilitation
- Did well per son

Now You Know the Answers!!

The most common clinical presentation of osteoporotic compression fractures is

a. Discoloration at the fractured areas
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Questions/ Concerns/comments