Miniseminar: A patient with OSTEOPOROSIS CAUSED BY CORTICOSTEROIDS

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Definitions

• Osteoporosis
  = a deficiency of the bone mass with a normal ratio of mineral to matrix

• Osteomalacia
  = a deficiency of the bone mass due to a failure of calcium salts deposition in bone matrix
If the amount of calcium stored in healthy bone decreases, the bone’s dense outer layer becomes smaller, while the spongy inner layer increases, eventually making the bone more porous and fragile.

Image from [http://www.johnshopkinshealthalerts.com](http://www.johnshopkinshealthalerts.com)
Risk Factors for Osteoporosis

- Age
- Body size
- Ethnicity
- Family history
- Low levels of sex hormones
- Hyperthyroidism
- A diet low in calcium or vitamin D
- Heavy use of alcohol
- Cigarette smoking
- Being sedentary
- Certain medications
Classification of Osteoporosis

- Generalized
  - Senile (postmenopausal)
  - Idiopathic osteoporosis of male
  - Idiopathic juvenile osteoporosis
  - Cushing’s disease and exogenous steroids
  - Malnutrition (celiac disease)
  - Scurvy (vitamin C deficiency)
  - Osteogenesis imperfecta
  - Homocystinuria
Classification of Osteoporosis

- Others
  - Hyperparathyroidism
  - Hyperthyroidism
  - Acromegaly
  - Heparin-induced
  - Multiple myeloma
Symptoms of Osteoporosis

- back pain
- stooped posture
- declining height
- Many people have no obvious symptoms until a bone breaks, typically in the hip, arm, or wrist
Types of imaging procedures

- Radiogrammetry
  the cortical thickness on either side of the medullary space is measured and expressed a combined cortical thickness (CCT)

- Dual energy X-ray absorptiometry (DEXA) scans
Findings of Imaging Studies

- increased lucency of bones
- visible primary trabeculae give bones a striped appearance
- thinning of the cortices of bone

Specific sign of osteoporosis caused by corticosteroids:
“marginal condensation”
← increased density next to the end-plates
Patient: Miss M

- 6 year-old female
- Indication: point tenderness
- Acute Lymphocytic Leukemia (ALL) and receiving steroids for 2 years
Plain Radiography: normal companion film vs. patient M’s film

Both images from PACS, CHB; courtesy Dr. Rosenthal.
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Plain Radiography:

normal companion film vs. patient M’s film

Image from shs.westport.k12.ct.us/.../skeleton_evidence.htm

image from PACS, CHB; courtesy Dr. Rosenthal
Plain Radiography:
normal companion film vs. patient M’s film

Image from http://www.ceessentials.net/images/TSpineER/image029.jpg
image from PACS, CHB; courtesy Dr. Rosenthal
Zoom in

Image from http://www.ceessentials.net/images/TSpineER/image029.jpg

Image from PACS, CHB; courtesy Dr. Rosenthal
Conclusions

- Corticosteroids can cause osteoporosis.
- Clinically, patients using corticosteroids should be monitored.
- Corticosteroid induced osteoporosis can affect patients across age groups.
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