

Miniseminar: A patient with
OSTEOPOROSIS
CAUSED BY
CORTICOSTEROIDS

Midori Harafuji

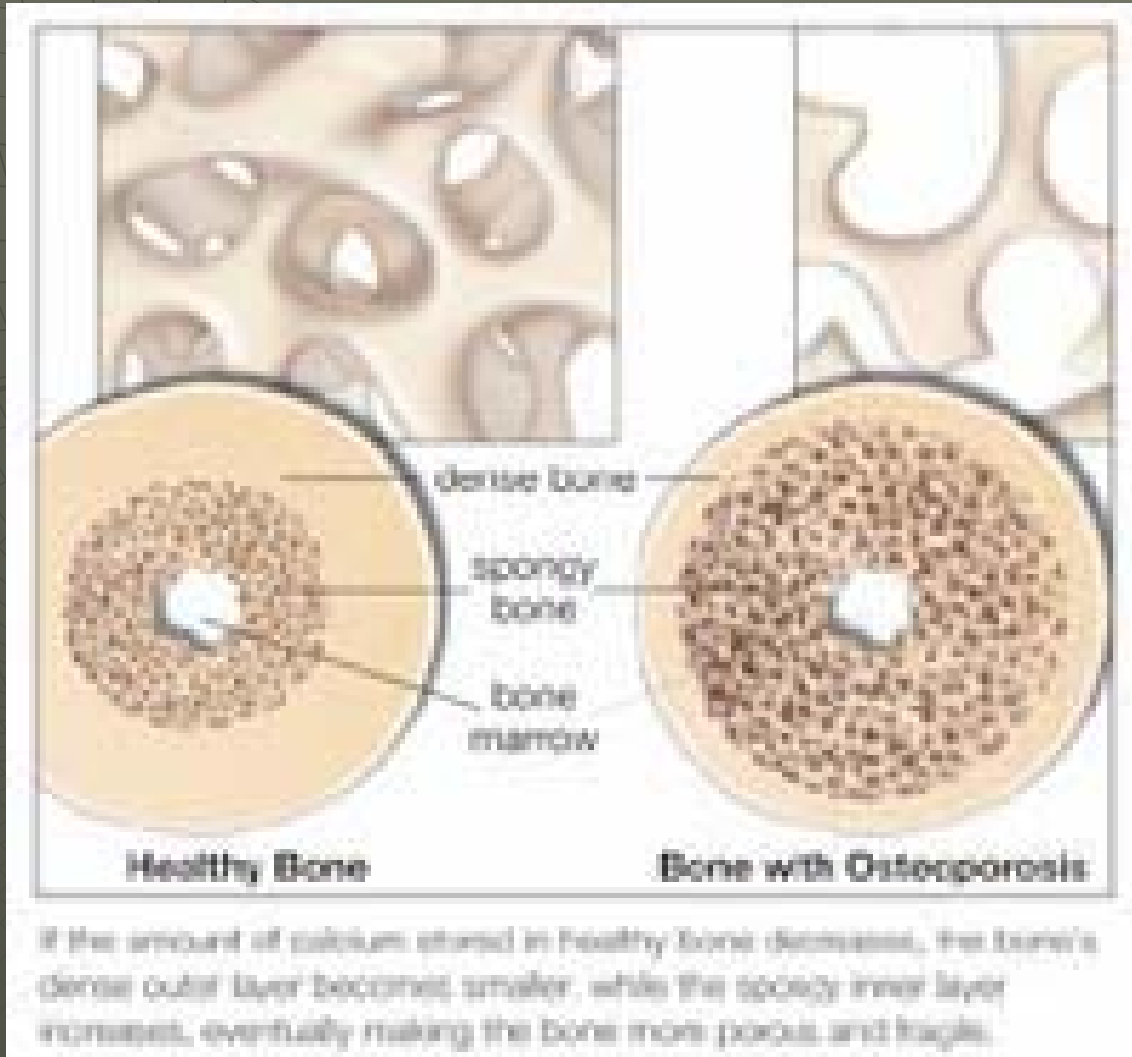
(Teikyo University School of Medicine 5th
year)

Dr. Gillian Lieberman

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

Pathophysiology



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 as 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.

Zoom in



Both images from PACS, CHB; courtesy Dr. Rosenthal

Plain Radiography: normal companion film vs. patient M's film



[Image from shs.westport.k12.ct.us/.../skeleton_evidence.htm](http://shs.westport.k12.ct.us/.../skeleton_evidence.htm)

image from PACS, CHB; courtesy Dr. Rosenthal

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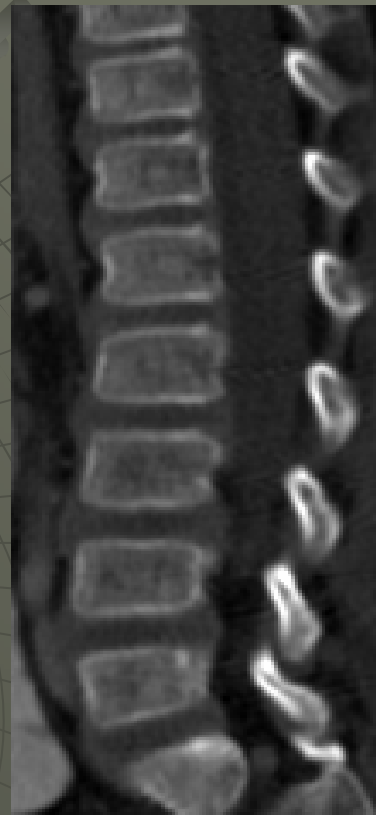
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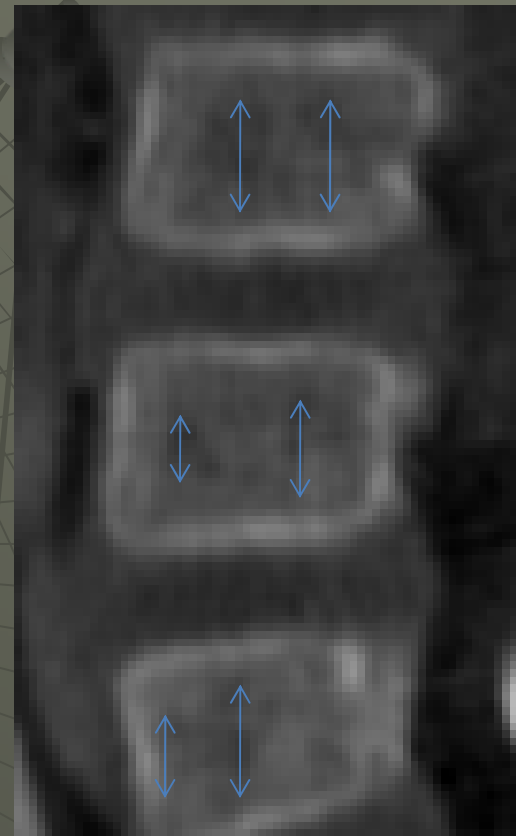


Image from <http://www.ceessentials.net/images/TSpineER/image029.jpg>

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

Acknowledgments

- Dr. Gillian Lieberman
- Dr. Michael H. Rosenthal
- Dr. Dan Raemer
- Dr. Melissa Perry
- Dr. Paul L. Dratch
- Maria Levantakis
- Heather Gunn
- Brook Calton
- Akinori Mitani

Bibliography

1. Richard H. Daffner: Clinical Radiology The Essentials, 2nd edition.
2. Mario G, Pauine F, Martin J, Walter L, David J: Textbook of Diagnostic Imaging in the Elderly.
3. John Caffey: Pediatric X-Ray Diagnosis, 7th edition.
4. The Radiologic Clinics of North America: Bone Disease.
5. Frederic N, Jerald P: Essentials of Caffey's Pediatric X-ray Diagnosis.
6. CA Helms. "Metabolic Bone Disease" in *Fundamentals of Diagnostic Radiology*.
7. Cotran K: Robbins Pathologic Basis of Disease, 4th edition.
8. LF Rogers. "Metabolic, Endocrine, and Related Bone Diseases" in *Paul and Juhl's Essentials of Radiologic Imaging, 6th edition*.
9. Novelline, Robert A: Squire's Fundamentals of Radiology, 5th edition.
10. Bone Disease (Third Series) Syllabus
11. JB Vogler, HK Genant. "Osteoporosis" in *Radiology 5*.
12. David Sutton, Jeremy W: A Short Textbook of Clinical Imaging.
13. Johns Hopkins Guide to Osteoporosis
14. Mayo Clinic com.