

Case 4 Generalised bone pain



A 34-year-old woman presented complaining of multifocal pain in her chest and legs. The pain was intermittent, was aggravated by weight bearing. Initially was alleviated by NSAID's recommended by her doctor.

She was referred to orthopaedic clinic and was seen approximately 1 month after the hip pain developed. She denied fever, chills and weight loss. History of use of Magnesium hydroxide/aluminum hydroxide; 1000 mg/pill; for heart burn.

She had tenderness to palpation to several of her ribs. The hip also was painful during flexion, abduction, and external rotation.

Your Diagnosis

Diagnosis Osteomalacia

Blood urea nitrogen (17 mg/dL [normal, 8–25 mg/dL]),

creatinine (0.8 mg/dL [normal, 0.6–1.5 mg/dL])

Calcium (9.8 mg/dL [normal, 8.5–10.5 mg/dL]).

LFT and thyroid function: Normal

WBC 6200 per cc and low hemoglobin (11.6 g/dL

ESR 14 mm

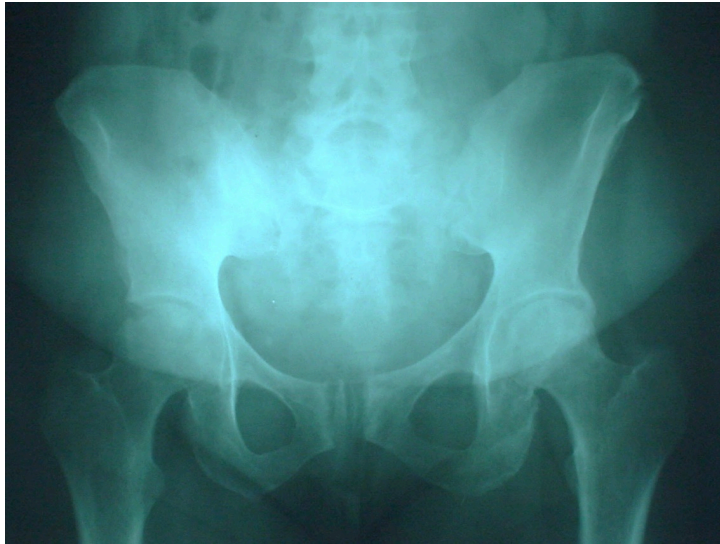
CRP 8.0 mg/L

Alkaline phosphatase 244 U/L [N: 30–100 U/L]

Phosphorus 1.9 mg/dL [N 2.6–4.5 mg/dL]).

A bone scan of Osteomalacia: Numerous foci of uptake are seen bilaterally in the ribs, shoulders and lower extremities. No increased uptake is seen in the thyroid or parathyroid region.





Differential Diagnosis

Vitamin D deficiency
Hyperparathyroidism
Metastatic disease
Aluminum toxicity
Hypophosphatemia
Antacid-induced hypophosphatemic osteomalacia

Discussion

This patient had pain for more than 2 years, abnormal Phosphate and alkaline phosphatase and normal screening for infection.

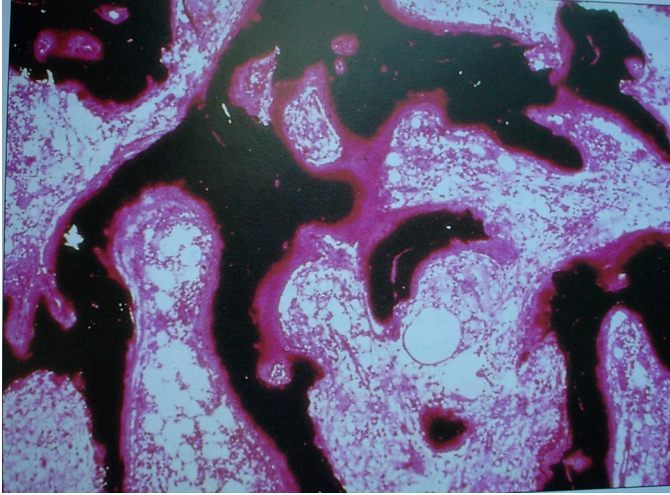
Radiographic studies revealed diffuse osteomalacia with pseudofractures [Looser's zone] most consistent with a metabolic etiology.

Osteomalacia is characterized by reduced bone density attributable to decreased mineralization of newly formed bone matrix. Underlying abnormalities include abnormal matrix, as in chronic renal failure.

This disease usually presents as proximal weakness associated with muscle wasting and hypotonia in the lower spine, pelvis, and lower extremities and at sites of pathologic fractures.

Osteomalacia usually is indicated radiographically, with nonspecific findings, such as thinning of the cortex and reduced bone density. **Looser zones** may be present in the femur and pelvic rami, lateral border of the scapula are pseudofractures due to unmineralised bone. They are radiolucent lines lying perpendicular to the cortical margin

A definitive diagnosis is made with bone biopsy, showing unmineralized matrix, a widened osteoid seam, and high osteoid volume ([10%). Double tetracycline labeling usually reveals a reduced distance between bands, attributable to decreased skeletal growth rate.



Quantitative Histomorphometry: **>10% is Osteoid**

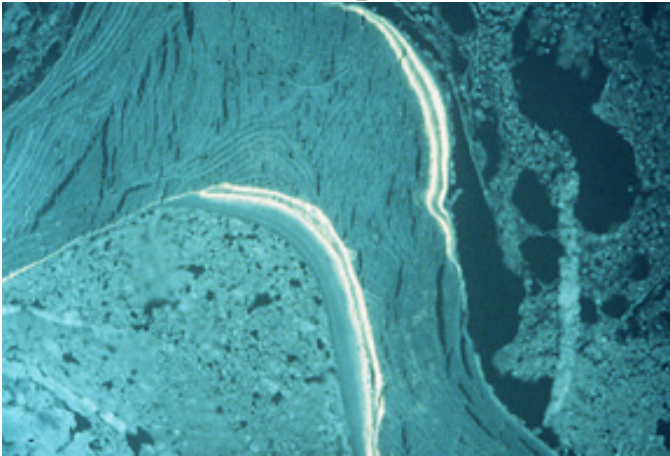
Typical tetracycline labeling schedule is as follows:

First label - tetracycline 250 mg tid / three days

Wait 11 - 14 days

Second label - declomycin 300 mg bid / three days

Wait 3 - 5 days. Biopsy. No double ring in Osteomalacia



Vitamin D deficiency occurs with several conditions:

TABLE I
BIOCHEMICAL FINDINGS IN THE RACHITIC AND OSTEOMALACIC SYNDROMES*

Category	Serum Calcium	Serum Phosphate	Serum Alkaline Phosphatase	Parathyroid Hormone	25-Hydroxyvitamin D	1,25-Dihydroxyvitamin D	Tubular Resorp. of Phosphate (Per cent)	Urinary Calcium	Misc. Findings
Deficiency states									
Vitamin-D deficiency	Low to normal	Low	High	High	Low	Low	Low	Low	
Phosphate deficiency	Normal	Low	High	Normal	Normal	Normal	High	Normal	
Gastrointestinal	Low	Low	High	High	Low to normal	Low to normal	Low	Low	
Vitamin-D-resistant									
Phosphaturic	Normal	Low	High	Normal	Normal	Normal	Low	Normal	Glycosuria, aminoaciduria, etc. (Fanconi-I syndrome)
Type-I dependent	Low	Low	High	High	Normal	Low	Low	Low	
Type-II dependent	Low	Low	High	High	Normal to high	Normal to high	Low	Low	
Renal tubular acidosis	Low	Low	High	High	Normal to high	Normal to high	Low	High	Low levels of sodium and potassium; high levels of chloride acidosis and alkaline urine
Renal osteodystrophy	Low	High	High	High	Low	Low	?	Low	High levels of blood urea nitrogen and creatinine

*Table adapted, with permission, from Mankin, H. J.: Rickets, osteomalacia, and renal osteodystrophy. An update. *Orthop. Clin. North America*, 21: 86, 1990.

Although 80% of patients are asymptomatic, some may experience fatigue, nephrolithiasis, bone pain, abdominal pain, or psychiatric complaints.

Neoplastic disease, either metastasis or primary hematologic tumor, can present with severe pain, hypercalcemia, pathologic fractures, spinal cord compression, and other nerve compression syndromes.

Aluminum toxicity is a rare disorder that typically occurs in patients receiving total parenteral nutrition and in a small percentage of dialysis patients using aluminum containing phosphate binders, antacids, and dialysates.

Accumulation of aluminum leads to bone pain, weakness, mutism, dysphonia, microcytic anemia, and hypercalcemia.

The most common cause is decreased intestinal absorption, as in dietary deficiency, antacid abuse, and malabsorption.

Aluminum-containing antacids are considered first-line therapy for reflux disease. Although generally benign, aluminum- and magnesium-containing antacids can negatively influence bone physiology.

The aluminum or magnesium component of these drugs binds dietary

phosphate, preventing its intestinal absorption and causing a negative phosphate balance typically within 3 to 4 weeks. The resulting hypophosphatemia is thought to prevent proper nucleation of mineral salts into the bone matrix, causing osteomalacia

Approximately half the patients also had fractures, with pseudofractures and subperiosteal erosions occasionally seen. Fractures typically occurred in ribs 2, 3, and 4, vertebrae, hips, and pelvis.

For her reflux disease, she was educated on lifestyle modifications and instructed to follow up.

She had experienced resolution of bone pain and was able to tolerate full weight bearing and resume baseline activity within 3 months of treatment and cessation of antacids. At last follow up at 12 months, the patient was free of pain and stabilized on calcium, phosphate, and vitamin D supplementation.