A Woman With Back Pain

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The Editorial Board of *JNMA* is proud to launch yet another reader-oriented monthly column entitled "Radiology Rounds," which will be orchestrated by Dr James Collins, longtime NMA member and professor of radiology at UCLA. Dr Collins and his colleagues across the country will endeavor to bring us a variety of interesting cases with both an educational and clinical message that will undoubtedly prove useful to our primary care physicians and many specialists as well. It is anticipated that this will evolve into a continuing medical education initiative going forward.

We would like for this to be an interactive column, so please feel free to forward your views and opinions of the cases being presented to Dr Collins for follow-up in *JNMA*. If you have an interesting case with excellent radiologic images, please feel free to contact Dr Collins directly so that we can share your experience with all of our NMA colleagues and friends.

Keyword: radiology ■ pain ■ bone ■ biopsy

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CLINICAL HISTORY

This is a 31-year-old female who was in excellent health until she developed vague intermittent low-back pain unrelated to activity, radiating into the right buttock and lateral thigh but without any other symptoms.

PHYSICAL EXAMINATION

The physical findings were significant only for focal midline tenderness over L2 vertebra. The neurological examination was within normal limits.

LABORATORY RESULTS

Alkaline phosphatase was elevated with normal serum calcium and phosphorus. All other laboratory studies were within normal limits.

COURSE

Initial lumbar radiographs of the lumbar spine series revealed an "ivory vertebra" of the L2 vertebra confirmed by computed tomography (CT) scan and technetium bone scan positive only at L2. On admission, she underwent a spinal angiogram that was negative for abnormal blood flow at L2 and for any other abnormality. A percutaneous Craig needle biopsy of L2 under fluoroscopic control was performed for cultures and pathology. The histological examination revealed thickened bone trabeculae and prominent cement lines in mosaic pattern with increased osteoblasts and osteoclasts, consistent with Paget's disease of bone. She was advised of

Figure 1. Anterior posterior x-ray of the thoracolumbar spine post spinal angiograph displaying contrast within the renal pelvis of the left kidney (K) (right kidney not labeled) and the dense ivory vertebra of the second lumbar vertebra (2L).

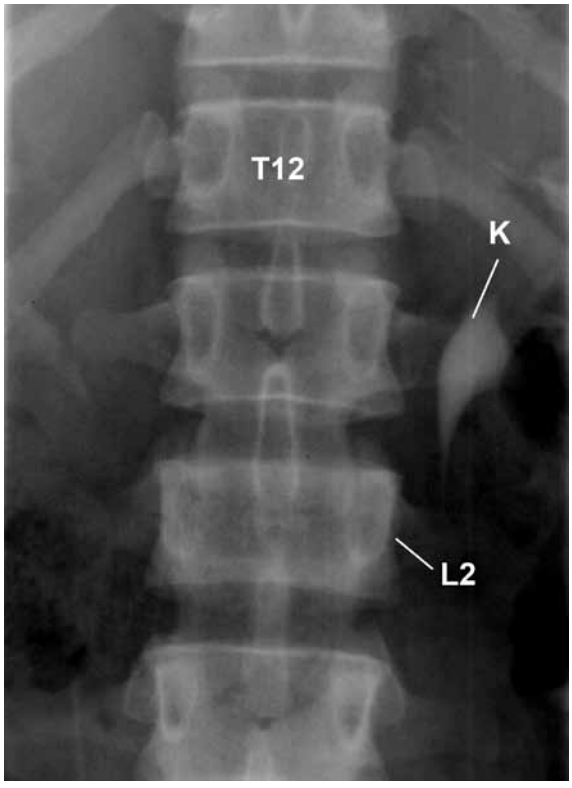


Figure 2. CT-selected image that displays the lytic destruction of the second lumbar vertebra (L2) accentuating the amorphous cortical margins (2 arrows). Left kidney (K), right psoas muscle (P), spinous process.

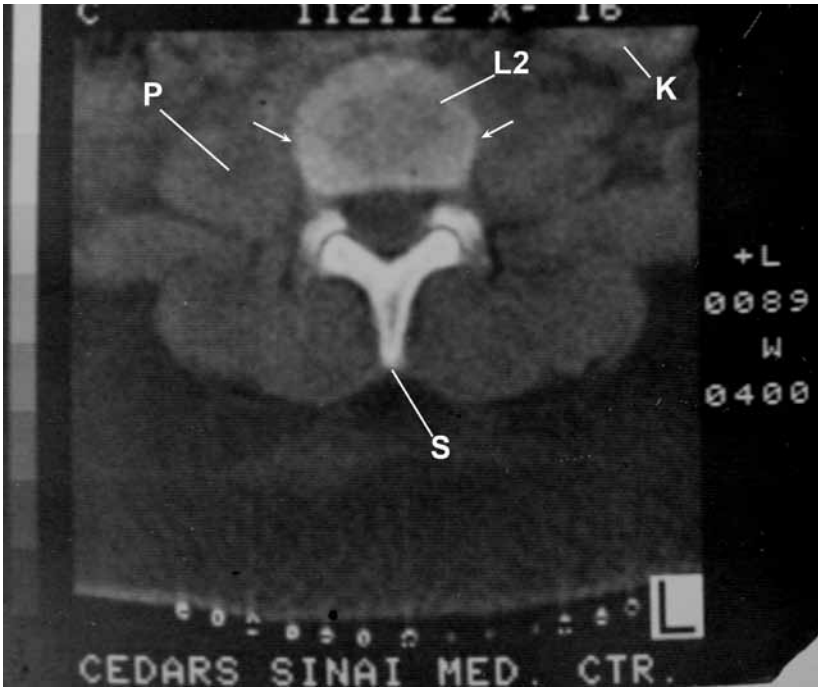
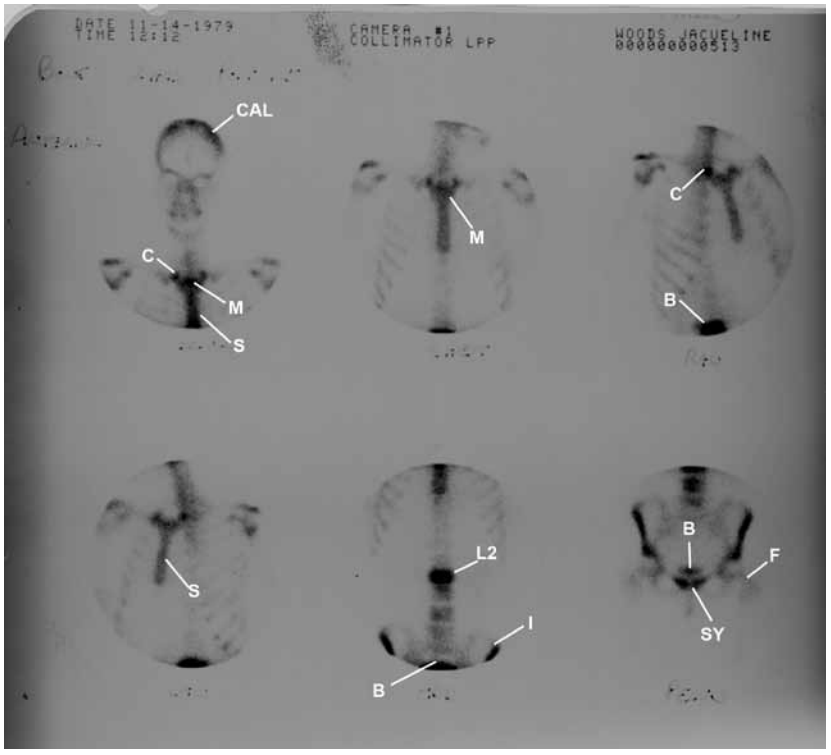


Figure 3. This is the technetium 99-m bone that displays the increased uptake of the isotope in L2 vertebra. Anterior spine of the iliac bone (I), bladder (B), calvarium (CAL), clavicle (C), femur (F) manubrium (M), sternum (S), symphysis pubis (SY),



our findings and instructed to take aspirin for pain relief and await further therapy.

RADIGOGRAPHIC FINDINGS

Anterior-posterior view plain x-ray of the lumbar spine (Figure 1) displays an L2 "ivory vertebra" with hazy cortical margins of the vertebral body, increased vertebral width without increased height reflecting the classical findings for vertebral spine involvement. Residual contrast remains from an angiogram of the kidneys. The CT scan (Figure 2) cross-referenced the same findings. The technetium isotope bone scan (Figure 3) was positive for increased uptake at the L2 vertebra. An x-ray of the percutaneous biopsy procedure documented the Craig needle position for obtaining the biopsy (Figure 4).

DIAGNOSIS

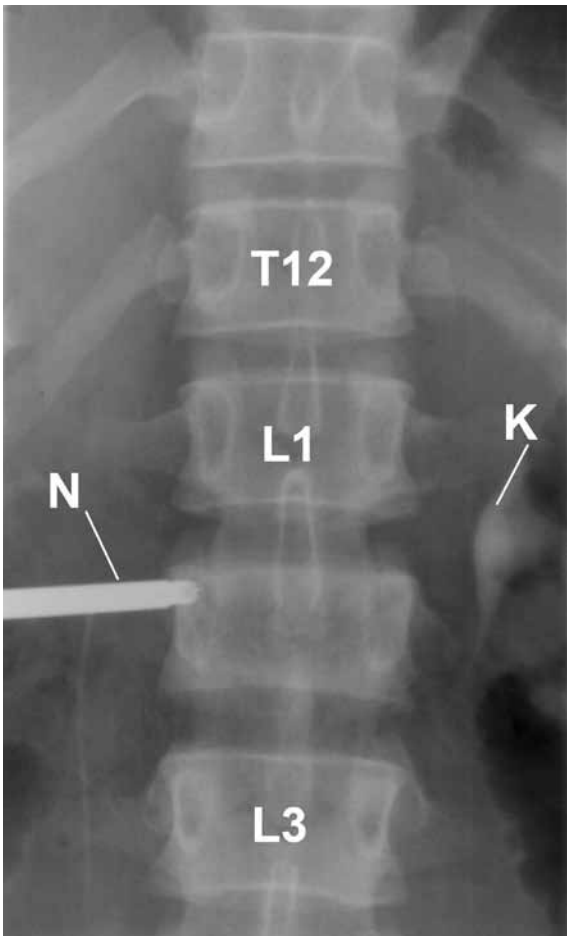
The diagnosis was Paget's disease of the second lumbar vertebra.

DISCUSSION

Paget's disease, osteitis deformans, was named after Sir James Paget, an English physician who described the abnormality in 1876. The disease results from remodeling of bone that undergoes constant replacement of old bone. The histological changes are from a wave of osteoclasts moving through bone, leaving behind a sea of blood (arteriovenous malformation). The altered fascial planes (pathology) may trigger complaints. The differential considerations for finding a dense "ivory vertebra" should include prostate, breast cancer, lymphoma, and inflammatory disease of bone (tuberculosis and coccidiomycosis), and, rarely, epidural lipoma to bone, although increasing size of a vertebra is highly suggestive of Paget's disease.[1]

The disease occurs most commonly in parts of England, western Europe, and the United States. Paget's disease is uncommon in Scandinavia, China, and India It is uncom-

Figure 4. Posterior anterior x-ray obtained to document the biopsy site of the 4 L2 vertebra. Observe the cutting tool of the Craig needle (N) within the vertebral body of L2. First lumbar vertebra (L1), third lumbar vertebra (L3), contrast within the pelvis of the left kidney.



mon in the fifth decade and most commonly diagnosed in the sixth decade as age increases. The detection of the disease is found on x-ray procedures performed for different reasons. The symptoms are commonly related to bone or joint pain, swelling of joints, tenderness or redness over sites of involvement. Fractures may occur at the site of bone destruction; commonly, bones of the pelvis, femur, spine, skull, and long bones such as the tibia. The diagnosis may be suggested by physical examination, x-rays, and laboratory studies. Physical examination may detect abnormal architecture in shape and size. X-rays may reveal abnormal shapes and increased areas of bone deposition. A technetium bone scan, as in our patient, may detect a positive uptake of the isotope.[2] Laboratory studies record normal serum calcium and phosphorus with increased levels of alkaline phosphatase, reflecting increased bone production. The histological findings are increased absorption of lamellar bone and replacement by coarse, fibrous, dense poorly organized trabecular bone.[3,4] Serum alkaline phosphate is typically elevated as well as urinary hydroxyproline (from osteoid breakdown). Many patients are asymptomatic, and the disease is found by chance during physical examination. Vague pain related to involved bone is common. Other patients may present with complications of the disease, including pathologic fractures, high-output cardiac failure (due to increased blood flow through involved bones), urinary stones (occurring in about 1% of patients), and sarcomas or giant cell tumors.

Controversy exists as to whether or not asymptomatic patients should be treated. Patients with symptoms receive analgesics and anti-inflammatory drugs for pain relief. There is no cure for Paget's disease. Porcine, salmon, and human calcitonins have been used for extensive disease to decrease alkaline phosphatase levels, but patients have had problems from developing antibodies with loss of effectiveness. Diphosphonates have been shown to be very effective in reducing symptoms, alkaline phosphates levels, and hydroxyproline excretion by suppressing apatite crystal dissolution, and continue to have an effect for up to 2 years after withdrawal of the drug.

Take-Home Message

Paget's disease of bone may present as an ivory vertebra on plain x-rays. A technetium bone scan should be obtained to rule out other sites of bone involvement. The differential diagnosis should include metastatic prostate, breast, lymphoma, inflammatory disease, and epidural lipoma to bone. A percutaneous biopsy under fluoroscopic control is inexpensive and a safe procedure to obtain diagnostic tissue.

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