

# Radionuclide Bone-Scan Abnormalities In Leprosy: Case Reports

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***Radionuclide bone scans were performed on two patients with leprosy. The resulting scan patterns simulated hypertrophic osteoarthropathy and diffuse arthritis, findings entirely consistent with the primary disease process.***

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Leprosy, a continuing world-wide health problem, is surrounded with superstition, fear, and misconception. Confusing radionuclide bone-scan patterns were seen in two patients who had concealed a previous diagnosis of leprosy. Previous bone-scan experience in leprosy has not been reported.

## CASE REPORTS

**Case 1.** A 43-year-old man presented with a 5-year history of weakness of the arms and legs, hypoesthesia, and intermittent rash. Physical examination revealed moist ulcerations over the right lateral malleolus and on the plantar aspect of both feet; the peripheral pulses were normal. Tender erythematous slightly indurated papules and plaques were present over the arms, legs, and trunk. The intrinsic hand muscles and anterior tibial groups were wasted, and the lateral portions of the eyebrows had fallen out. The ulnar nerves were thickened, and temperature, touch, and pain sensation were absent over the territories of the peroneal, ulnar, and median nerves.

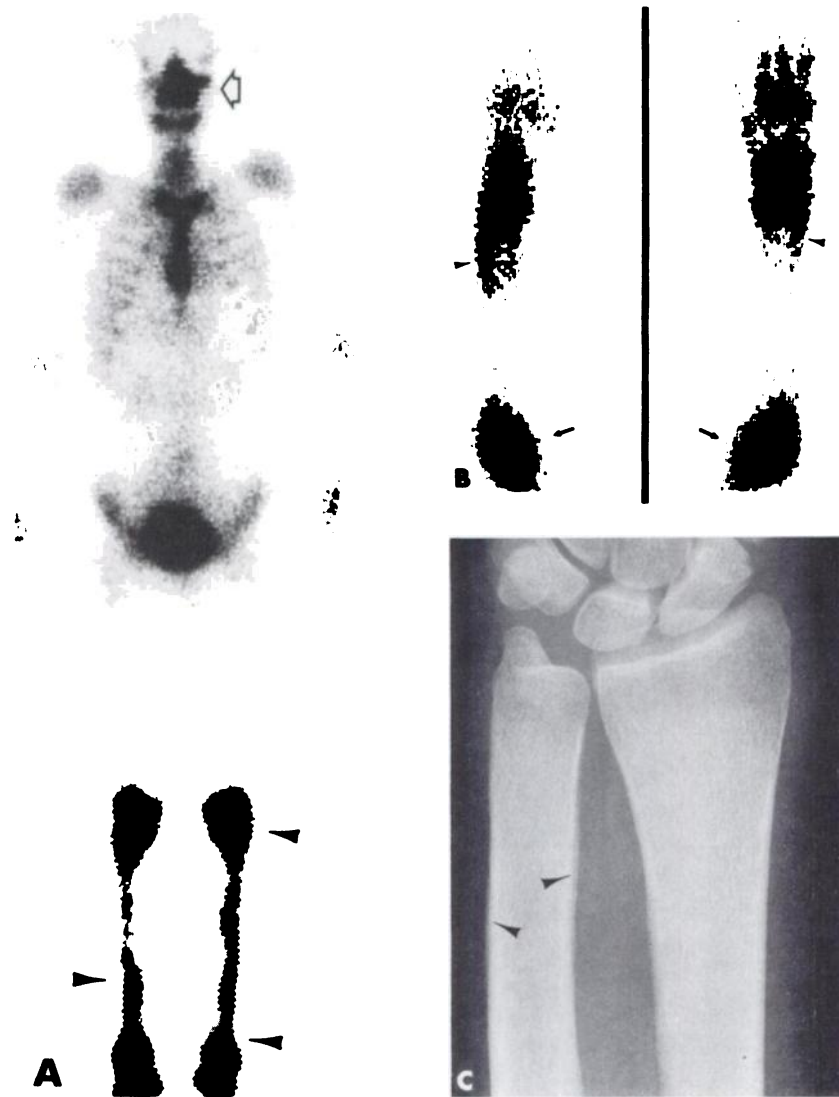
A rectilinear bone scan and supplemental scintillation camera views were performed 2 hr after injecting 15 mCi of  $^{99m}\text{Tc}$ -pyrophosphate. A symmetric pattern of increased uptake could be seen in both lower legs and knees and, less prominently, in the elbows, wrists, and ulnar sides of both forearms (Fig. 1). Increased radionuclide activity was also noted over the maxillary sinuses and nasal cavity. Radiographs revealed uniform periostitis of the tibiae, fibulae, and distal ulnae and left maxillary sinusitis. None of the pulmonary or extrapulmonary abnormalities associated with hypertrophic osteoarthrop-

athy were found, and a search for occult neoplasm was unproductive. Biopsy of the skin revealed subcutaneous infiltration with large numbers of polymorphonuclear leukocytes, histiocyte-like cells with foamy cytoplasm, and multinucleated giant cells. Special stains showed abundant acid-fast bacilli. We subsequently learned the patient had been treated previously for leprosy.

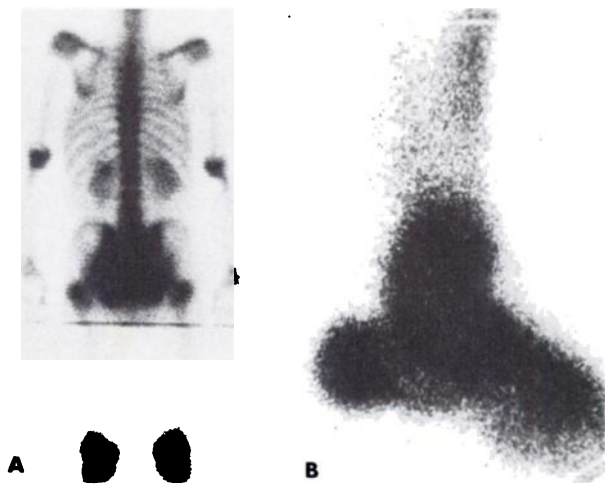
**Case 2.** A 31-year-old man presented with a 1-year history of arthralgias and intermittent fevers. Tender erythematous subcutaneous nodules were present over the trunk, arms, and legs, and the left ulnar nerve was thickened. Pain sensation was decreased in the territory of the left trigeminal nerve, and vibratory sensation was decreased over the left foot. Motion of all major joints was restricted due to pain. A bone scan performed 2 hr after injection of 15 mCi of  $^{99m}\text{Tc}$ -pyrophosphate showed a symmetric pattern of increased activity over all the peripheral joints (Fig. 2). A radiographic skeletal survey was normal. Skin biopsy revealed acid-fast bacilli. Although the patient denied knowing he had leprosy, we learned that he had been treated with dapsone a few months earlier in Mexico. With resumption of treatment, the patient's arthralgias increased markedly over the next 2 weeks. Fluid aspirated from the left knee revealed acid-fast bacilli.

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**FIG. 1.** (A) Anterior view of  $^{99m}\text{Tc}$ -pyrophosphate bone scan shows increased uptake over major joints and long bones, especially from knees to ankles (arrowheads). Increased activity is also present over nasal region and maxillary sinuses (open arrow). (B) Views of forearms and hands show increased uptake over distal ulnae (arrowheads), wrists, and over both elbows (arrows). (C) Radiograph of left wrist shows periosteal new-bone formation over distal ulna. Underlying bone is normal.



**FIG. 2.** (A) Anterior view of  $^{99m}\text{Tc}$ -pyrophosphate bone scan shows increased uptake over shoulders, elbows, wrists, hips, and knees. (B) Lateral scintigram of left ankle shows increased uptake. Similar findings were seen in right ankle. Both ankles were radiographically normal.

DISCUSSION

In these patients, the abnormal bone scans were taken during a reactive phase of leprosy: erythema nodosum leprosum. Because of the scan findings, additional studies were initiated to exclude occult neoplasm. The differential diagnosis of symmetric long-bone periostitis involving both the upper and lower extremities also includes pachydermoperiostosis, which was easily excluded clinically. Both patients showed the clinical features of erythema nodosum leprosum, and biopsies of the cutaneous lesions revealed diffuse infiltration by *Mycobacterium leprae*.

Leprosy, a disease with widespread distribution in tropical and subtropical regions, is also seen in the United States, principally in Texas, Louisiana, Florida, Hawaii, California, and New York. Many years of affliction with this chronic infectious disease are necessary to produce bone changes. The bone lesions

are particularly frequent in the cooler areas of the body, such as the hands, feet, and face, and may be either specific, due to osteitis leprosa, or nonspecific, related to neuropathic lesions or secondary infection.

Specific bone lesions are infrequent (3-5%) in leprosy (1). After beginning chemotherapy, patients may experience an exacerbation of symptoms, including fever, lymphadenopathy, and nodular skin eruptions. Intractable pain and tenderness may develop over the tibial crest and the subcutaneous border of the ulna. Symmetric periostitis of the tibia, fibula, and distal ulna may be noted, and microscopic examination should reveal subperiosteal infiltration with *Mycobacterium leprae* (2). The constellation of erythematous skin lesions, pain, and periostitis involving the lower extremities has been called "red leg" and has been attributed to immunologic factors present during the reactive phase of leprosy (3,4). Acute polyarthritis is also noted, and the detection of acid-fast bacilli in joint fluid has been reported, although rarely (5,6).

Scintigraphic and radiographic patterns in patients with leprosy may be identical to those seen in hyper-

trophic osteoarthropathy. Moreover, symmetric radionuclide joint activity may suggest a rheumatoid-like arthritis. Physical findings should lead to the correct diagnosis, and investigation for occult malignancy or rheumatoid arthritis is not required.

#### REFERENCES

1. PATERSON DE, RAD M: Bone changes in leprosy: Their incidence, progress, prevention and arrest. *Int J Lepr* 29: 393-422, 1961
2. KARAT S, KARAT ABA, FOSTER R: Radiological changes in bones of the limbs in leprosy. *Lepr Rev* 39: 147-169, 1968
3. ENNA CD, JACOBSON RR, RAUSCH RO: Bone changes in leprosy: A correlation of clinical and radiographic features. *Radiology* 100: 295-306, 1971
4. WILCOCKS C, MANSON-BAHR PEC: *Manson's Tropical Diseases*, 17th ed. Baltimore, Williams & Wilkins, 1972, p 425
5. LOUIE JS, KORANSKY MD, COHEN AH: Lepra cells in synovial fluid of a patient with erythema nodosum leprosum. *N Engl J Med* 289: 1410-1411, 1973
6. KARAT ABA, KARAT S, JOB CK, et al.: Acute exudative arthritis in leprosy: Rheumatoid-arthritis-like syndrome in association with erythema nodosum leprosum. *Br Med J* 3: 770-772, 1967

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