Localization of a Bone Imaging Agent in a Calcified Hematoma

Wei-Jen Shih, Jian-Kui Han, Sara Brandenburge, Sylvia Magoun and Leonidas Mostowycz

Nuclear Medicine and Radiology Services Department of Veterans Affairs Medical Center and University of Kentucky Medical Center Lexington, Kentucky; and Department of Nuclear Medicine, Shandong Medical University, Jinan, Shandong, China

A patient with chronic renal failure and secondary hyperparathyroidism had iliac bone biopsy. The procedure was complicated by a soft-tissue hematoma, which had calcified. A 3–4-cm palpable mass was visible in the lower left abdominal wall. Intense uptake of ^{99m}Tc-HMDP corresponded with the location of the calcified hematoma in this patient.

Key Words: technetium-99m-HMDP; renal failure; hyperparathyroidism; calcified hematoma

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A wide spectrum of nonosseous disorders results in extraosseous bone scanning agent uptake. These disorder entities include neoplastic, hormonal, metabolic, inflammatory, ischemic, traumatic, excretory and artifact (*1*). Benign heterotopic calcification or bone formation of soft tissue can occur as a result of trauma (*2*,*3*), surgery (*4*), hyperparathyroidism (*5*), spinal cord injury (*6*), a hematoma (*7*,*8*), myositis ossificans and tumoral calcinosis (*1*). Chronic renal failure complicated by hyperparathyroidism is associated frequently with calcification of soft-tissue sites.

CASE REPORT

A 38-y-old man with a history of high blood pressure with progressively decreasing renal function was referred for a bone scan. He previously had a renal biopsy, which confirmed arterionephrosclerosis. Bone images acquired 2 h after intravenous injection of 20 mCi ^{99m}Tc-HMDP showed high body background and faint visualization of both kidneys (Fig. 1). This scan illustrates the findings of severe renal failure (high background). His concurrent serum BUN and creatinine were 65 mg/dL (N = 7–21) and 15 mg/dL (N = 0.5–1.5), respectively.

The patient required hemodialysis and developed secondary hyperparathyroidism. His parathyroid hormone N-terminal was 172 pg/dL (N = 4–14). Seventeen months after the first bone scan, the patient had a bone biopsy from the right iliac crest to guide therapy for his chronic renal failure. The biopsy result was mixed uremic osteodystrophy with minimal accumulation of aluminum, indicating active vitamin D metabolite, 1, 25 $(OH)_2$ D_3 therapy. The patient complained of pain in a golf ball-sized mass in the left lower abdomen. A second bone scan 7 mo after the bone biopsy was performed. Following the bone biopsy, a 3–4-cm mass was visible and palpable, protruding from the lateral aspect of the left lower abdomen (Fig. 2). The second ^{99m}Tc-HMDP bone scintigram showed a superscan pattern of secondary hyperparathyroidism with an area of intense uptake anterior to the left iliac bone (Fig. 3). A concurrent plain abdominal radiograph showed evidence of left iliac bone injury with two holes and a calcified mass (Fig. 4A). A CT scan of the pelvic bone confirmed a calcified hematoma (Fig. 4B). The patient continued on hemodialysis until he had a renal transplant.

DISCUSSION

This patient's renal dysfunction was evident by high body background and faint visualization of both kidneys on Figure 1 and poor renal function tests. The patient developed secondary hyperparathyroidism which caused the superscan pattern visible in Figure 2. The second set of bone images also showed an area of intense bone agent localization anterior to the left iliac bone.

The focal area of increased uptake in the region of, but separated from, the left anterior iliac bone should be differentiated from a positive bone scan due to the repair process at the biopsy site (*9*). It has been reported that bone imaging performed within 3 d of iliac crest bone biopsy or more than 2 mo after the biopsy had a normal scan appearance at the biopsy site (*9*). Our patient's bone scan and bone biopsy were 7 mo apart. Although plain radiography showed two holes in the left iliac bone, the bone scan was negative at this site of bone biopsy. The differential diagnosis of post-traumatic soft tissue dystrophic calcification, such as seen in Figure 2, should be differentiated from malignancy, such as extra-osseous osteosarcoma (*10*). Malignancy should be suspected when the etiology is unknown (*10*).

This patient was known to have a history of iliac bone biopsy,

For correspondence or reprints contact: Dr. Wei-Jen Shih, Nuclear Medicine Service, VA Medical Center, Lexington,KY 40511.

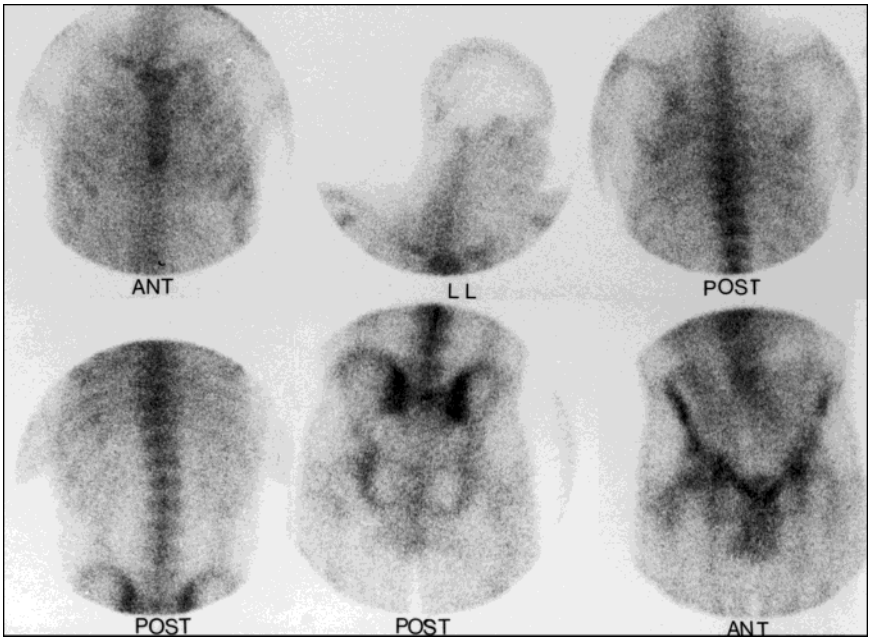

FIGURE 1. Technetium-99m-HMDP bone images show high body background and barely visualized kidneys. This figure illustrates findings of severe renal failure.

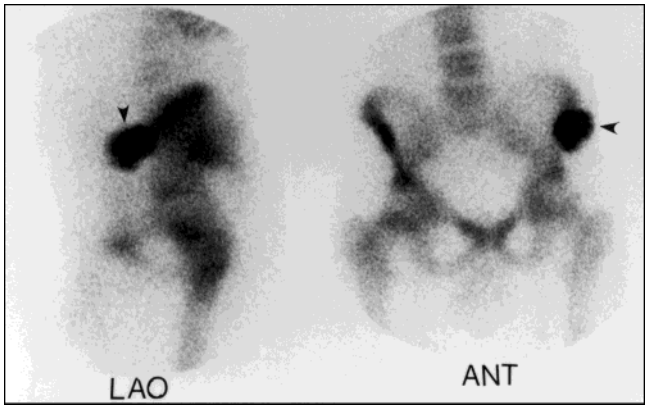

FIGURE 2. Technetium-99m-HMDP bone images performed 2 y later show an oval area (arrowheads) of intense radiotracer localization in the region of, but separated from, the left anterior iliac bone in addition to the superscan pattern of secondary hyperparathyroidism. There is a diffuse increase in activity of the bones and nonvisualization of the kidneys.

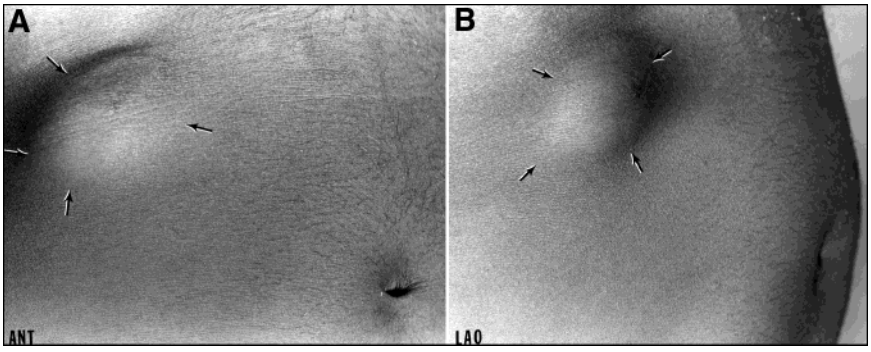

FIGURE 3. Photos of patient showing a rounded protruding 3–4-cm mass (arrows) located in the patient's lower left abdomen, laterally.

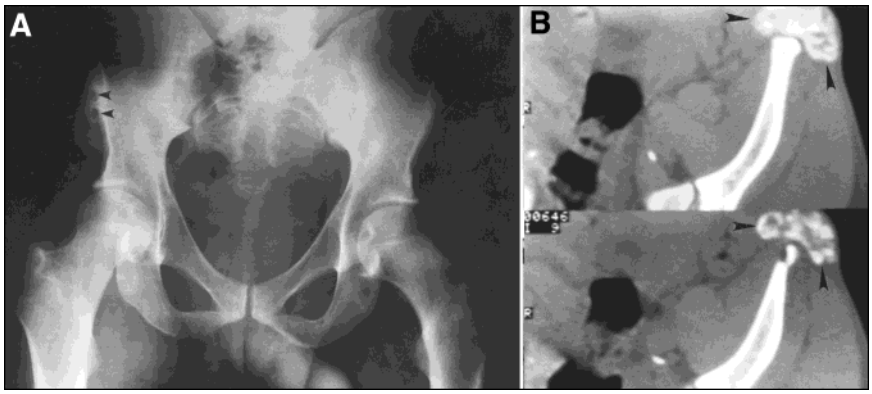

FIGURE 4. (A) An anterior pelvic radiograph shows evidence of left iliac bone injury with two holes (arrowheads) and a calcified mass. (B) A CT scan of the pelvis shows a calcified hematoma.

followed by the formation of a mass in the left lower abdomen, adjacent to the biopsy site. The bone biopsy apparently was complicated by soft-tissue hematoma, which had undergone calcification in this patient with secondary hyperparathyroidism due to chronic renal failure. The value of the bone scan was to suggest that heterotopic ossification was actively continuing in this patient, based on the observation that the degree of uptake in the area of heterotopic ossification is significantly greater than in adjacent noninvolved bone.

An iliac biopsy of a patient with chronic renal failure and secondary hyperparathyroidism was complicated by calcified hematoma. The soft-tissue calcification was demonstrated by bone scintigraphy.

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