Cold Areas in Bone Scanning

Photon-deficient ("cold") lesions on bone scans have been described recently as a newly recognized phenomenon of bone imaging (*1,2*). These photon-deficient areas correspond to a variety of disease processes including metastatic tumor, post-traumatic aseptic necrosis, and sickle cell sludging. Recently, we encountered a photon-deficient lesion that has not been previously reported.

A 34-year-old woman had a bone scan as part of a workup for osseous metastases in August 1975. Eleven years earlier, the patient had had a malignant melanoma removed from the right lower leg. At that time, a right inguinal node biopsy was negative. Ten years later, 1 year before the bone scan, she had a right groin dissection for nodal metastases. She had no history of previous trauma or radiotherapy to the spine, and she denied any symptoms referable to the axial skeleton. Pertinent laboratory data included normal serum calcium and alkaline phosphatase levels.

Anterior and posterior rectilinear scans of the torso were performed 3 hr after the intravenous injection of 15 mCi of ^{99m}Tc-diphosphonate, using a 5-in. dual-probe scanner (Ohio-Nuclear, Solon, Ohio) fitted with low-energy collimators (8.9 cm focal distance, 1.0 cm geometric radius), with 5:1 minification.

The posterior image showed a photon-deficient area in the region of the first lumbar vertebra (Fig. 1). On radiographs the L_1 vertebral body exhibited a general diminution of density and vertically oriented trabeculations separated by clear spaces. The x-ray features, which were unchanged in 18 months, were diagnostic of a cavernous hemangioma (*3*). The remaining vertebrae were normal. The upper lumbar spine, as seen on an oral cholecystogram, is shown in Fig. 2.

The considerable loss of bone secondary to replacement of the normal bone architecture by thin trabeculations probably accounts for the presentation of the hemangioma as a photon-deficient area on the scan. Residual bone uptake presumably is either normal or insufficiently increased to compensate for the loss of bone substance. Based on this observation, we think that the differential diagnosis of cold areas on bone scans should include hemangiomas of bone in addition to such previously reported causes as osteolytic metastases and arrest of intraosseous blood flow.

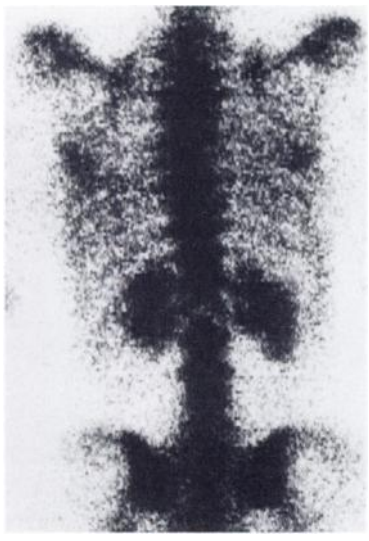

FIG. 1. Posterior rectilinear scan of torso shows cold area in region of first lumbar vertebra.

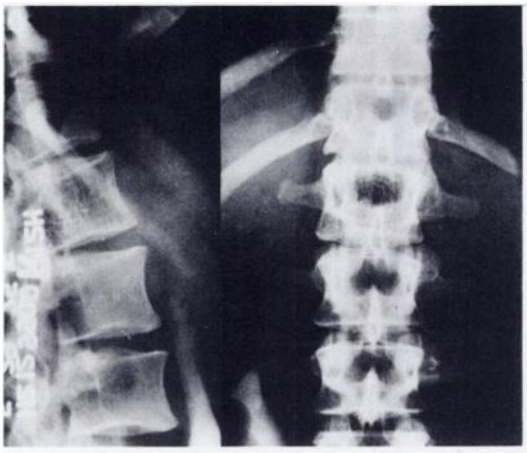

FIG. 2. Anterior and lateral projections of lumbar spine show general diminution of density and vertically oriented striations involving L_1 vertebral body. These changes are diagnostic of cavernous hemangioma.

PETER F. WINTER
LOUIS J. PERL
College of Physicians and Surgeons
Columbia University
New York, New York

REFERENCES

1. GOERGEN TG, ALAZRAKI NP, HALPERN SE, et al.: "Cold" bone lesions: A newly recognized phenomenon of bone imaging. *J Nucl Med* 15: 1120–1124, 1974

2. SY WM, WESTRING DW, WEINBERGER G: "Cold" lesion on bone imaging. *J Nucl Med* 16: 1013–1016, 1975

3. SHERMAN RS, WILNER D: The roentgen diagnosis of hemangiomas of bone. *Am J Roentgenol Radium Ther Nucl Med* 86: 1146–1159, 1961

Incidence of Solitary Skull and Extremity Involvement in Whole-Body Scintigrams

Following our recent publication (*1*), in which the use of whole-body scanning was emphasized because of the widespread dissemination of osseous abnormalities throughout the skeleton (including the extremities), a number of inquiries were received from institutions imaging only the axial (vertebrae, thorax, pelvis) skeleton. Specifically, these questions were directed toward the incidence of skull or extremity