jnm/CASE REPORT

POSITIVE ^{99m}Tc-POLYPHOSPHATE BONE SCAN IN A CASE OF SECONDARY HYPERTROPHIC OSTEOARTHROPATHY

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Secondary hypertrophic osteoarthropathy of the upper extremities is demonstrated by ^{99m}Tc-polyphosphate in an 11-year-old boy with Hodgkin's disease of the mediastinum.

Many nonmalignant disease entities causing an increased uptake of bone-seeking radionuclides have been recorded (*1*). No case of hypertrophic osteoarthropathy has been reported using ^{99m}Tc polyphosphate. Harner, et al (*2*) state that they had a patient who had "marked increase in uptake of isotope" on a scan. Chaudhuri (*3*) and Biehler (*4*) described the appearance of pulmonary osteoarthropathy on radiostrontium scans. The use of ^{99m}Tc-polyphosphate has now become widespread and the authors wish to describe an unusual case of secondary osteoarthropathy in a child who had positive and extensive scan findings.

CASE HISTORY

One month prior to admission, an 11-year-old white boy developed cough, intermittent fever, and pruritus. Treatment with antibiotics failed and 2 weeks prior to admission he complained of painful swelling of his ankles. He was noted to have clubbed fingers. He appeared acutely ill and pale at the time of admission. There was no significant lymphadenopathy. Alkaline phosphatase was 190 international units. Hepatomegaly was present. During his hospital stay, he developed pain and tenderness over his forearms. Chest roentgenograms and tomograms showed a large lobulated mediastinal mass with a small left pleural effusion. The lungs were clear. Further evaluation failed to reveal any other evidence of distal tumor. Thoracotomy revealed a large mediastinal mass which histologically proved to be nodular sclerosing Hodgkin's disease. Radiographic survey of the long bones demonstrated the classical changes of hypertrophic osteoarthropathy in the radii, ulnas (Fig. 1), tibias, fibulas, clavicle, distal left humerus, metacarpals, and carpals. Bone scan performed 2½ hr after the injection of 7 mCi of ^{99m}Tc-labeled stannous polyphosphate depicted a diffuse increase in activity over the shafts of the involved areas (Fig. 2). Of particular interest was the left humerus (Fig. 3) where the increased uptake was limited to the distal part of the shaft producing a more localized "hot" area. This correlated well with radiographic findings. The child was referred for radiotherapy.

DISCUSSION

Bamberger (*5*) and Marie (*6*) first described hypertrophic osteoarthropathy in 1889 and 1890, respectively. It has been associated with many entities both inside and outside the thorax but is quite uncommon in children (*7*). Pathologically (*8*) there is an overgrowth of vascular connective tissue containing plasma cells, lymphocytes, and blood vessels particularly around the distal ends of the bones and joints. As the inflammatory reaction subsides, osteoid is laid down and becomes calcified. The cause of the entire process is not yet clear.

Radiographic findings are most common in the long tubular bones and are typically bilateral and symmetrical. Areas of increased activity may be asymmetrical as in the humerus and therefore difficult to differentiate from metastatic disease. The usual sites of involvement are the distal third of the tibias, fibulas, radii, and ulnas. The femurs, humeri, metacarpals, and metatarsals may be affected later. Other bones, including vertebrae, are less commonly affected. Biehler (*4*) and Chaudhuri (*3*) both described increased uptake of radiostrontium at the

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FIG. 1. Radiograph of right forearm showing osteoporosis and abnormal periorsteal reaction involving radius and ulna.

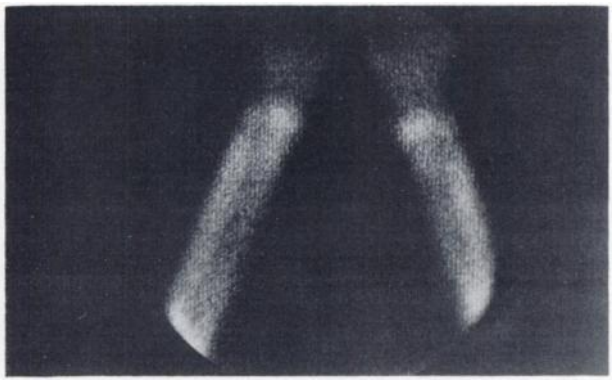

FIG. 2. ^{99m}Tc-polyphosphate scintiphoto of forearms 2½ hr after injection. There is increased uptake of radionuclide, most marked in ulnas. Note bilateral symmetry.

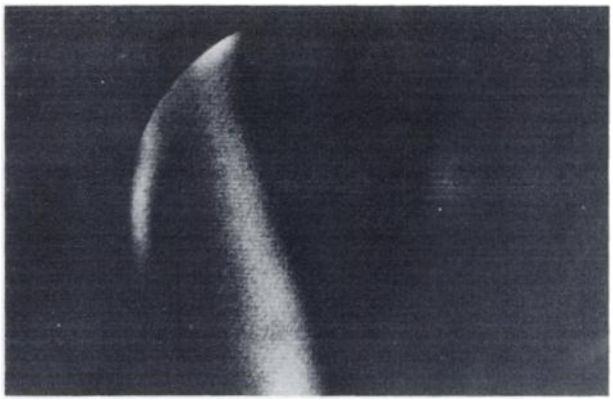

FIG. 3. Scintiphoto of left arm showing increased activity limited to distal third of shaft.

site of periosteal new bone formation in patients with pulmonary disease. Many entities can produce periosteal reaction and may be associated with increased pickup of bone-seeking radionuclides. The findings on bone scan, therefore, are not specific and must be correlated with radiographs. Increased activity over the typical sites of distribution should be suggestive of the diagnosis and help differentiate it from spread of primary tumor.

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