Aortic Aneurysm Detected by 

$^{99m}$Tc-Pyrophosphate Imaging: Case Report

Richard J. Campeau, Stuart Gottlieb, and Nilza Kallos

Jackson Memorial Hospital, University of Miami School of Medicine, Miami, Florida

An example of aneurysmal concentration of $^{99m}$Tc-pyrophosphate (Tc-PP) is described. An abdominal aortic aneurysm was suspected when a rectilinear bone scan showed an abnormal paraspinal area of activity. The aneurysm was confirmed by ultrasonic examination. Conventional radiographic examination failed to reveal calcification within the aneurysm. Aneurysmal concentration of Tc-PP, should be considered in patients showing abnormal radioactivity in the region of vascular structures on radionuclide bone images.


A patient with an abdominal aortic aneurysm showed marked accumulation of $^{99m}$Tc-pyrophosphate (Tc-PP) at the site of the aneurysm. The aneurysm was suspected from the appearance of unusual activity in the abdomen on a conventional bone scan and was confirmed by ultrasound examination. This case represents a further example of extraosseous concentration of pyrophosphate.

CASE REPORT

A 73-year-old woman was referred for a bone scan to evaluate the recent onset of low back pain, 20-lb weight loss, and weakness of both lower extremities. Her vital signs were normal. A neurologic examination revealed mild bilaterally decreased tone, strength, and sensation of the lower extremities. Her gait was wide-based, with a slight limp on the right, and the dorsalis pedis pulses were diminished. One examiner recorded a pulsatile abdominal mass to the left of the midline. Blood chemistry tests, including calcium, phosphorus, and blood urea nitrogen, were within normal limits.

After the intravenous injection of 20 mCi of $^{99m}$Tc-PP, a whole-body rectilinear bone scan was performed (Fig. 1A). A left abdominal paraspinal curvilinear area of abnormal activity was observed. This activity corresponded to an aortic aneurysm, determined by abdominal ultrasound to measure 6 cm in length by 5 cm in diameter (Fig. 1B). No evidence of paraspinal calcification was noted on the plain film of the abdomen.

DISCUSSION

Extraosseous concentration of Tc-PP, and other technetium-labeled phosphates has been reported recently in a variety of benign and malignant diseases (1–11). The exact mechanism of soft-tissue concentration of $^{99m}$Tc-phosphates is unknown. The histologic demonstration of calcium in extraosseous tissues showing abnormal concentrations of $^{99m}$Tc-phosphates (4–13) raises the question of radiopharmaceutical binding to pathologic calcification or ossification. No confirmatory cellular studies, such as autoradiography of pathologically calcified tissues, however, are available at present.

The striking uptake of $^{99m}$Tc-phosphates occasionally seen in normal breast tissue (9) and in certain tumors histologically lacking calcium (14) suggests that factors other than altered calcium-phosphorus metabolism play a role in extraosseous accumulation of phosphate bone-seeking radionuclides. Schmitt and Holmes (10,11) suggest that $^{99m}$Tc-phosphates bind to soft tissues that have high

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For reprints contact: Richard J. Campeau, Dept. of Radiology, Div. of Nuclear Medicine, Tulane University Hospital, 1430 Tulane Ave., New Orleans, LA 70112.

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concentrations of phosphatase enzymes, particularly acid phosphatase. Other workers have speculated on the possibility of inherent tumor-cell avidity for strontium-87m (12), as well as for Tc-PP, (8).

The present case provides another example of extrasosseous accumulation of Tc-PP. Such cases extend the gamut of clinically useful information that may be obtained from the conventional bone scan and emphasize the need to interpret data in the clinical context of the patient's history and physical findings. In the appropriate clinical setting, a bone scan with an abdominal paraspinal curvilinear area of activity that is not ureteral should raise the possibility of an abdominal aneurysm.

REFERENCES


FIG. 1. (A) Technetium-99m-pyrophosphate rectilinear bone scan. Abnormal curvilinear area of radioactivity is noted left of spine. (B) Abdominal ultrasound scans. Above, cross-sectional scan obtained through aneurysm (AN) near its midportion. Below, cross-sectional scan at lower level, obtained with slightly greater instrument sensitivity, showing aneurysm (AN) and pseudolumen (PL) surrounded by clot (C).