Uptake of Tc-99m Pyrophosphate by the Lactating Breast

Many reports in the literature have established the usefulness of technetium-99m pyrophosphate in scanning for acute myocardial infarction (*1,2*). The pyrophosphate is presumably incorporated into "damaged" myocardial mitrochondria (*3*). The uptake of this and other bone-scanning agents in active and in abnormal breast tissue has also been reported (*4,5*), and one investigator has found approximately 2% of the injected activity of technetium pyrophosphate secreted in 100 ml of breast milk. This secretion of technetium-99m into breast milk could cause confusion in the interpretation of myocardial scans. We have recently encountered such a case.

A 20-year-old woman was admitted to the obstetric service with the diagnosis of premature rupture of membranes. The patient underwent Cesarean section and experienced a septic postoperative course. On the 13th postoperative day she developed an irregular cardiac rhythm with episodes of ventricular tachycardia. Because of the sudden onset of cardiac arrhythmias, myocardial infarction was suspected. Serial electrocardiograms, cardiac enzymes, and a cardiac scan were obtained. Cardiac enzymes and ECG showed no evidence of myocardial infarction. In anterior view the myocardial scan showed increased uptake in a diffuse pattern, but further study clearly showed that this represented activity within the breast, rather than the myocardium. The scan was therefore interpreted as showing no evidence of myocardial infarction (Fig. 1).

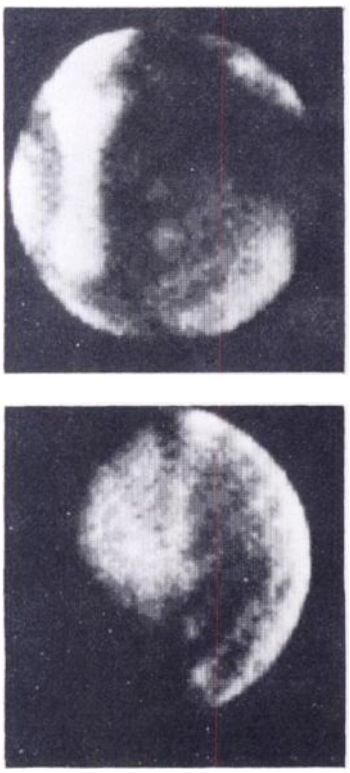

FIG. 1. Breast uptake of Tc-99m PP_i. Top, myocardial scan anterior view, showing increased activity in breast. Bottom, left lateral view showing uptake in left breast.

Because of the relative infrequency of myocardial scanning in young women, especially during the brief period of pregnancy and lactation, this finding will probably not be common. Nevertheless, when the study is indicated, such a finding, if unrecognized, could lead to inaccurate interpretation.

STEVEN LANDGARTEN
Hillcrest Medical Center
Tulsa, Oklahoma

REFERENCES

1. BONTE FJ, PARKEY RW, GRAHAM KD, et al: The new method for radionuclide imaging of myocardial infarcts. *Radiology* 110: 473–474, 1974

2. PARKEY RW, BONTE FJ, MEYER SL, et al: A new method for radionuclide imaging of acute myocardial infarction in humans. *Circulation* 50: 540–546, 1974

3. SHEN AC, JENNINGS RB: Kinetics of calcium accumulation in acute myocardial ischemic injury. *Am J Pathol* 67: 441–452, 1972

4. CARMODY R, HIGHMAN JH: Uptake of pertechnetate in mammary tissue and thyroid after pregnancy. *Br J Radiol* 48: 63–64, 1975

5. SIEGEL ME, FRIEDMAN BH, WAGNER HN: A new approach to breast cancer. Breast uptake of ^{99m}Tc-HEDPA. *JAMA* 229: 1769–1771, 1974

Intraosseous Meningioma: An Unusual Radionuclide Presentation

Brain imaging with [^{99m}Tc] sodium pertechnetate has been shown to be highly sensitive for detection of intracranial meningiomas. The yield in most series has approached 100% (*1,2*). Accumulation has also been reported to occur in some meningiomas with the Tc-99m phosphate complexes (*3,4*).

The following is a case of a purely intraosseous meningioma presenting on skull x-rays as a lytic lesion in the left temporal region. Dynamic and static brain studies with [^{99m}Tc] pertechnetate were normal. Skull images with Tc-99m diphosphonate, however, were markedly positive.

A 42-year-old man presented with a history of headache, blurred vision, and tinnitus. His physical examination was normal. Skull x-ray revealed a 3-cm, slightly irregular lytic lesion in the left temporal area near the squamosal suture. There was no surrounding sclerosis or increased vascular markings. A brain study was performed using 25 mCi of pertechnetate. The anterior dynamic study was normal. After a delay of 3 hr, four-view static images were performed

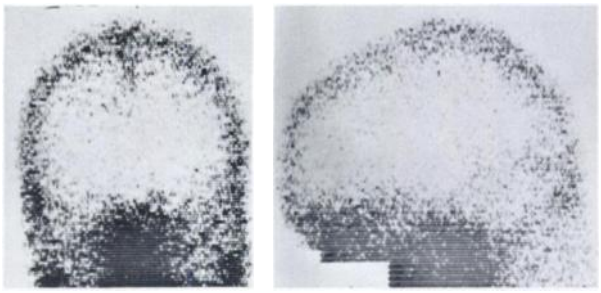

FIG. 1. Normal anterior and left lateral views performed 3 hr after injection of pertechnetate.

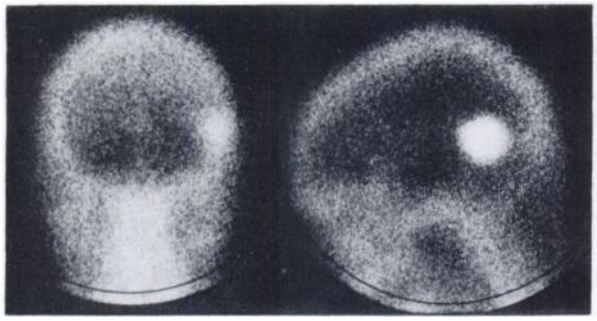

FIG. 2. Anterior and left lateral skull images made 3 hr following administration of Tc-99m diphosphonate show marked accumulation in the left parietal region.

on a rectilinear scanner with the collimator distance adjusted to bring the skull within the focal plane of the detector (Fig. 1). These were also normal. Five days later scintillation camera images of the head were performed using 20 mCi of Tc-99m diphosphonate. These showed an area of markedly increased activity in the left temporal region corresponding to the lytic skull lesion (Fig. 2). En bloc excision revealed a 3- by 3-cm, slightly raised lesion below the periosteum of the bone. The outer table was involved but the inner table and underlying dura were intact. Microscopic examination revealed typical meningioma cells with whorls and psammoma bodies. No bony elements were present.

Klein et al. recently reported a dipolic extracranial meningioma that was seen on both dynamic and static pertechnetate images (*5*). Their patient also had a corresponding lytic lesion in the parietal area on skull films. At surgery there was a large subcutaneous soft-tissue component with erosion of the outer table of the skull and extension through the inner table and dura. The large soft-tissue mass and intracranial extension may account for the better visualization in their patient with pertechnetate.

Meningiomas producing a purely lytic skull lesion are extremely rare (*6,7*). More commonly they cause an osteoblastic reaction producing a sclerotic appearance (*6*). The intraosseous location of the tumor in our patient is also unusual. Since meningiomas arise from dural elements, a possible mechanism is entrapment of dural cells along the suture line early in life. It is not known why such marked concentration of Tc-99m diphosphonate occurs in meningiomas, although it may be related in part to microscopic calcification or to increased osteoblastic activity in the surrounding bone. Accumulation within the tumor per se must also be considered since some purely intracranial tumors have been shown to concentrate Tc-99m diphosphonate. The diphosphonate may prove to be a sensitive detector of meningiomas, especially when skull involvement is present. A negative image with pertechnetate does not exclude an intraosseous meningioma.

DAVID ZARITZKY
ROBERT J. COWAN
Bowman Gray School of Medicine
North Caroline Baptist Hospital
Winston-Salem, North Carolina

REFERENCES

1. SAUER J, FIEBACH O, OTTO H, et al: Comparative studies of cerebral scintigraphy, angiography and encephalography for detection of meningiomas. *Neuroradiology* 2: 102–106, 1971

2. SHELTON J, SMOAK WM, GARGANO FP, et al.: Dynamic scintigraphy in intracranial meningiomas. *Radiology* 109: 109–115, 1973

3. GRAMES GM, JANSEN C, CARLSEN EN, et al: The abnormal bone scan in intracranial lesions. *Radiology* 115: 129–134, 1975

4. MCQUADE S, HIGGINS HP: Tc-polyphosphate in diagnosing meningiomas of the sphenoid wing. *J Nucl Med* 15: 1205–1206, 1974

5. KLEIN EW, FARHAT SM, HOSKINS PA, et al.: Radionuclide cerebral angiographic evaluation of a dipolic extracranial meningioma: Case report. *J Nucl Med* 16: 833–834, 1975

6. EVANS RW: *Histological Appearances of Tumors*, 2nd ed. Edinburgh and London, Publisher, 1966, p 393

7. HUSAINI TA: An unusual osteolytic meningioma. *J Pathol* 101: 57–58, 1970

Focal Porta-Hepatis Defect on Nuclide Imaging

The focal porta-hepatic defect on scintillation imaging has always presented a diagnostic problem. Dr. McClelland's excellent review of 40 proven cases in 1975 revealed that only 42% represented significant disease (*1*). Ten of the 40 proven cases (25%) represented malignancy. Other portal defects related to proven entities included cirrhosis, fibrosis, dilated bile ducts, viral hepatitis, hepatic laceration, cyst of the falciform ligament, and ruptured gallbladder. McClelland's review of the literature also mentioned hepatoma, abscess, infarction, choledochal cyst, and dilated splenic vein. Another 14 of his cases (35%) were considered within normal limits and other imaging modalities were not available at that time to define the defects precisely.

Recently, Sample et al. exhaustively studied 26 cases of periportal defects using a multiplane tomographic scanner as well as gray-scale ultrasound (*2*). Through precise anatomic analysis, 17 cases were proven to be normal (mostly portal venous anatomy) while five of nine (44%) were due to intrahepatic or periportal malignancies. One of Sample's abnormal cases was related to extrinsic pressure from an enlarged pancreatic carcinoma, and four other abnormlities were related to pathologically enlarged ducts.

Sample also reviewed the literature, and neither he nor McClelland note a normal kidney as causing an impression on nuclide scan that could contribute to the periportal defect. We have had two thin patients whose scans showed nonspecific periportal defects. Although intravenous urog-