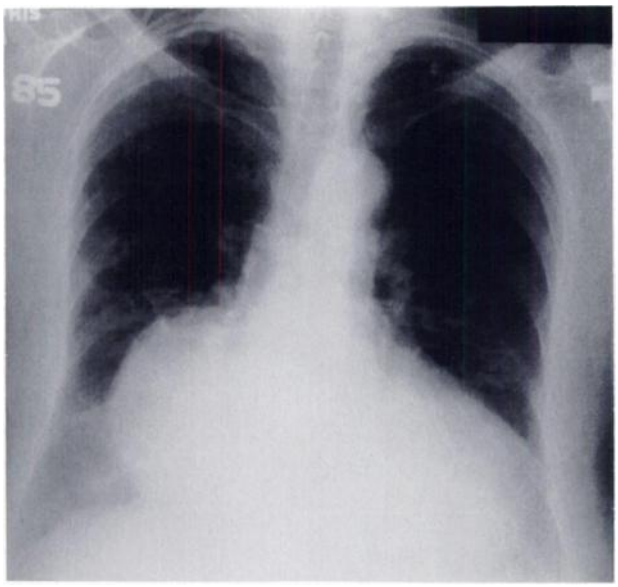

FIGURE 1
Chest x-ray showing mass in right lower lung field

ment. To verify this, a liver scan was requested. The flow study obtained with technetium-99m sulfur colloid 8 mCi i.v. showed photopenia in the mass lesion in the pulmonary arterial phase (Fig. 2A) but filled in during the aortic phase (Fig. 2B). These findings were compatible with systemic arterial blood supply to the lesion the differential diagnosis of which included a tumor. Liver scan was normal. At surgery, the mass was found to be supplied by internal mammary artery. Histologically the tumor was malignant fibrous histiocytoma. Another case was reported in the literature (*2*) wherein this tumor was supplied by bronchial arteries as demonstrated on bronchial arteriograms.

On the basis of our observation we conclude that the aortic blood supply of the pulmonary lesion should include the differential diagnosis of tumor and pulmonary sequestration and not the latter alone as reported by Kobayashi et al.

References

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REPLY: While it is indeed possible that a tumor can be supplied by systemic blood supply, it is hard for us to agree with the main direction of the conclusion presented by Dr. Moinuddin concerning his extremely interesting case, i.e. that differential diagnosis of tumor and pulmonary sequestration is necessary, per se, when aortic blood supply of a pulmonary lesion is recognized. Only if the uptake increase of an abnormal mass in the aortic phase is unclear must both cases be considered. The reason for this is that it has been shown that the blood flow in sequestration is larger than that of tumor, because the feeding artery is thicker. This in turn results in a difference in radioisotope uptake between sequestration and tumor in radionuclide angiography. In fact, in Dr. Moinuddin's case there is little uptake by the tumor in the aortic phase and in this phase there is little difference between the tumor itself and the lung. On the other hand, in our case (*J Nucl Med* 26:1035–1038, 1985) uptake of sequestration increased on the aortic phase and we could clearly recognize the mass. Evidence suggests that there are few cases of sequestration with such poor blood supply that differential diagnosis from tumor would be necessary.

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Can a 24-Hour Image in Bone Scan Differentiate Osseous Metastasis From Benign Bone Disease?

TO THE EDITOR: In a recent report, Israel et al. (*1*) suggested that the ratio of lesion-to-nonlesion technetium-99m methylene diphosphonate ([^{99m}Tc]MDP) uptake at 4 and 24 hr might be a reliable method for separating metastatic lesions from degenerative changes in the vertebral column. On the other hand, Alazraki et al. (*2*) recently have commented on

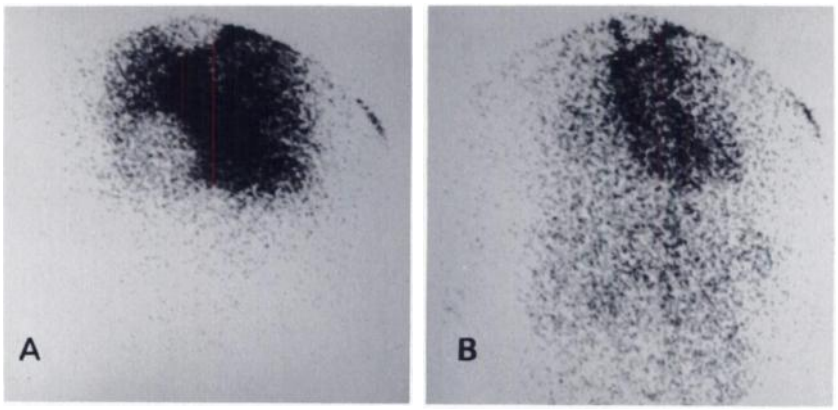

FIGURE 2
A: Dynamic flow study in pulmonary phase showing photopenia in mass. B: Aortic phase of flow study demonstrates systemic blood flow to mass

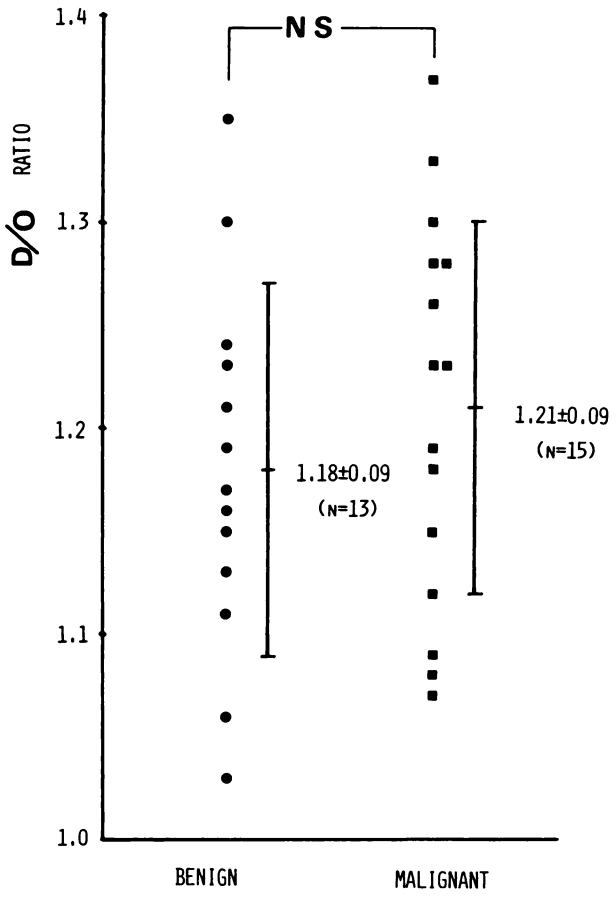

FIGURE 1
Values of delayed-to-ordinary study ratio (D/O) defined as L/N 24 hr/L/N 3–5 hr in bone scans. (L/N:lesion-to-nonlesion ratio) Difference between benign bone diseases and malignant bone tumors in D/O values was not statistically significant

the usefulness of a 24-hr image in assessing osteomyelitis in patients with peripheral vascular disease. Other investigators (*3,4*) have shown that quantification is even more sensitive than visual examination, and the trend in bone scintigraphy is toward quantification of the three-phase or four-phase, including a 24-hr delayed image, bone scintigraphy. We wonder, however, if the delayed uptake of [^{99m}Tc]MDP at 24 hr would truly be useful in differentiating osseous metastasis from benign bone disease.

In order to assess the validity of this method, bone scan was performed in 20 patients, of whom ten had metastatic bone tumors, one had osteosarcoma and nine had benign bone diseases, that is, arthrosis deformans, spondylosis deformans, chondroma, osteochondroma, fracture, acute and chronic osteomyelitis. Twenty-eight areas of abnormal concentration on the bone scans in 20 patients were analyzed. Both the ordinary static images and the delayed static images were taken at 3–5 hr and 24 hr after the injection, respectively. Each 5-min image was acquired on a 128 × 128 computer matrix. Data were displayed and a rectangular region of interest (ROI) was taken over the bone lesion. The same ROI was placed over a normal bone in the adjacent or contralateral region. The lesion-to-nonlesion ratio (L/N) was calculated for the ordinary and delayed studies. The delayed-to-ordinary study ratio (D/O) was defined as L/N 24 hr/L/N 3–5 hr. The average D/O values for benign bone diseases and malignant bone tumors were 1.18 ± 0.09 (n = 13), 1.21 ± 0.09 (n = 15), respectively. There was a considerable overlapping of the results in individual patients. The difference in the D/O values was not statistically significant (Fig. 1).

In conclusion, a 24-hr image in bone scanning was invalid for the differentiation between malignant bone tumor and benign bone disease. We wish to use lesion-specific bone scanning agents with quantification in the foreseeable future, in order to open new prospects in the research of oncology and miscellaneous bone diseases.

References

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REPLY: We read with interest the letter of Kosudo et al. We are pleased that they made use of our method of the 24–4-hr lesion to nonlesion ratio (T/F ratio) (*1*). We regret, however, that when selecting their study population, they did not take into consideration the physiologic basis of the technique. When pathologies such as those selected by the authors are compared, the results are expectedly disappointing.

The T/F ratio technique was not proposed as a theoretical or practical method to differentiate malignant from benign bone lesions. It was suggested as a method for differentiating lesions containing lamellar from those with woven bone (*1*). Uptake of a bone seeking radiopharmaceutical continues longer in new woven bone (e.g., metastasis) than in lamellar bone (e.g., normal skeleton, degenerative disease) where it decreases progressively between 4 and 24 hr (*2*). What we suggested was a "method for separating metastatic from degenerative lesions in the vertebrae" (*1*). In such cases the method showed a reasonably high sensitivity and specificity. We are continuing these measurements as a routine diagnostic procedure and the data for 60 additional patients confirm our initial results.