RADIOSTRONTIUM LOCALIZATION IN METASTATIC OSTEOSARCOMA

It is curious that Schall et al (*J Nucl Med* 12:131–133, 1971) overlooked my reports of strontium localization in the pulmonary metastases of osteosarcoma (*Amer J Roentgen* 104:766–769, 1968; *Amer J Roentgen* 109:813–819, 1970). I first found evidence of ^{85}Sr uptake in known pulmonary metastases of osteosarcoma in 1966 and described this case with five others at a meeting of the Central Chapter, Society of Nuclear Medicine in 1967.

I have subsequently used ^{87m}Sr lung scans routinely in children who have newly diagnosed osteosarcoma and in at least one case have detected metastases which were missed on routine chest x-rays. A review of the past five years experience of lung scanning with ^{87m}Sr is now in preparation. With refinements of focusing and elimination of motion artifacts, as by gamma-camera imaging with breath holding, increased precision should be possible. However, the specificity of ^{87m}Sr uptake for bone tumors and bone tumor metastases is not supported by recent observations of isotope uptake into primary soft tissue in the chest (*J Canad Med Assn*, in press), which suggest a specificity for malignant tumors in general.

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THE AUTHORS' REPLY

We have some further comments which may be of interest concerning our recent case report in the *Journal* of the detection of an osteosarcoma metastatic to lung by radiostrontium scintiscanning (*1*).

1. Following the left pneumonectomy, the specimen was counted using a 5 x 4-in. NaI(Tl) scintillation crystal positioned 10 ft above the organ. The amount of ^{85}Sr present in the specimen (adjusted for decay) was 4.0 μCi, or 4% uptake of the original 100 μCi dose. Assuming that 75% of the total weight of the lung (1,500 gm) was due to the metastatic osteosarcoma, then the uptake of ^{85}Sr by the tumor was 3.56 mμCi/gm. This is comparable to the figure reported by Charkes et al (*2*) as the average of three areas at the periphery of a primary osteosarcoma of the tibia in a 13-year-old girl.
2. Using the T = 3.35 R cm^2/hr-mCi for the 513-keV gamma ray of ^{85}Sr (*3*), we calculated the potential dose to a pathologist examining the specimen as approximately 6 mrad, assuming that it took ½ hr to complete the dissection and that the tissue was an average of 1 cm from his body. Of course this dose increases exponentially at distances closer to his skin.
3. Rarely does a health physics problem arise from the diagnostic, compared with therapeutic, administration of a radionuclide. This is because only relatively small doses of short-lived tracers (^{99m}Tc, ^{131}I) are used for diagnostic purposes and because an entire organ is usually not surgically removed following the scan (brain, liver). In this case, however, a large amount of tissue was removed which contained a radionuclide with a long half-life (65 days). At our institution the pathology department is notified when this type of surgery is contemplated, and the specimen is clearly labeled as radioactive. In this way, proper precautions can be taken during the examination of the tissue and for proper shielding during extended storage.

Dr. Samuels did indeed describe the uptake of ^{85}Sr and ^{87m}Sr by osteosarcomas metastatic to lung in the December 1968 issue of the *American Journal of Roentgenology*. This was strictly an oversight on our part, and we apologize for it. No insult intended. His second article on the same subject appeared in the August 1970 issue of the same journal, a few weeks after we had submitted our original article to the *Journal of Nuclear Medicine*.

Both of Dr. Samuels' articles are liberally cited in our recent paper summarizing our own experience with radiostrontium scintiscanning to detect metastatic osteosarcomas (*4*). However, in our review of the literature for this study we found a report of a

similar case which had appeared in the literature even before Dr. Samuels' first article. This was a paper by Woodbury and Beierwaltes in the September 1967 issue of the *Journal of Nuclear Medicine* (8:646–651, 1967.) (Dr. Samuels even cites this in his 1968 paper.) This report deals with the delineation of osteosarcoma metastases by ^{18}F in man and rats using the same principle, of course, as with radiostrontium scanning. It was because of the possibility that we had overlooked some previous article that we refrained from using the term "first" in our report and merely stated that it was an unusual finding.

The moral of all this is that no matter how unique a finding you think you have observed someone has probably made it—and published it—previously. And no matter how thorough a literature search you think you have conducted, there are one or two big ones which always get away.

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FURTHER OBSERVATION ON ^{131}I-BSP CLEARANCE IN THE DUBIN-JOHNSON SYNDROME

I would like to add another short note to my article (*1*) and the letter to the editor from Lull (*2*).

In the previous communication we reported that ^{131}I-mono-iodide BSP (prepared by Dainabot Lab., Tokyo, Japan) has unique value in differentiating cases with Dubin-Johnson syndrome from cases with Rotor syndrome and Gilbert disease. Iodine-131 rose bengal has limited value for this purpose since this dye is excreted from the liver quickly in all these cases.

I recently had the opportunity to study a whole family membership with two cases of Dubin-Johnson. We expected to see the presence of modified ^{131}I-BSP clearance in other family members similar to abnormal ^{64}Cu clearances in relatives of patients with Wilson's disease. This did not occur; however, we did observe similar delayed clearance of ^{131}I-di-iodide BSP(prepared by Dainabot Lab) in cases with the Dubin-Johnson syndrome.

Thus it became clear that labeled BSP, both mono-iodide and di-iodide, is useful and has unique value in differentiating between patients with constitutional hyperbilirubinemia even though clearance of ^{131}I di-iodide BSP is remarkably slower than ^{131}I-mono-iodide BSP.

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UNIDIRECTIONAL VERSUS BIDIRECTIONAL SCANNING

It has been said (*1*) that unidirectional scanning has not been generally accepted because of the added time consumed relative to bidirectional scanning. To believe this is to deny the whole purpose of unidirectional scanning.

The facts are best demonstrated by taking a concrete example. In this department we routinely perform brain scans unidirectionally at a speed of 100 cm/min with the "fly-back" speed of 500 cm/min provided on our Picker machine. With a line spacing of 0.32 cm, a scan comprising 50 lines each 25 cm long takes 15 min. We use a time constant of 0.5 sec, corresponding to a space constant of 0.8 cm. If we accept the fact that in the bidirectional mode the space constant is limited to about 0.05 cm to avoid undue scalloping, then the scan speed must be reduced to 6 cm/min to enable a time constant of 0.5 sec to be used. The time required to produce