

Journal, describe difficulty in obtaining early images using indium-111-labeled granulocytes to detect occult infection (1). In this study they used autologous granulocytes for labeling and imaging in patients with normal or elevated granulocyte counts. The early images, at 1-4 hr, had a sensitivity of only 33%. They therefore question our previous report of the rapid localization of activity to sites of infection, which were seen in granulocytopenic patients with known infections when given indium-111-labeled donor cells (2). However, I would like to reaffirm our observation of the rapidity with which labeled cells migrate in granulocytopenic patients. As a continuation of the previous report, studies done in nuclear medicine at our institution confirm this. The localization is clearly apparent, without computer manipulation of the image, as early as 30 min after injection of labeled donor cells.

I do not doubt that they are observing less localization at 1 hr in their autologous studies, but suggest that this difference is not a function of the technique, but is related to granulocyte kinetics and the differences in the marginating pool of granulocytes available in patients with a normal white-cell count contrasted with granulocytopenic patients. There may be a dilutional effect in patients with normal counts so that proportionally fewer labeled granulocytes migrate to sites of infection initially, because unlabeled granulocytes are also migrating there. In contrast, in granulocytopenic patients, the only circulating granulocytes are often the labeled donor cells, and they respond rapidly and in larger proportion to the chemotactic stimulus of an infection. This, in part, I believe explains the differences between these two studies.

Furthermore, in our study, we were imaging clinically apparent infections for purposes of evaluating transfusion response. It is possible that this involved a greater chemotactic stimulus than that in an occult, clinically nonlocalized infection.

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REFERENCES

1. DATZ FL, JACOBS J, BAKER W, et al: Decreased sensitivity of early imaging with In-111 oxine-labeled leukocytes in detection of occult infection: Concise communication. *J Nucl Med* 25:303-306, 1984
2. DUTCHER JP, SCHIFFER CA, JOHNSTON GS: Rapid migration of ¹¹¹indium-labeled granulocytes to sites of infection. *N Engl J Med* 304:586-589, 1981

Reply

We thank Dr. Dutcher for her comments. Since we studied only patients with normal or elevated white counts whereas Dr. Dutcher's patients were granulocytopenic, a difference in leukocyte kinetics certainly could explain the disparity between her findings and ours.

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Re: Does Bone Measurement on the Radius Indicate Skeletal Status?

I read with interest the paper by Mazess et al. (1) and the statement that the "limbs . . . did not reflect the preferential osteopenia in the spine". I-125 absorptiometry of the distal third of the radius is chiefly a measurement of cortical bone, and thus a comparison has been made of cortical bone at one site with mainly trabecular bone in the spine.

The distal end of the radius contains significant amounts of trabecular bone and special-purpose I-125 CT scanners have been built that can measure the trabecular bone density very precisely (2,3). The distal radius is not only convenient and accessible for bone-density measurement but in osteoporotic patients is associated with fracture. In women approximately one third of all fractures occur at this site, and after age 55 the incidence of fracture in women is six times that in men (4).

For monitoring the course of osteopenia or its treatment, the method should have a reproducibility of greater than 1%, and there should be few obstacles to repeat measurements. We have built a low-dose CT scanner that uses an I-125 source (Hosie CJ, Richardson W, Gregory N, unpublished data). This is a self-contained unit, with image reconstruction carried out by a multiprocessor microcomputer. Trabecular bone density in the distal radius has been measured with a reproducibility of 0.5% in normal subjects and osteoporotic patients. Other groups have reported similar reproducibility with an I-125 computed tomograph (2,3) and have obtained good correlation between trabecular bone density of the distal radius and trabecular bone density of excised vertebrae (2,5). Our preliminary results indicate that in osteoporosis there is a preferential decrease of trabecular bone (45%) compared with that for cortical bone (30%).

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REFERENCES

1. MAZESS RB, PEPPLER WW, CHESNEY RW, et al: Does bone measurement on the radius indicate skeletal status? *J Nucl Med* 25: 281-288, 1984
2. RÜEGSEGGER P, ANLIKER M, DAMBACHER M: Quantification of trabecular bone with low dose computer tomography. *J Comput Assist Tomogr* 5: 384-390, 1981
3. HANGARTNER TN, OVERTON TR: Quantitative measurement of bone density using gamma-ray computed tomography. *J Comput Assist Tomogr* 6: 1156-1162, 1982
4. KNOWELDEN J, BUHR AJ, DUNBAR O: Incidence of fractures in persons over 35 years of age. *Br J Prev Soc Med* 18: 130-141, 1964
5. HANGARTNER TN, OVERTON TR: Recent developments in peripheral CT measurements. *J Comput Assist Tomogr* 7: 553, 1983

Reply

Hosie correctly notes that measurements of compact bone on the limbs do not reflect the trabecular bone of the axial skeleton, but suggests that measurement of trabecular bone of the distal radius may be clinically useful. Of course, absorptiometric scans on the distal radius are usually done at a site (10% of the forearm length) that is only about 10-15% trabecular, and even more distal sites are not more than 20-40% trabecular (1). We have found that shaft and distal sites on the radius are highly correlated ($r = 0.95$), and consequently absorptiometric scans at both locations must be equally poor indicators of spinal status (2). Computerized scanners based on x-rays and I-125 emission, such as those pioneered by the Zurich group cited by Hosie, provide precise measurements at the distal radius and other limb locations (proximal tibia). Rügsegger (3) reported that trabecular bone of the distal radius was significantly diminished in osteoporotic patients. Nevertheless, there are two perplexing problems in addition to the high cost of these specially engineered systems. First, a technical difficulty is caused by the "environmental density" artifact (4). The trabecular bone on the distal radius (or tibia) is surrounded by a layer of much denser