Letters to the Editor

Symmetric Photon Deficiency in the Femoral Heads on Bone Imaging: A Normal Variant

TO THE EDITOR: Kulkarni et al. recently described two cases of bilateral avascular necrosis involving the femoral head in patients with systemic lupus erythematosis (*1*). Radionuclide bone scans were performed in both cases and demonstrated relatively symmetric photon deficiency in the superior lateral aspect of the femoral heads on the anterior images. I do not wish to argue the point of whether the patients did or did not have avascular necrosis, but it has been my experience that symmetric relative photon deficiencies in the superior lateral aspect of the femoral heads seen on anterior images of a radionuclide bone scan, may represent a normal variant. When receiving the literature, I found no specific reference to this observation (*2–7*). On the anterior image of the normal adult pelvis found in the article by Gaucher et al., in which radionuclide imaging in hip abnormalities is discussed, I noted that the superior lateral aspects of both femoral heads were symmetrically photon deficient (*7*). This observation is not specifically discussed in their article. I also noted that on the posterior image of the normal adult pelvis in the article by Gaucher et al., the femoral heads appear fairly homogeneous when compared to the anterior images.

To further evaluate this observation, I prospectively reviewed 50 radionuclide bone scans with specific attention to the anterior and posterior images of the hips. I excluded all patients with any clinical scenario related to hip pathology so that I could better define a patient population with relatively normal hips. Out of 50 patients studied, 18 displayed symmetric relative photon deficiency in the superior lateral aspect of both femoral heads on the anterior view of the pelvis. The femoral heads on the posterior view were relatively homogeneous (Fig. 1). I believe that this phenomena is due to the shallow nature of the anterior acetabular rim when compared to the posterior rim. The anterior superior lateral aspects of the femoral heads are not covered by the acetabulum yielding a relative decreased photon density on the radionuclide bone scan.

I, therefore, believe that symmetric relative photon deficiency in the superior lateral aspect of the femoral heads seen on the anterior projection of a radionuclide bone scan may be normal variant and therefore the diagnosis of avascular necrosis should not be made on this single observation.

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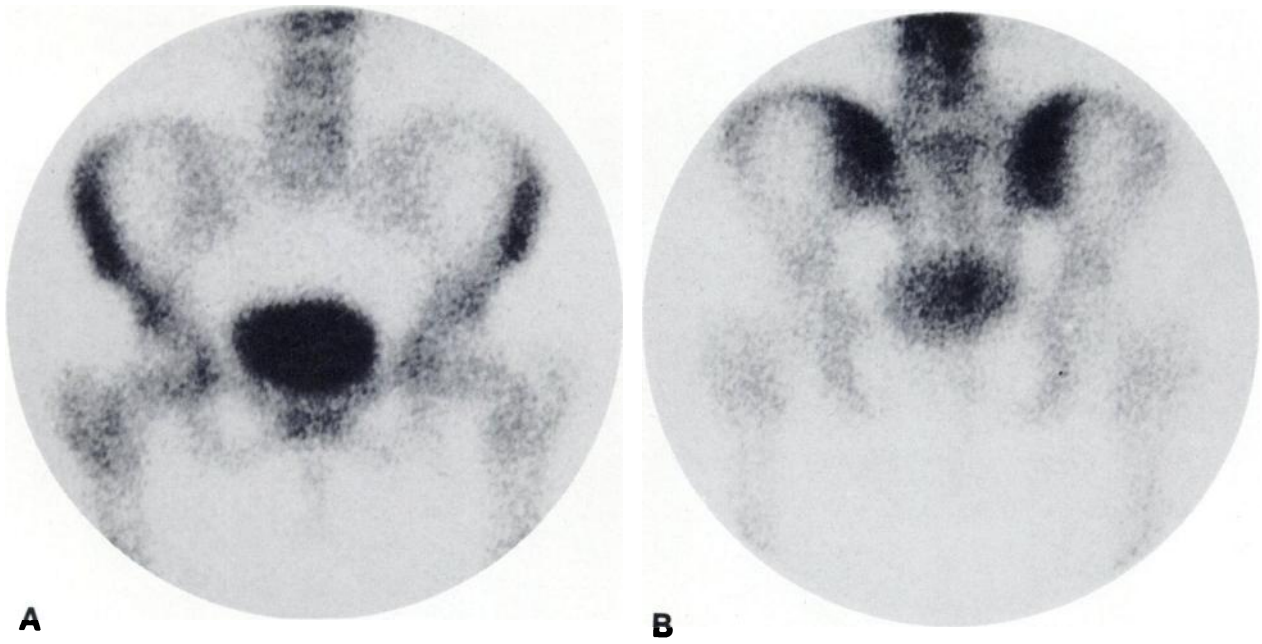

FIGURE 1
A: Anterior pelvis with symmetric relative photon deficiency in the superior lateral aspects of both femoral heads. B: Posterior pelvis with relatively homogeneous femoral heads.

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William L. Higgins
West Virginia University Hospitals, Inc.
Morgantown, West Virginia

Acceptance Testing of Gamma Cameras

TO THE EDITOR: The recent article by Murphy provides an excellent summary of the performance parameters that should be measured after an Anger scintillation camera is installed and the quality control procedures that should be utilized to evaluate daily performance (*1*). Although the set of standardized procedures provided by the National Electrical Manufacturers Association (NEMA) (*2*) cannot be performed in its entirety because of computer limitations in most state-of-the-art nuclear medicine systems, the major elements of camera performance can and should be tested. In the last 4 years, I have tested 30 cameras representing all major manufacturers. Only one camera met specifications and that only because it was manufactured before performance specifications were published. My experience is essentially the same as that of Finney et al. (*3*). While the failure of most scintillation cameras to pass acceptance tests may be partly attributed to the high degree of complexity of state-of-the-art instruments, most of the blame must be attributed to inadequate testing by the vendors at the time of installation. This statement is substantiated by the fact that all but a few of the cameras eventually met specifications and passed the acceptance tests. A satisfactory installation should mean more than the simple ability of a camera to provide an image.

Users who wish to perform acceptance tests will need some special equipment such as the NEMA resolution test pattern (*1,2*). In certain instruments they will also need special equipment such as field-of-view masks that are available only from the vendor. In addition, special software may be required to quantitate such parameters as uniformity, spatial resolution, multiple window spatial registration, etc. Some calculations can be performed by hand from data obtained with standard keyboard commands. For example, FWHM and FWTM values can be calculated from listings of numerical values provided by "Profile" or "Slice" commands.

Individuals performing acceptance tests need the complete assistance of the vendor's representatives. For example, in many cameras it is necessary to know the proper combination of correction circuits turned off/on for an instrument to reach the specified maximum count rate according to the NEMA specifications. Similar assistance is needed for measuring other performance parameters.

As Dr. Murphy pointed out, components not detailed in the NEMA protocols must also be tested. These include collimators, whole body scanning mechanisms, electronic formatters, magnifier/rotator circuits, etc. In my experience, vendors are usually willing to correct problems even if they are not subject to detailed specifications.

The article by Dr. Murphy comes at an appropriate time. The recent improvements in Anger camera technology will only bring added benefit to the patient when these instruments are operating to the full extent of their capability.

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L. Stephen Graham
Nuclear Medicine Service, V.A. Medical Center
Sepulveda, California
and
Biomedical Physics Division
UCLA School of Medicine
Los Angeles, California

Early Description of "Bull's-Eye" Plot for Emission Cardiac Tomography

TO THE EDITOR: We are pleased to note the growing acceptance of the "bull's-eye" plot for displaying tomographic thallium-201 data, as exemplified in L. Holman's keynote address at the 1987 Annual Meeting of the Society of Nuclear Medicine. We are also pleased that Caldwell et al. at the University of Washington and Garcia et al. at Cedars-Sinai were acknowledged by Dr. Holman for their early recognition of the merits of the bull's-eye approach to data presentation (*1,2*). However, we feel it is important to point out that the bull's-eye method was actually developed earlier by Johnson, Kirch, Hasegawa, Sklar, Hendee and Steel at the University of Colorado and Denver Veterans Administration Hospital. This technique was described at the 1981 Western Section meeting of the Society of Nuclear Medicine, the 1981 Annual Meeting of the Society of Nuclear Medicine, and the 21st Annual Meeting of the American Association of Physicists in Medicine (*3,4*). A paper describing the bull's-eye method, submitted in 1981 to *The Journal of Nuclear Medicine*, was rejected for publication. We did not, unfortunately, pursue publication further, which may explain why this early presentation of the method is now obscure.

References

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