

Case Report: A Position to Delineate Pelvic Radionuclide Uptake

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At present, the most common use of bone imaging is in the search for metastatic disease in patients with known or suspected carcinoma (1). Kidneys and bladder may be routinely evaluated on bone images obtained with technetium-99m phosphate agents, since incidental lesions of the urinary tract are frequently found by this means. However, renal and bladder activity may prevent recognition of focal lesions in the overlying bone (2). As a result, residual bladder activity may mimic or mask bone involvement, particularly in a patient with chronic urinary retention, low lying bladder, or bladder diverticula.

Having a patient void just before the pelvis is imaged will reduce bladder activity (3) but will rarely eliminate it, most likely because of Tc-99m's adsorption to the bladder mucosa (4). Therefore, follow-up views including delayed imaging up to 24 hr (2) after radiopharmaceutical administration, lead shielding over the bladder, decubitus views, views of the pelvis in the prone position (5), and tomography (6) have been used to facilitate evaluation of the pelvis with questionable bladder uptake.

Our experience has shown 24-hr delayed views to be less than optimum. Residual bladder activity is still present with only fair skeletal information density. Lead shielding of the bladder may actually mask the area of interest, resulting in loss of information. Minimal residual bladder uptake in the lower pelvic area may result in an ambiguous diagnostic picture. Decubitus views may not provide the required delineation or shift in bladder locale. In addition, having the patient positioned in the prone view may not adequately demonstrate the area in question. We also did not have access to scintillation tomography, which might have resolved this problem.

This particular patient was a 48-year-old white woman

who had a right radical mastectomy in 1974. Bone scans from 1977 to 1979 demonstrated increased activity in the posterolateral area of the fifth rib (Fig. 1). Radiographic correlation and biopsy confirmed this to be metastatic disease. The remainder of the bone scan appeared normal. In 1980, a bone scan again demonstrated the rib lesion and also a new focal area of increased activity in what appeared to be the left superior pubic ramus (Figs. 2 and 3). The question arose as to whether this uptake was due to:

- (1) bone uptake,
- (2) bladder uptake, or
- (3) skin contamination.

The particular focal uptake made contamination unlikely; however, the patient was instructed to cleanse the area and was then rescanned. The "hot spot" in question persisted. A 1981 bone scan again confirmed increased uptake in the same area, suggesting this might be a metastasis to the left ischium rather than to the left superior pubic ramus. Radiographic correlation was obtained but it failed to demonstrate any obvious destruc-

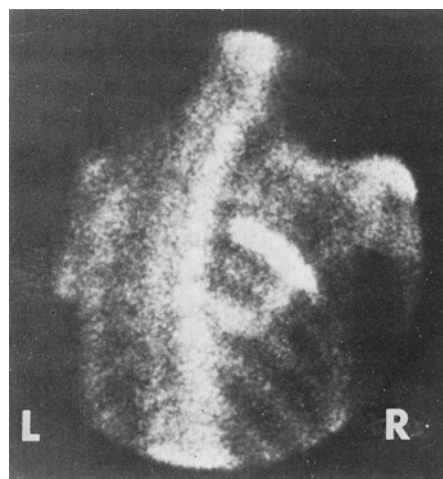


FIG. 1. Right posterolateral view of thorax demonstrates fifth rib involvement.

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tive lesion in this region. When the follow-up bone scan was performed, the nuclear medicine technologist suggested a view in the subpelvic girdle. To do this, the patient sat on the face of a collimated scintillation camera.

Method

This innovative position, which we named the Giga squat view, requires the patient to sit on the collimator face of an Anger camera. The study was performed with an HP-IV Searle Anger camera, using a low-energy diverging collimator. The scintillation camera face is aimed toward the ceiling and is parallel to the floor. For patient comfort, the camera head is lowered as much as possible. The patient x-y-z orientation is in the three upright mode for CRT display and scintillation recording. Alternatively, a marker placed on one side will help determine orientation. The persistence scope is referred to for appropriate position and alignment, displaying the subpelvic girdle structures (Fig. 4).

Imaging is performed immediately after the patient voids. The "Thinker" (Fig. 5), while providing a general

idea of patient position, does not accurately illustrate arm positioning for this view. Sitting upright, the patient should cross his arms over the chest, rather than rest them on his lap or sides. In case of an infiltrated injection, the injected arm is to be extended away, laterally, from the body. This is to avoid any possibility of injection site superimposition on the proximal femur. Symmetrical and bilateral views were taken at 300K counts each (Fig. 6A and B). These views demonstrated optimum delineation of the bladder structure as opposed to bone uptake of Tc-99m MDP.

A modified view can be obtained by having the patient's torso tilted posteriorly forming an approximate

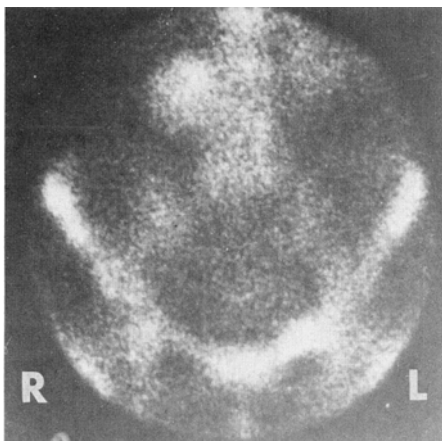


FIG. 2. Anterior pelvic view demonstrates increased activity in left lower pelvis.

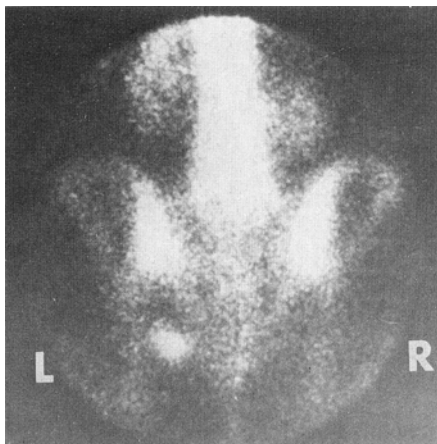


FIG. 3. Posterior pelvic view demonstrates increased activity in left lower pelvis.

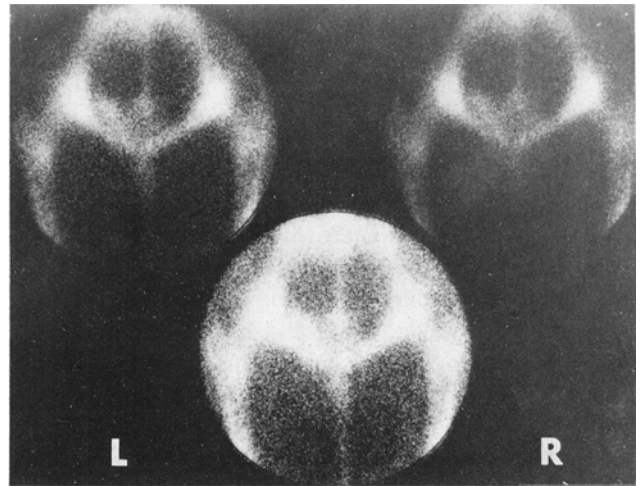


FIG. 4. Scintigraph of Giga squat view.

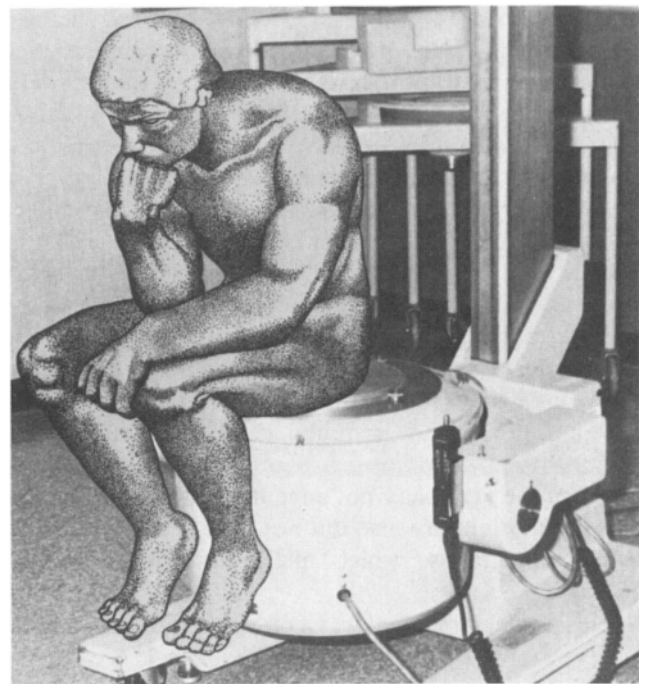


FIG. 5 A different approach to imaging the pelvis by sitting on the scintillation camera face. (With apologies to Auguste Rodin.)

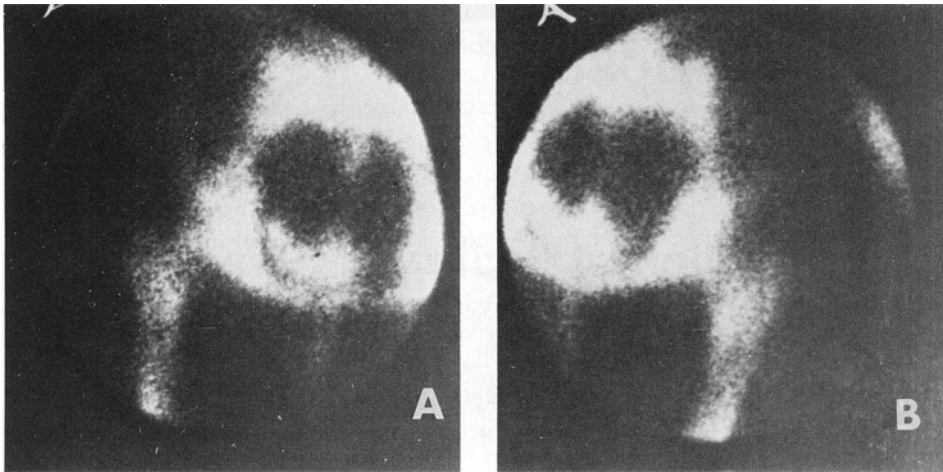


FIG. 6. Bilateral Giga squat views: (A) left side; (B) right side.

60° angle to the detector head. Both the perpendicular and angled views may be necessary to show the degree of change in the bladder's location (7).

Discussion

For this particular case, the Giga squat views provided information to demonstrate that the uptake in question was due to bladder. Figure 4 and particularly Fig. 6A and B clearly illustrate asymmetrical urinary bladder uptake in the left anterior region of the pelvic outlet.

We believe this view may also prove useful in assessing acetabulum or sacro-iliac joint uptake in radionuclide imaging. We have also imaged extremely well-defined views of the femoral neck, using this technique, for scintigraphic and radiographic correlation of suspected lesions in this area. In addition, use of this view to complement conventional views for such studies as TcO_4 testicular scans or gallium-67 scans may prove quite useful to the diagnostician.

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