LUNG IMAGING WITH THE PINHOLE ANGER CAMERA

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Field size has been a factor limiting the use of the Anger camera for imaging the lungs because it is often impossible to include both lungs in a single field of view of the multihole collimator. Each lung can be imaged separately, but it is preferable that both lungs be imaged simultaneously to facilitate comparison.

The use of a pinhole collimator eliminates this problem, but, in the past the limited number of available photons from 300-μCi doses of 131I-macro-aggregated albumin necessitated long exposure times. The introduction of 113mIn- or 99mTc-labeled particles or microspheres has now made it possible to obtain a satisfactory single image of both lung fields with a pinhole collimator in 5 min or less.

The pinhole aperture of the single pinhole collimator supplied with the Pho/Gamma Camera† is 7.5 in. from the crystal and 1 in. from the face of the collimator. The pinhole-to-crystal distance can be reduced to 5.5 in. by changing the position of the pinhole in the collimator. The amount of magnification (or minimization) can be altered by placing the area being imaged various distances from the face of the pinhole collimator (Table 1). For imaging the lungs, the patient’s back is 7 or more inches from the face of the collimator with the pinhole 5.5 in. from the crystal. This provides better sensitivity without great loss of resolution.

The posterior scintiphoto and posterior rectilinear scan of the same patient with multiple pulmonary emboli are shown in Fig. 1. The dose was 1.0 mc of 113mIn-iron hydroxide (Stern et al, 1966). The scintiphoto is comparable to the scan. The perfusion defects seen in the scan are well visualized by the camera. The time required for the scintiphoto was 7 min. Doses of 2–3 mc have been used which decrease the exposure time to 2–3 min. Care must be taken when using the pinhole collimator to center the lungs well in the field of view because distortion from the coma effect of the pinhole aperture may occur at the periphery of the image.

FIG. 1. Posterior rectilinear scan and scintiphoto of man with multiple pulmonary emboli. 50,000 counts were accumulated in 7 min in the scintiphoto.

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CONCLUSION

Use of the pinhole Anger camera allows simultaneous, rapid and satisfactory imaging of the lungs when particles labeled with a millicurie dose of a short-lived radionuclide are used. The pinhole collimator affords flexibility in field size unlike the multihole collimator which restricts the area of the field of view to that of the crystal.

REFERENCE