COLLIMATOR SELECTION FOR SCINTILLATION CAMERA BRAIN SCANNING

Collimator selection for use with the scintillation camera was a topic in the December issue of *The Journal of Nuclear Medicine*. The article by Westerman *et al* (*1*) presented results of imaging a ^{99m}Tc source phantom using 4,500-square-hole and 1,090-round-hole collimators. Many people mistook these collimators for the 4,000-square-hole and 1,000-round-hole collimators available with the Nuclear-Chicago scintillation camera. The 4,500-hole, 1.75-in.-thick collimator is equivalent to the Nuclear-Chicago 4,000-hole, 1.75-in.-thick collimator. The 1,090-hole, 1.5-in.-thick collimator *is not equivalent* to the 1,000-hole, 3-in.-thick Nuclear-Chicago collimator.

We have performed studies using the 4,000-hole and 1,000-hole collimator provided with the Nuclear-Chicago Pho-Gamma III scintillation camera and a ^{99m}Tc source similar to that used in the referenced investigation. The radioactive source test phantom was prepared using ^{99m}Tc in a 12-cm-diameter tank that was 15 cm deep; the concentration was 0.2 μCi/ml. Three pseudotumors were used. The pseudotumors were 0.7 cm, 1.0 cm and 1.5 cm in diameter and each contained ^{99m}Tc at a concentration of 2.0 μCi/ml. The diluent was water.

An Anger scintillation camera was used. The camera was adjusted to accept pulses generated by gamma rays in the 125–155-keV energy range. The collimators were those that are provided as standard equipment.

The recording of the resultant image on the oscilloscopes was accomplished with the Fairchild Polaroid film camera and a special enlarger attachment designed at this hospital to provide a one-to-one subject-image size ratio. Each collimator was used to image three pseudotumors individually at 1-cm and 4-cm depths in the phantom. The images were recorded at 25,000 counts, 50,000 counts, 100,000 counts and 500,000 counts. The collimator face was 8 cm from the surface. The 0.7-cm-diameter pseudotumor situated 1 cm below the phantom surface was faintly visualized with the 4,000-hole collimator after an accumulation of 500,000 counts. All other attempts with both the 1,000-hole and the 4,000-hole collimators failed to demonstrate the 0.7-cm pseudotumor.

Using the 4,000-hole collimator, the 1-cm-diameter pseudotumor 1 cm below the phantom surface was faintly visualized after an accumulation of 25,000 counts. The pseudotumor was readily visualized at the subsequent accumulations of 50,000 counts, 100,000 counts and 500,000 counts. The 1-cm-diameter tumor was not visualized with the 1,000-hole collimator in the 25,000-count scintiphotograph. Subsequent scintiphotographs, using the 1,000-hole collimator, showed a poorly visualized area of concentration at the site of the pseudotumor after an accumulation of 50,000 counts and good visualization of the pseudotumor at the 100,000 and 500,000 integral count levels.

Both collimators clearly imaged the 1.5-cm-diameter pseudotumor when it was placed 4 cm below the surface of the phantom. The 4,000-hole collimator presented a clearer configuration image than the 1,000-hole collimator.

The apparent sensitivity of the 1,000-hole and the 4,000-hole collimators were equal for the ^{99m}Tc source used in this study.

In summary, scintillation camera imaging of pseudotumors at ^{99m}Tc concentrations 10 times that in a background phantom indicates that the commercially available, 4,000-square-hole collimator is superior to the 1,000-round-hole collimator for visualizing this type of tumor.

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REFERENCE

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SIMPLIFIED GFR METHOD?

I have read with interest the paper in the November issue of the *Journal* by Eberstadt, Alvarez and Ungay entitled, "Simplified method for determining glomerular filtration rate with ^{131}I-sodium iothalamate" (*1*). I believe that the publication of such a method warrants a very strong statement of caution to those who would adopt its use directly. A simplified method infers that it has been adapted from something more complex. It is indeed true that single-injection clearance methods are available in the literature and various simplifications have been presented. However, it is necessary to obtain a