TO THE EDITOR:

I read with interest the article by Hal O. Anger in the Journal of Nuclear Medicine, July, 1964, on multi-channel collimators. I would like to make the following points:

(i) On page 516 the author maintains that parallel-channel collimators have substantially uniform "depth response," the sensitivity in practice being modified by tissue attenuation.

(ii) Similarly, on page 519, an equation for the geometrical efficiency of a multi-channel collimator, which is independent of the subject to collimator distance, is given.

(iii) The author further states on page 520 that the geometrical efficiency is independent of the subject to collimator distance, this fact being confirmed approximately by experiment.

These statements would appear to be opposed to a recent rigorous mathematical analysis carried out at this establishment. Calculations which consider a stationary collimator, as opposed to Anger's hypothetical moving one, and a continuous distribution of isotropically emitting gamma isotope at the subject plane, show the geometrical efficiency for such a collimator, with circular holes, to be as follows:

$$S = \frac{\pi d^2}{32\sqrt{3}\,(1 + w/d)^2 t^2} \cdot \left[\frac{1}{(1 + z/t)^2} + \frac{2.\sqrt{3}\,(\tfrac{1}{2} + z/t)}{\pi (z/t)^2 (1 + z/t)}\right]$$

d = Hole diameter

t/

t = collimator thickness (and hole length)

w = septal thickness

and z = distance from subject to collimator outer face.

This relationship, although rather complex, is essentially inverse square in subject to collimator distance for a given collimator, as would intuitively be expected. Certainly for small variations in "z", "S" is approximately constant. However, this is not true in the general case.

I am also somewhat at a loss as to Anger's use of the term "depth of focus" as applied to parallel-channel collimators, since such collimators focus at infinity. I would submit that, in this case, the "depth response" of a collimator can only be measured in terms of the variation of sensitivity with subject to collimator distance.

Yours faithfully,

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