

**ESTIMATION OF FUNCTIONAL SIZE OF THE SPLEEN**

The study by Samuels and Stewart published in *The Journal of Nuclear Medicine* (1) is to be commended for turning our attention to the estimation of splenic size in children with sickle-cell disease. There are a few notes of caution that should be specifically stated in order to arrive at a relatively consistent approach to the problem.

1. Scans with  $^{99m}\text{Tc}$ -sulfur colloid define only the *functional* size of the spleen. We have shown that many small children with sickle-cell disease have anatomically present spleens (as determined roentgenographically and by palpation) but do not possess the ability to accumulate the radiocolloid (2). This "functional asplenia" complicates radioisotopic estimates of spleen size.

2. The spleen is relatively lateral and posterior. In an effort to estimate splenic weight, we had proposed an approach, based on literature data, using the lateral spleen scan of adults (3). Samuels and Stewart employed an equation we had suggested for anterior *roentgenograms* and applied it to the radioisotopic splenic scans. This is a misapplication of the approach, but we are pleased to see that some form of reasonable splenic weight estimate arose. Certainly efforts should be made to utilize the lateral and posterior scans (Samuels and Stewart themselves prepared an equation based on posterior views).

**THE AUTHOR'S REPLY**

I agree that  $^{99m}\text{Tc}$ -sulfur colloid shows only functional size. The original article states: ". . . the scan image represents the functional size of the spleen with respect to reticuloendothelial activity."

As to "misuse" of a roentgenographic formula, I would defend the similarity of transmission roentgenogram to an emission scan in more detail except that my own much simpler formula seems to give an equally valid estimate from posterior spleen scans. Without Spencer's fractional exponential, you can make an instant mental calculation with my formula. I invite others to try it and compare.

I agree with Spencer that counting rates over liver and spleen should be documented for each view. This is a routine in our laboratory and provides a quick index of relative R-E activity of the spleen and liver in a variety of pathological conditions.

3. We would suggest that the liver and spleen counting rates (per unit area) be recorded on each view of  $^{99m}\text{Tc}$ -sulfur colloid scans. This is emerging as a useful and simple device for defining functional asplenia in the patient population. Evidence is accumulating that a small number of disorders other than sickle-cell disease are accompanied by splenic dysfunction (and these patients should have their blood smears carefully checked for Howell-Jolly bodies and other abnormalities). Similarly, patients with this type of abnormal blood picture (4) should likely have a splenic scan. (This work was supported by CA 06519 from the USPHS and T-492 from the American Cancer Society.)

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**REFERENCES**

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3. SPENCER, R. P.: Relationship of surface area on roentgenograms and radioisotopic scans to organ volumes. *J. Nucl. Med.* 8:785, 1967.
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If adjustment is made for the different amounts of R-E tissue within the focal range of the collimator over each organ, a reasonable estimate of spleen function is possible, although in cases to be documented in detail I still perform conventional splenic sequestration tests with  $^{51}\text{Cr}$ -RBCs.

I think that the results of  $^{99m}\text{Tc}$ -sulfur colloid spleen-liver uptake compare with  $^{51}\text{Cr}$ -RBC spleen uptake very well if the colloid is standardized. Small differences in colloid preparation or use of other colloids can alter organ affinity very substantially and make comparison of spleen-liver colloid uptake impossible.

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