

**SPLENIC DISPLACEMENT AND CHANGES OF SPLENIC SIZE**

In the March issue of the *Journal of Nuclear Medicine* Spencer and his colleagues discussed changes of spleen size after the injection of epinephrine (1) and also described a case in which a change in the position of the spleen could be attributed to dilation of the stomach (2).

May I suggest that the size and shape of the spleen on a scintiscan (or radiograph) depend on its position in the body and the scanning plane. Image formation in both procedures is due to the projection of a "shadow" of a (geometric) solid onto a plane surface. The size and shape of this projection will always depend—with a single exception—on the angle of incidence of the projecting rays and also on its distance from the source of illumination and the plane of projection. The exception is the projection of a sphere by *parallel* rays. If diverging rays are used, no exception is valid, and at least the size of the projection of all solids is dependent on the relative distance of the solid from the source and the plane of projection.

In scintigrams, where the organ itself is the source of the "illuminating" rays, its position and depth in the body will affect the area projected (mainly because of attenuation). It follows, therefore, that the organ's dimensions on a scintigram will depend on the above-mentioned factors. Unfortunately, there is no simple relationship between the depth of an organ and its projected area. My experience is that the "height" of the spleen in the posterior and lateral views may vary by as much as two centimeters. Therefore, any rotation of the spleen about this axis may change the apparent "height" without necessarily implying a change in the size of the spleen.

This explains the original observation by Andrén (3) who reported an "increase in spleen size" by as much as 200% after the ingestion of 300–1,000 ml

of water. He concluded that this was due to uptake of water by the spleen and hoped, in a later paper (4) quoted by Spencer, that it would be a useful sign in the differential diagnosis of certain liver diseases. Parker, et al (5), however, have shown that the change in spleen size after a water load is apparent and should be attributed to a change in the position of the spleen caused by a full stomach. This also explains Andrén's observation that the "increase" in spleen size occurred almost immediately after the water was ingested, especially when the patient was supine, but disappeared also almost immediately when the patient stood up.

Obviously the spleen is, under certain circumstances, more mobile than might have been thought at first glance. This must be kept in mind before conclusions are drawn about changes in size of the spleen as judged by scanning procedures.

**BRUNO SCHOBER**

University of British Columbia  
and Lions Gate Hospital  
North Vancouver, British Columbia  
Canada

**REFERENCES**

1. SPENCER RP, LANGE RC, SCHWARTZ AD, et al: Radioisotopic studies of changes in splenic size in response to epinephrine and other stimuli. *J Nucl Med* 13: 211–214, 1972
2. LANDGARTEN S, SPENCER RP: Splenic displacement due to gastric dilation. *J Nucl Med* 13: 223, 1972
3. ANDRÉN L: Enlargement of spleen immediately after water load. *Acta Radiol* (Stockholm) 47: 371–373, 1957
4. ALMÉN T, ANDRÉN L: Variation in size of spleen induced by water load as diagnostic test of jaundice. *Acta Radiol* (Stockholm) 56: 119–123, 1961
5. PARKER JD, BENNETT LR: Effect of water ingestion on spleen size as determined by radioisotope scans. *Acta Radiol [Diagn]* (Stockholm) 11: 385–392, 1971

**AUTHOR'S REPLY**

Under a given set of circumstances, a scan or counting of an organ should be well-defined, except for respiratory and other motion. When the subject and detection device are not moved and a medication is administered intravenously, then immediate effects on the image can likely be attributed to the medication. If it turns out that epinephrine causes a major rotation of the spleen in some children (and not contraction), then this is important information

to have. The epinephrine effect in these cases is very real and reproducible and was also documented by palpation. The remainder of the discussion is interesting but not pertinent to the points under consideration.

**R. P. SPENCER**

Yale University School of Medicine  
New Haven, Connecticut