Rapid determination of oxidation state of unbound ^{99m}Tc and labeling yield in ^{99m}Tc labeled radiopharmaceuticals. *J Nucl Med* 17: 805–809, 1976

Prominent Motion of a Meckel's Diverticulum

Abdominal scintigraphy with sodium pertechnetate is a useful clinical screening test for the presence of a Meckel's diverticulum (*1*). In the usual procedure, the patient is imaged in the fasting state and serial images are obtained (*2,3*). On a positive scan, a Meckel's diverticulum usually appears as a stationary focus of activity that accumulates at the same rate as gastric activity. Occasionally this abnormal focus of activity moves during the imaging procedure (*3*). This communication describes the findings in a patient with a Meckel's diverticulum that showed prominent motion during imaging.

The patient was an 18-month-old male with a history of intestinal bleeding. After an 8-hr fast, 1 mCi Na^{99m}TcO$_4$ was given intravenously. Serial images of the abdomen were obtained with computer-assisted gamma camera systems. An acquisition time of 10 min was used for each of the first three images. When a changing pattern of activity became apparent, the imaging time was shortened to 5 min for two images and to 2 min for one image.

The serial images showed a single focus of abnormal activity in the abdomen, moving from the left lower quadrant to the extreme right lower quadrant during the imaging procedure (Fig. 1). This motion caused double exposures of the abnormal activity in three of six images obtained in 42 min. The patient did not move significantly during this period. The images were therefore interpreted as showing a Meckel's diverticulum with motion due to intestinal peristalsis. Subsequently surgical removal and pathologic examination confirmed the presence of a large ulcerated Meckel's diverticulum.

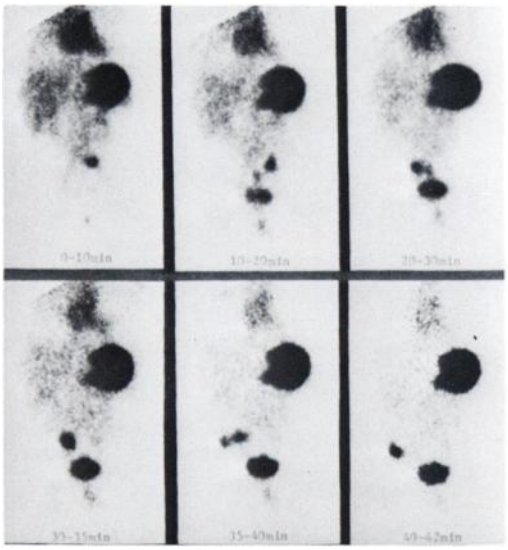

FIG. 1. Pertechnetate scintigrams in an 18-month-old male showing four discrete sites occupied by a Meckel's diverticulum that was subsequently confirmed at surgery. The images with two abnormal foci of activity resulted when the single abnormal focus in the diverticulum made a sudden transition from one site to another during the imaging period.

The interesting feature of this case was the prominent motion of the Meckel's diverticulum throughout the imaging procedure. Observation of the persistence scope during imaging helped to prevent confusion in the interpretation of the resulting images. As an image with a double exposure of the diverticulum activity was acquired, the first abnormal focus of activity suddenly stopped accumulating counts when the second abnormal focus appeared. These sudden transitions of the abnormal activity between four discrete sites in 42 min were thought to be most compatible with motion of a Meckel's diverticulum by intestinal peristalsis. In retrospect, shorter imaging times would have reduced the probability of double exposure of the Meckel's diverticulum without unduly reducing image quality.

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Rating of the Radiopharmaceuticals for Brain Imaging

In recent years, Haynie et al. (*1,2*) have compared the biologic behavior of a number of radiopharmaceuticals in an animal brain-tumor model, employing a rating system that they expounded in their first paper (*1*). Without undermining the importance of their well-planned, well-thought-out, and well-executed experiments, I wish to point out some of the shortcomings of this rating system. The authors are aware of some of the important shortcomings, such as the lack of tumor-to-bone ratios, which were therefore excluded from the rating system. My purpose is not to dwell on these, but to draw attention to those that are intrinsic in the rating system itself.

1. All of their measurements are quantitative, yet in their rating system, they have converted these quantitative observations into a qualitative rank order. As a result, one can only say, for example, that Agent A is better than B, but cannot specify how much better. It may be slightly better or it may be infinitely superior. In mathematical terms, an interval scale has been reduced to an ordinal scale (*3*) with the concomitant loss of the quantitativeness in the rating system.

2. Four of these qualitative parameters (grades for % administered dose/g, and tumor-to-brain, tumor-to-blood, and tumor-to-skin ratios) have been combined together with equal emphasis. Since, in two-dimensional scanning, one more or less sums the counts arising from different depths in an organ, more counts are contributed to a brain scan by the radioactivity present in the brain and blood than by the radioactivity present in the skin. Therefore, tumor-to-skin ratios should not be used with the same emphasis as the tumor-to-brain and tumor-to-blood ratios. Also, I am not sure whether the % administered dose/g belongs in this rating system at all. Since this parameter bears primarily on