Use of Pulmonary Segmental Reference Charts in Reporting Lung Scintigrams

TO THE EDITOR: We read with interest the report by Magnussen et al. (*1*). In using the PIOPED and other classification schemes to assist in the diagnosis of pulmonary embolism, we agree that a reference to a segmental anatomy resource is useful to enhance accuracy and reproducibility. In their article, Magnussen et al. developed a segmental reference chart for this purpose.

The charts they developed represent the individual segments in the various views as independent of each other and not overlapping. The charts apparently demonstrate where the segments meet on the surface of the lung. We note that when there is a perfusion defect, it may be anywhere within the segment, not just the part of the segment that is seen on the lung surface.

There is considerable overlap in the position of the segments when the projection anatomy rather than the surface anatomy is considered, and, in our opinion, the position of the volume of a segment (three-dimensional) cannot be estimated accurately from two-dimensional anatomy charts.

To address this problem, we developed a series of interactive drawings based on the projection anatomy of the individual segments of a standard lung model using CT. It has been published in the Radiological Society of North America's electronic journal (*2*) and may be viewed and used over the Internet. Using this system, the physician would select a defect, if present, on the scan to be analyzed. A presumptive determination of which segment (or part of a segment) it represents would then be made by looking at the drawings of projection images of all segments in the view in which the defect is best seen. By clicking the computer's mouse on that segment in the drawings, the position of that segment in all views normally obtained in a lung scan will appear. Then the pattern of the defect in the drawings would be compared with the pattern of the defect in the scan views. If the pattern of the defect in all views, as seen in the drawings, does not match the defect in the views on the scan being analyzed, then the physician would start again and select another segment until the best match is found. The best match would then be considered the segment in which the defect exists.

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Is There a Relationship Between ^{99m}Tc-Sestamibi Uptake and Oxyphil Cell Content in Hyperparathyroidism?

TO THE EDITOR: In the August 1998 issue of the *Journal* Carpentier et al. (*1*) tried to substantiate their earlier hypothesis of a relationship between ^{99m}Tc-sestamibi (MIBI) retention and parathyroid oxyphil cell count in parathyroid adenoma. Based on their retrospective analysis of 14 patients, they concluded that the oxyphil cell content is the only biological variable that is associated with late tracer retention, whereas the initial tracer uptake was correlated to the volume of the lesion and serum calcium levels. They further reported that the results of only one study conflicted with their results, but they did not regard it as a contradiction to their results because it was not based on a dual-phase imaging protocol.

We cannot agree with the authors, because we have already discussed this topic on the basis of preliminary results in a letter in 1995 (*2*) and in the publication of the final results of dual-phase imaging in 56 patients with primary hyperparathyroidism in 1997 (*3*). In contrast to the observation of Carpentier et al., we could not demonstrate a correlation between the oxyphil cell count and the regional sensitivity of dual-phase ^{99m}Tc-MIBI scintigraphy in a multivariate analysis. Furthermore, Ishibashi et al. (*4*) have shown that a prolonged retention of tetrofosmin was independent of the number of oxyphil cells in primary and secondary hyperparathyroidism. The most recent article by Ishibashi et al. (*5*), admittedly not accessible when Carpentier et al. submitted their manuscript, repeated this observation with MIBI.

Thus, based on the published literature, Carpentier et al. claim that the oxyphil cell content is the only biologic parameter variable that is associated with prolonged tracer retention has to be taken with some caution. The importance of the oxyphil cell content for dual-phase MIBI parathyroid scintigraphy may also be challenged on the basis of the clinical observation that the method is only of limited value in secondary and tertiary hyperparathyroidism, despite the increased concentration and secretory importance (*6*) of oxyphil cells in hyperparathyroidism due to chronic renal failure. One possible explanation of the conflicting results in the literature might be our observation of a correlation between serum calcium, parathyroid hormone levels and oxyphil cell content (*3*). This is in accordance with the findings of Carpentier et al. of a correlation between serum calcium levels and early tracer uptake, and, therefore, serum calcium levels may play the key role in modifying MIBI kinetics by influencing the membrane potential.

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