radiation and the target organ, on the energy and type of particle emitted and on the size, shape and composition of the target and source organ. All of these parameters affect the value of S and consequently the absorbed dose. In the case of irradiation of the bladder (wall), changing the volume of the bladder contents, results in a change in the absorbed dose received from radioactivity within the bladder content. For bladder wall dose estimation, it is necessary to estimate the change in bladder content volume over time since the S factors also change.

Tabulations of the S factors, as well as specific absorbed fractions are available (e.g., 2–5). Harvey et al. (*1*) utilized those in ICRP-23 (*3*) for photons and ICRP-30 (*6*) for the beta particles. Unfortunately, ICRP-23 lists specific absorbed fractions for the bladder wall only for a fixed bladder content volume of 200 ml. Harvey et al. used the same 200-ml volume for estimating the beta dose by means of the ICRP-30 GI-tract model.

Those who originally performed the specific absorbed fraction calculations listed in ICRP-23 emphasized (*2,4,5*) that the dose to the bladder wall, for a given cumulated activity in the bladder can vary by as much as a factor of ten depending upon assumptions about initial bladder volume, urinary output, frequency of micturition, etc. Assuming a fixed bladder content of 200 ml is often misleading. Harvey et al. (*1*) assume that one-half of the injected 6-[^{18}F]fluoro-L-dopa accumulates initially in the 200-ml bladder contents. A significantly higher absorbed dose from the betas and the photons would result with smaller bladder contents. Furthermore, sampling every 2-4 hr does not permit accurate estimation of the time of arrival of the activity into the bladder. Chen (*7*) has described a situation in which early micturition could contribute to increasing the total absorbed dose if radioactivity continued to be excreted by the kidneys after micturition.

How can the required data be obtained to accurately assess bladder dose? Among the methods are: (a) the use of a well-collimated external probe over the bladder, (b) PET measurements of the bladder, (c) bladder catheterization, or (d) animal studies. Such methods can yield valid time-activity information. From these data, specific absorbed fractions for the gammas can then be calculated, for example, by using the empirical formulas of Snyder (*5*).

A more detailed knowledge of the arrival of the activity in the bladder would also allow for an optimal choice of the micturition after tracer injection. In addition, as noted by Harvey et al. (*1*), the bladder dose could be minimized further by insuring the patient is well hydrated (and the bladder contains urine) prior to the administration of the radiopharmaceutical.

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Single Moderate-Sized Segmental V/Q Mismatch: Moderate Probability for Pulmonary Embolus

TO THE EDITOR: In a previous publication (*1*) we discussed the impact that different perfusion and ventilation perfusion patterns have in estimating the probability of pulmonary embolism. However, our data on single segmental defects were derived from only five patients: one with pulmonary embolism and four without. Since then, Cheely et al. found that one of three patients with a single segmental V/Q mismatch had pulmonary embolism (*2*). In looking at moderate-sized defects (e.g., an entire segment or 25–75% of a lung segment) associated with normal ventilation, Biello et al. showed that one of three patients with this pattern had pulmonary embolism (*3*).

In order to expand the number of patients in this category, we have subsequently reviewed the scans of eight patients who had single segmental defects, negative chest radiographs, and pulmonary angiography. With these criteria it took 5 yr to collect the above patient data. The scans were all performed with technetium-99m macroaggregated albumin and with xenon-133 as the ventilatory agent. Of the eight patients, four (50%) had evidence of pulmonary embolism by pulmonary angiography.

Thus, we conclude that single defects can occur with pulmonary embolism but that other manifestations are more frequent. Moreover, once this type of pattern is found, the chance of pulmonary embolism is in an intermediate range.

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