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Reply

The letter of Turner et al. is most helpful in confirming our recently published data on failure of milk of magnesia and cascara to clear the bowel of gallium citrate adequately. Also, the Chicago group has found that castor oil given for 2 days improves subjective ratings of gallium imaging of the abdomen, and they therefore recommend this preparation. Here we have been less eager to use castor oil after recovering bowel mucosa from the excreta of two patients so prepared. The use by Turner et al. of a high-fiber diet is, however, not substantiated by the data presented in the letter.

The necessity for a 2-day bowel preparation raises the question whether these workers have found that, with castor oil, the scans can be read more accurately earlier than without the preparation. This time factor has discouraged the use of gallium in the search for intra-abdominal abscess, where prompt diagnosis is critical. For this reason we now use indium-labeled leukocytes exclusively for detection of intra-abdominal abscess, reserving gallium for the grading of intrathoracic diffuse inflammatory processes and the detection of mediastinal tumor. We look forward to the publication of the data by Turner et al. to determine whether it is possible to obtain accurate results with gallium scintigraphy of the abdomen at earlier times with castor oil than without.

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Re: Peak Rate of Left-Ventricular Ejection by a Gated Radionuclide Technique: Correlation with Contrast Angiography

We were interested to read the report by Bhargava et al. (1). Differentiation of ventricular volume curves is inherently difficult because of the random noise in the original data. Hammermeister et al. (2) showed that to determine rate of change of volume from contrast ventriculography curves they required curve-fitting techniques to smooth the original data. The authors were obviously aware of these problems for they used a digital low-pass filter to smooth their contrast angiography volume-time curves and then applied a polynomial fit to the smoothed data. Their report suggests, however, that they did not adopt any curve-fitting procedure for the data derived from radionuclide ventriculography. Perhaps they felt that with only eight or nine frames (and therefore data points) in systole, curve-fitting was difficult; but then so too must be interpretation of rates of change of volume. We have previously reported (3) on the problems of deriving rate of volume change from such curves and have shown that dv/dt is influenced by the cutoff chosen for the low-pass filter. The method used by Bhargava et al. to assess reproducibility will tend to give false confidence, as they are simply assessing the ability of their automatic computer algorithm (which was used to locate the edge of the left ventricle) to analyze the same data, although their intra- and interobserver variations of $\pm 12\%$ and $\pm 13\%$, respectively, seem surprisingly high. It would have been pertinent to assess re-

producibility by analyzing two consecutive rest curves from the same patient. Since events early in systole may be more characteristic of ventricular performance than is the total volume ejected, data derived from ventricular volume curves could be of great clinical importance, but only if repeatable and accurate.

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Reply

We thank Drs. Muir and Hannan for their interest in our paper (1). We agree that for a more precise measurement of dv/dt and timing of events during systole, it might be advantageous to use a low-pass filter. We have pointed out in our paper (Methods section), that these data were acquired at rest and correspond to a sample rate of 25 to 33 Hz (frame time 30-40 msec). At this sample rate, the theoretical upper cutoff frequency is 12-16 Hz, and the actual cutoff is probably 6-8 Hz. This cutoff frequency is of the same order as that used for the cineangiographic analysis. Had this analysis been applied to exercise data or to data at higher heart rates, the sample rate would have increased considerably (RR-interval/28) and low-pass filtering would have been more desirable.

We have reviewed Drs. Muir and Hannan's article (2). In their study, the framing time was 20 msec, corresponding to a sample rate of 50 Hz. Application of digital filters to their volume curves was therefore reasonable. Finally, in our study the sample rate is not constant for all heart rates; consequently a different digital filter would have been required for each study to have yielded the same cutoff frequency. Therefore, we did not use low-pass filters. We agree that it might have been optimal to have assessed reproducibility by analyzing two consecutive rest studies from the same patient, but owing to lack of such data, we were unable to do so.

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