

Anesthesiology
73:795, 1990

In Reply.—We appreciate Dr. Gorback's concern regarding the limitations of regression analysis to evaluate the data in this study.¹ However, in his letter he overlooks several points. First, although there was a statistically significant relationship between left ventricular end-diastolic volume index (LVEDVI) and ED_a as measured by transesophageal echocardiography (TEE), as shown in figure 1, we emphasize in the results and in the discussion that there were discordant changes in the three of the eight patients studied, so that on balance the study showed in this group of patients a poor correlation between TEE and LVEDVI measured by scintigraphy. We emphasize this finding in the abstract, in the results, and in the conclusion, and we agree that this method (TEE) should not be used in this patient population as a reliable method for assessing LVEDVI.

The second point that specifically addresses Dr. Gorback's concern relates to the predictive value of TEE for estimating left-ventricular ejection fraction (EF) in this population. We agree that association does not imply accuracy, but we specifically made the measurement repeatedly in several patients and we found no discordant changes in 21 comparisons between EF_a by TEE and scintigraphy, whereas there were discordant changes in assessing LVEDVI with TEE, as mentioned above. The TEE method, therefore, allows an assessment of the relative change in left-ventricular EF in response to changes in the patient's clinical condition (*e.g.*, hypovolemia or ischemia) and in response to therapeutic interventions (*e.g.*, vasodilator or inotropic therapy).

It may be that the data in figure 2 would be better described by second-order regression, as suggested by Dr. Gorback. Alternatively, the left ventricle of patients with a normal EF might function differently than the left ventricle of patients with a reduced EF. Under these circumstances, the data might be analyzed separately. For example, note that there is a good correlation between left ventricular EF by

scintigraphy and left ventricular EF_a by TEE for patients with an ejection fraction ≤ 0.55 . In fact, using the 22 comparisons in figure 2 with an EF_a ≤ 0.55 , the *r* value is 0.91 and *P* ≤ 0.0001 . It is noteworthy that, for clinical purposes, the measurement is probably most useful in patients with an ejection fraction ≤ 0.55 .

In summary, our conclusions in the final paragraph of our article¹ emphasize that TEE could not be used to determine LV volume consistently in patients immediately after coronary artery bypass grafting. Furthermore, we state in the final paragraph that TEE assessed reliably only *directional* changes in EF which might be useful clinically.

JOHN H. URBANOWICZ, M.D.
NEAL H. COHEN, M.D.
MICHAEL A. MATTHAY, M.D.
Department of Anesthesia
University of California, San Francisco
521 Parnassus Avenue
San Francisco, California 94143-0649

REFERENCE

1. Urbanowicz JH, Shaaban MJ, Cohen NH, Cahalan MK, Botvinick EH, Chatterjee K, Schiller NB, Dae MW, Matthay MA: Comparison of transesophageal echocardiographic and scintigraphic estimates of left ventricular end-diastolic volume index and ejection fraction in patients following coronary artery bypass grafting. *ANESTHESIOLOGY* 72:607-612, 1990

(Accepted for publication July 24, 1990.)