

with this point, the primary focus of our report was the incremental benefit of TEE in the evaluation of patients with *S. aureus* bacteremia rather than the management of patients with endocarditis.

In conclusion, we respect the points raised by Guzzo and Simpson; however, we feel that the use of a validated diagnostic reference standard, the probable underestimation of endocarditis among excluded patients and the clinically logical conclusions in our study emphasize the need to consider TEE early in the evaluation of patients with *S. aureus* bacteremia.

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## Propagation Velocity of Left Ventricular Filling Flow Measured by Color M-Mode Doppler Echocardiography

I read with great interest the report by Duval-Moulin et al. (1) regarding to the application of color M-mode Doppler to assessing left ventricular diastolic function. The report indicated that left ventricular diastolic dysfunction during coronary angioplasty could be assessed by the propagation velocity of left ventricular early filling flow using color M-mode Doppler technique and that this index showed good correlation with an invasive variable, tau. Their method was very similar to, but not the same as, our method, which was reported in the *Journal* in 1996 (2). In their discussion, they introduced our method as follows: "Takatsuji et al. used a derived technique by measuring the interval between the maximal rate of increase of action potential upstroke ( $V_{max}$ ) at the mitral level and 70%  $V_{max}$  in the apical region." There are several inappropriate notations in this sentence. In our report, the propagation velocity was defined as follows:

filling flow signals. First, we located the point of maximal velocity around the mitral orifice in early diastole, which was obtained at the center of the minimized aliasing area. Next, we changed the first aliasing limit to 70% of the maximal velocity and located the point nearest to the apex on the aliasing boundary (which is usually obtained in the mid-left ventricle). The distance/time ratio, that is, the upward slope of the line connecting these two points, was measured and defined as the rate of propagation of peak early filling flow velocity.

First, the authors used the terms "action potential" and " $V_{max}$ ," which were not used in our report, and this terminology might mislead the readers and prevent appropriate understanding of our method. Second, we did not measure the "interval" but the "distance/time ratio"; and third, the second measurement point is not "in the apical region" but "in the mid-left ventricle." We have some evidence that the propagation velocity measured by our method is more accurate than that measured at the wavefront of filling flow, which was used in their report. Therefore, if they carefully traced our protocol, I believe that they would obtain better correlation between propagation velocity and tau. Nevertheless, we appreciate the authors' results because their study enhances the usefulness of color M-mode Doppler for evaluating diastolic function in many clinical settings.

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### Reply

We have taken into account the different points emphasized by Kitabatake about the report by Takatsuji et al. (1). As Kitabatake described, color M-mode Doppler allows remarkably effective observation of diastolic flow as a function of time and of space.

The color M-mode Doppler method has been developed by several groups, including Takatsuji et al. (1), Stugaard et al. (2) and ourselves (3,4). The technique shows correlation of the propagation of early diastolic flows in the left ventricle with hemodynamic data of relaxation, especially the index tau.

With regard to the report of Takatsuji et al. (1) we were naturally interested in their methods and results, which analyze the rate of propagation of peak early filling flow. However, their study was published in the *Journal* during the review process of our study. Consequently, we added this new information in the revised version of our manuscript, which may explain why we did not discuss all the aspects of the interesting report of Takatsuji et al.

Nevertheless, we would like to point out that in contrast to Takatsuji et al. (1) and Stugaard et al. (2), we preferred to analyze the flow front wave at the beginning of filling rather than the later events of the propagation of peak early filling flow to better evaluate the relaxation process.

By changing the first aliasing limit sequentially at intervals of 2 cm/s with the use of the baseline shift, a flow velocity higher than the aliasing velocity could be displayed in blue within red