

diameter rather than a greater distention of the artery because of the collateral flow. 6) The validation of the quantitative technique was performed with phantoms 2 to 3.5 mm in size, whereas the measurement of interest,—that is, the diameter of the recipient vessel—was significantly smaller. 7) Although appropriate care was taken to ensure an end-diastolic measurement, the authors report a significant decrease in the heart rate between the two studies, suggesting that the diastolic filling time was significantly longer at the time of the second measurement and, therefore, a greater filling of the recipient vessel could have occurred.

The results of this small, elegant study are critically dependent on the control of technical factors, some of which I have mentioned. Without this knowledge, the results of this study need to be interpreted with caution and require further validation.

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Reference

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Reply

The main aim of our study was not to validate the method of quantitative angiography combined with the cardiac image analysis system (Cardio 500, Kontron Instruments) (1) but to evaluate whether there exists additional collateral growth after the acute myocardial infarction. The further development of collateral vessels after the acute infarction was substantiated not only by the measurement of coronary lumen diameters, but also by the improvement in regional myocardial wall motion in the infarct areas (2).

We consider Langer's criticisms regarding technical and methodologic aspects of our study to be important. An observer of coronary cineangiograms was unaware of the sequence of paired angiograms of each patient in our study. Because coronary angiography was performed with hand injections of contrast medium, the amount of contrast medium appearing in the recipient artery may

have been dependent on the power and rate of injection. For this reason, the use of a power injector appears to be more desirable. However, in our study, we measured donor and recipient arteries simultaneously in the same end-diastolic frame. Because each artery served as its own control, the difference in the power and rate of injection may have been minimized. We selected the end-diastolic frame where the amount of contrast medium in the recipient artery was assumed to be largest. There was no accumulation of contrast medium in myocardial tissues after each contrast injection. Special care was taken to make paired measurements at the same site by using anatomic references such as side branches. Okumura et al. (3) have validated the accuracy and precision of the same angiographic image analysis system with the use of phantom models of coronary arteries with diameters of 0.5, 0.8 and 1 mm. Finally, although the diastolic filling time may be crucial, the diastolic aortic pressure appears to be more important as a determinant of the diameter of donor and recipient arteries, which was quite comparable between the two stages of infarction. We expect that Langer will improve this area of investigation by taking account of several important points raised by himself.

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