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On Measuring "Agreement" and Not "Correlation"

Kawahara et al. (1) use correlation coefficients and regression analysis to compare three echocardiographic methods of estimating mitral valve area. This is inappropriate. Data that are in poor agreement may produce high correlations; a high correlation is also likely if the range of the true quantity in a sample is wide (2). The appropriate statistical approach would be to calculate the "agreement" between the estimates of mitral valve area by the various methods (2). A reanalysis of the tabular data provided by the authors is presented in Table 1. This reanalysis does not alter the authors' principal conclusion that Doppler color flow imaging provides an accurate estimate of mitral valve area. However, it provides more precise information on the extent of agreement between the various methods and, indeed, is the correct method of analysis.

Table 1. Agreement Between Methods of Estimating Mitral Valve Area (MVA)

Method of Estimating MVA	Limits of Agreement With Catheterization MVA (cm^2)
1. Two-dimensional echocardiography	−0.43 to +0.37
2. Doppler pressure half-time	−0.38 to +0.53
3. Doppler color flow imaging	−0.34 to +0.26

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Reply

In our paper we emphasized our view that the color Doppler imaging technique may be of use in measuring the stenotic mitral valve area even in patients in whom this area cannot be measured by such techniques as pressure half-time or two-dimensional echocardiography.

As Vasan points out, in some cases data with poor agreement may yield high correlations, thus resulting in misleading data. Therefore, the level of agreement must be considered. In our study, agreement of the three methods with the catheter method were relatively good, as indicated by the SEE in each figure and confirmed by Vasan's reevaluation. Thus, under these conditions, correlation coefficients and regression analysis seem to be enough to determine the accuracy of three methods. Of course, calculation of the "agreement" may provide more precise information on the most accurate method among them, although it does not alter the primary conclusions of our paper.

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Balloon Angioplasty of Native Aortic Coarctation

The well written paper by Minich et al. (1) raises some important issues. In addition, a problem in the presentation of residual coarctation gradients after balloon angioplasty should be pointed out. In the abstract and in the text, under Results, the authors indicate that the reported gradients (27 ± 2 mm Hg, mean ± SEM) are immediate postangioplasty values, whereas in Table 1, they state that the gradients were obtained during postangioplasty follow-up before surgery. Thus, it is not clear what these values represent, but I will assume in the comments to follow that these are gradients detected immediately after balloon angioplasty.

Choice of balloon size. The size of the balloon used for angioplasty by the investigators appears inadequate; the balloon/isthmus ratio was 0.98 ± 0.05. Because the isthmus is the narrowest segment of the aorta, the balloons used by Minich et al. are small. The balloon should be two or more times the size of the coarcted aortic segment but no larger than the descending aorta at the level of the diaphragm (2–5). We initially use a balloon that is midway between the size of the isthmus and the size of the descending aorta at the level of the diaphragm. If there is not an adequate relief of pressure gradient and angiographic improvement, we repeat the procedure with a larger balloon. The final size of the balloon is limited to the diameter of the aorta at the level of the diaphragm. Table 1 and

Table 1. Effect of Balloon Size on the Immediate Response of the Pressure Gradient Across the Coarctation After Balloon Angioplasty

Case No.	Age (yr)/ Gender	Status	AAo (mm Hg)	DAo (mm Hg)	Gradient (mm Hg)
1	5/F	Pre	118	87	31
		10 mm	111	87	24
		12 mm	109	99	10
2	10/F	Pre	137	79	58
		10 mm	125	90	35
		12 mm	130	113	17
3	2/F	Pre	133	103	30
		8 mm	96	76	20
		10 mm	90	76	14
4	1.5/M	Pre	103	72	31
		8 mm	106	71	35
		10 mm	96	79	17

AAo = ascending aorta; DAo = descending aorta; F = female; M = male; Pre = before balloon angioplasty.