



MITRAL ANNULAR AREA: ACCURACY OF SINGLE AND BIPLANE LINEAR MEASUREMENTS COMPARED TO 3D PLANIMETRY

ACC Poster Contributions

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Background: The ASE guidelines for quantification of mitral regurgitant volume advocate using a single 4-chamber (4Ch) mitral annulus (MA) diameter in a circular formula to estimate MA area. However the validity of this measurement compared to 3D planimetry of the area (MAA) has not been evaluated.

Methods: 36 patients with 3D transesophageal echocardiographic volume sets of the mitral valve were used to image the MA and measure the equivalent of: 4Ch, commissural (Com), 2Ch, and 3Ch diameters. The 4Ch and 2Ch views as well as the 3Ch and Com views were in orthogonal (90 degrees) planes. The MAA was compared to estimates of MA using single diameters in a circular area formula as well as MA using 2 diameters in an elliptical formula.

Results: The table below shows the MA calculations. Using a single 4Ch diameter in a circular formula, or using the 4Ch/2Ch or 3Ch/Com diameters in an elliptical formula were not significantly different from the MAA. All other calculated MA were significantly different from MAA. On linear regression analysis, MAA correlated strongly with 4Ch circular MA ($r = 0.93$, $p < 0.001$), 4Ch/2Ch elliptical MA ($r = 0.98$, $p < 0.001$), and 3Ch/Com elliptical MA ($r = 0.95$, $p < 0.001$).

Conclusions: The most accurate estimate of MAA is obtained by using the 4Ch and 2Ch diameters in an elliptical formula. However, if an on-axis 2Ch view is not obtained, then the calculation becomes less accurate. Good agreement is also achieved with apical 4Ch diameters using a circular formula which supports the ASE guideline.

Mitral Annular Area Calculations (n=36)

Mitral Annular Area	Mean± SD	P value vs. MA area 3D planimetry
MA area 3D planimetry	7.8± 2.6	
Area 4Ch (circular)	7.6 ± 2.4	0.32
Area 2Ch (circular)	8.2 ± 3.3	0.049
Area 3Ch (circular)	6.5 ± 2.1	< 0.001
Area Com (circular)	9.1 ± 3.6	< 0.001
Area 4Ch/2Ch (ellipse)	7.9 ± 2.7	0.41
Area 3Ch/Com (ellipse)	7.6 ± 2.7	0.24
Area 4Ch/com (ellipse)	8.3 ± 2.8	0.001
Area 4Ch/3Ch (ellipse)	7.0 ± 2.2	< 0.001