Measurement of Parasternal Long-axis and Commissural Mitral Annulus Diameters Improves the Accuracy of Mitral Annular Cross-sectional Area Calculation

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Abstract

Purpose: Calculation of mitral annular cross-sectional area (CSA_{MV}) using the diameters from the apical long-axis and commissural plane (LAX/CC) method could be more accurate than the calculated area obtained by the annular diameters in the conventional apical four- and two-chamber view (4CV/2CV) method. The purpose of the study is to clarify which approach gives better accuracy: to use the 4CV/2CV method from the apical view or to use the LAX/CC method from the apical view or the parasternal view.

Subjects and Methods: Thirty patients without valvular heart diseases were enrolled in this study (22 males, 8 females, 48.7±18.6 years old). CSA_{MV} was measured by three methods as follows: using the conventional 4CV/2CV method from the apical view, and using the LAX/CC method from the apical view and the parasternal view. Left ventricular inflow volume (Q_{LVIT}) was calculated using CSA_{MV} obtained by each method. LV outflow volume (Q_{LVOT}) was measured by the Doppler method. Correlations and differences between Q_{LVOT} and Q_{LVIT} were compared among the three methods.

Results and Discussion: Compared with the 4CV/2CV method, Q_{LVIT} values by the LAX/CC method from the two views were well correlated with Q_{LVOT} (4CV/2CV method: $r=0.745$, $p<0.01$ LAX/CC method from apical view: $r=0.799$, $p<0.01$ LAX/CC method from parasternal view: $r=0.925$, $p<0.01$). Further analysis with Bland–Altman plots revealed that the Q_{LVIT} obtained by the LAX/CC method from the parasternal view exhibited the closest agreement with Q_{LVOT}.

Conclusions: CSA_{MV} obtained by the LAX/CC method for both apical and parasternal views is more accurate than that obtained by the conventional 4CV/2CV method. Moreover, the LAX/CC measurement from the parasternal view is better than from the apical view.

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