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Multi-parametric echocardiographic assessment for preoperative decision making in surgical treatment of atrioventricular septal defect.

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Introduction. Surgical management of unbalanced atrioventricular septal defect (AVSD) remains challenging because of a high mortality rate and difficulties in decision making between biventricular repair (BVR) and univentricular palliation (UVP) in borderline cases. In this study we aimed to define echocardiographic criteria for imbalance and prove their predictability for mortality and reoperation rate.

Methods. From 1986 to 2016 664 patients diagnosed with AVSD were identified in our institution. 522 patients received AVSD repair, 2.5 % of these patients had unbalanced AVSD but were suitable for biventricular strategy. Of 253 patients pre- and postoperative echocardiographic data were available for retrospective analysis. For echocardiographic assessment modified atrioventricular valve index (mAVVI), ventricular cavity ratio (VCR), left ventricular inflow index (LVII) and right ventricle/ left ventricle inflow angle were measured. Left atrioventricular valve reduction index (LAVRI) was calculated to estimate left atrioventricular valve area after cleft closure. Correlation was proved between echocardiographic indices, surgical strategy, postoperative course, survival and reoperation rate.

Results. mAVVI was the only index to distinguish between balanced and unbalanced AVSD and predict surgical strategy (<0.19: UVP, >0.4:BVR; Jegatheeswaren et al.). Borderline cases (n=13) received biventricular repair and had no higher mortality or reoperation rate. Inflow angle positively correlated with ventilation time (p=0.01) and predicted early postoperative course. LAVRI < 0.5, moderate mitral valve regurgitation and a mean gradient > 3 mmHg at discharge were associated with reoperation.

Conclusion. No echo index correlated with mortality. mAVVI seemed usable for preoperative decisions concerning interventricular balance. Correlation of right ventricle/left ventricle inflow angle with ventilation time may indicate the importance of ventricular septal defect size for postoperative course. LAVRI, residual mitral valve regurgitation or stenosis strongly correlated with reoperation rate. A multi-parametric echocardiographic assessment using indices for ventricular and atrioventricular valve size can facilitate decision making in borderline cases of unbalanced AVSD and surgical management of the atrioventricular valve.