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USEFULNESS OF INTRAOPERATIVE TRANSESOPHAGEAL ECHOCARDIOGRAPHY IN EVALUATING CORRECTION FOR TETRALOGY OF FALLOT

Kurokawa S[1], Honma T[1], Mukai S[2], Nagawawa C[2], Morino R[2], Iwade M[2], Takada K[2], Sugino Y[2], Nomura M[2]
Department of Anesthesiology, Niigata University Faculty of Medicine, Niigata City, Japan[1] and Department of Anesthesiology, Tokyo Women's Medical University, Tokyo, Japan[2]

Introduction: There is limited information available concerning the accuracy of intraoperative diagnosis of transesophageal echocardiography (TEE) in predicting the extent of residual abnormalities and assessment of cardiac function after surgical repair of Tetralogy of Fallot (TOF) 1). The aim of this study is to evaluate intraoperative TEE diagnosis capability, especially focused on detection of VSD leakage, residual pulmonary stenosis (PS) and RV dysfunction.

Methods: We investigated differences between TEE findings with biplane probe and both results of intraoperative direct manometry and postoperative transthoracic echocardiography (TTE) in a total of 19 consecutive pediatric patients who underwent repair of TOF. Both prebypass and postrecovery echocardiographic examinations included measurements of the right ventricle (RV)-main pulmonary artery (PA) peak instantaneous pressure gradients (PG), the degree of pulmonary valvular insufficiency, and color Doppler interrogation of the ventricular septum for residual defects.

The studied patients ranged from 5.6 to 11.8kg (10.5±3.1kg) in weight and 8 to 63 months (28.0±26.3 months) in age. Repair preserving pulmonic valve was performed in 9 cases and transannular patch in 10 cases.0TEE showed minor VSD residual shunt in 3 cases (15.8%), which were also detected by TTE examination after the operation. Mosaic appearance with color Doppler imaging was seen in RV outflow truct to PA in 13 cases (68.4%) after weaning from CPB. On the other hand, the PG derived from intraoperative TEE did not correlate well with RV pressure (RVp) (r=0.19), ratio of RVp to aortic pressure (RVp/AoP) (r=0.13) by intraoperative direct manometry. Postoperative PG by TTE (r=0.51) tended to correlate with TEE PG, however no statistical significance was observed in this setting (p=0.08). Three patients underwent revisions for residual PS based on RVp/AoP more than 0.8, and TEE could indicate precise location of PS in these cases. RV dysfunction was detected in 6 cases (31.6%) after CPB, who had significantly lower RVEDV (77.5±13.6% of normal, p=0.01), RVEF (51.0±7.2%, p=0.02) and LVEDV (87.8±16.5% of normal, p=0.03) preoperatively compared with remaining 13 cases with normal RV function. In one case, severe wall motion abnormality in TEE was observed after the procedure due to right coronary artery obstruction and therefore re-procedure of RV outflow truct reconstruction was performed. There were no serious complication, hemodynamic instability and airway obstruction with TEE monitoring itself for all cases.

Discussion and Conclusion: The usefulness of TEE has been documented in patients with structural cardiac anomalies, allowing for more effective application of these technologies. Although RV pressure measurement with TEE was not so accurate in this study, intraoperative TEE was useful to assess overall diagnosis of the surgical procedure for TOF.

References:

1) Joyce JJ et al; Reliability of intraoperative transesophageal echocardiography during Tetralogy of Fallot repair. Echocardiography 2000;17