

TITLE: INTRAOPERATIVE ECHOCARDIOGRAPHY
IN CHILDREN WITH CONGENITAL
CARDIAC SHUNT LESIONS: COMPARISON
OF TRANSESOPHAGEAL AND
EPICARDIAL ECHOCARDIOGRAPHY

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To determine the accuracy and limitations of intraoperative transesophageal echocardiography (TEE) in analyzing shunt lesions, 50 children ranging from 3.0 to 45 kg and 4 days to 16 years old underwent TEE which included 2-D, color and pulsed Doppler echocardiography. A pediatric uniplane probe (6.9 mm Aloka/Corometrics) was used in those patients ≤ 20 kg (n=36) and a biplane probe in those patients >20 kg (n=14). Shunt lesions included anomalous pulmonary veins (n=4), secundum ASD (n=6), perimembranous VSD (n=7), muscular VSD (n=1), doubly-committed subarterial (supracristal) VSD (n=7), tetralogy of Fallot (n=12), AV canal (n=6), truncus arteriosus (n=2), and univentricular hearts (n=2).

Preby TEE results were compared to preoperative precordial (PPE) (n=50) and prebypass intraoperative epicardial (n=49) echocardiograms in order to determine which echo modality most frequently provided a correct diagnosis. Discrepant diagnoses were settled using intraoperative direct visual inspection as the gold standard diagnostic modality. Postby TEE results were compared to postbypass intraoperative epicardial (n=46) and postoperative precordial echocardiograms (Ppe) (n=36), using the latter as the diagnostic gold standard modality.

Correct and complete echo results were obtained in 45/49 (92%) preby epicardial and 47/50 (94%) preby TEE

echocardiograms. In 2/50 (4%) the PPE diagnosis was erroneous and corrected by Preby ITEE. Both had an incorrect diagnosis of an atrioventricular septal defect but in fact had OSASD (Ostium Secundum)/PMVSD (Perimembranous) with persistent left superior vena cava connecting to a markedly dilated coronary sinus. The latter diagnosis was made by Preby ITEE and confirmed by intraoperative direct inspection. 3/50 (6%), all of whom had DCSAVSD, had incomplete ITEE due to inability to clearly image the right ventricular outflow tract.

Postby ITEE demonstrated the absence of hemodynamically significant residual shunts in 47/50 (94%), although trivial residual shunts located at patch margins were shown by color Doppler in 12/50 (24%). Post-operative clinical evaluation in 50/50 including echocardiograms in 31/50 (62%) confirmed the postby ITEE findings. Of those undergoing Ppe, correct echo results were obtained in 31/36 (86%) postby TEE and 31/34 (91%) postby epicardial echos. The 5 in whom the postby TEE diagnosis was incorrect included the 3 with "supracristal" VSD, 1 with a trivial residual VSD at postby TEE but none at postoperative echo, and 1 with a trivial residual VSD present at postoperative echo but none at postby TEE. Preby and postby epicardial echo were correct and complete in all 3 with "supracristal" VSD.

ITEE can be used to confirm or provide additional information to the preoperative diagnosis, to document an adequate surgical repair and to identify residual defects. We found that DCSAVSD were difficult to image well with uniplane TEE but could be well seen by epicardial echocardiography. The incidence rate of significant residual defects was very low in our series, however, with this preliminary experience we feel that ITEE can be used to accurately assess the morphologic and flow features of most intracardiac shunt lesions.

TITLE: INTRAOPERATIVE
ECHOCARDIOGRAPHY IN INFANTS &
CHILDREN WITH REGURGITANT
VALVAR LESIONS: COMPARISON OF
TEE AND EPICARDIAL
ECHOCARDIOGRAPHY

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To determine the accuracy and limitations of intraoperative transesophageal echocardiography (TEE) in analyzing valvar regurgitation (VR), 18 children ranging from 3.5 to 54 kg and 0.4 to 16 years old underwent prebypass TEE (Preby TEE) and postbypass TEE (Postby TEE) which included 2-D, color and pulsed Doppler. A miniaturized uniplane probe (6.9 mm Aloka/Corometrics) was used in those patients ≤ 20 kg and a biplane probe in those patients >20 kg. VR was graded as 0=none, +=mild, ++=moderate, +++=severe. Abbreviations: AR, MR, PR, TR=aortic, mitral, pulmonary and tricuspid regurgitation respectively. Lesions studied were congenital TR+MR (n=1), Ebstein's with TR (n=1), "supracristal" VSD with AR (n=2), tetralogy of Fallot with PR (n=5), AV canal with MR+TR (n=5), postoperative pulmonary atresia with PR (n=2), univentricular heart with TR (n=1), and subaortic stenosis with MR (n=1).

Preby TEE results were compared to preoperative precordial (PPE)(n=18) and prebypass intraoperative

epicardial (Preby EPI) (n=16) echocardiograms. Postby TEE results were compared to Postby EPI (n=15) and postoperative precordial echocardiograms (Ppe) (n=13). Preby TEE was performed in 18/18 (100%) with no complications.

Preby EPI was performed in 16/18 (89%). There was concordance between Preby TEE versus Preby EPI results in 16/16 (100%) and concordance between Preby EPI versus Ppe results in 18/18 (100%). Postby TEE was done in 18/18 with diagnostic quality studies in 17/18 (94%). 1/18 (6%) had very poor quality Postby TEE and epicardial studies. There was concordance between the Postby TEE and Postby EPI results in 15/15 (100%) in whom both were performed and concordance between the Postby TEE versus the Ppe results in 9/13 (70%) in whom both were performed with adequate image quality. One of 13 (8%) had poor quality Postby TEE, and 3/13 (23%) had discordant Postby ITEE versus the PPE results. The last 3 cases included one with an AV canal in which the Postby TEE showed MR+++/TR+++ with the PPE showing MR++/TR++, another with an AV canal and MR++ at Postby TEE but only MR+ at PPE, and the third with tetralogy of Fallot with PR+ on Postby TEE and PR++ at PPE. **CONCLUSION:** TEE provides accurate assessment of the presence and severity of valvar regurgitation in pediatric patients prior to surgical correction. Following surgical correction, Postby TEE results are concordant with Postby EPI results, but are not always predictive of the severity of VR at postoperative echocardiography and, therefore, can be used only as an estimate of postoperative VR.