SCA 89

CLINICAL DECISION MAKING USING INTRA-OPERATIVE TEE DURING FONTAN OPERATION

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Introduction: Intraoperative TEE can play an important role in confirmation of preoperative diagnosis and assessment of surgical repair during corrective surgery for congenital heart disease. TEE can provide accurate assessment of various defects and immediate effects of surgical corrections. For Fontan operation, TEE can offer critical information regarding assessment of atrioventricular valvular regurgitation (AVVR), ventricular outflow tract (VOT) obstruction and post-operative venous stenosis, all of which may require immediate surgical intervention. The purpose of this study is to demonstrate a critical role of the intraoperative TEE in assisting surgical decision making during Fontan operation.

Methods: Twenty-three consecutive patients undergoing Fontan operation were enrolled. Ten patients required atrioventricular valve surgery. A distinct patient required Damus-Kaye-Stansel procedure (D-K-S) and VSD enlargement. Ventricular function, AVVR and stenosis in VOT and venous pathways were evaluated by TEE. Pediatric-size multiplane or biplane probes were used for the patients less than 15kg and adult-size multiplane probe for larger patients. Previously undiagnosed defects or abnormalities found by TEE were differentiated into two categories; major and minor abonormalities defined as required or unrequired additional surgical interventions.

Results: Patients ranged from 7.3 to 49.0kg in weight and 17 months to 24 years in age. Total cavo-pulmonary connection was performed in all patients. Lateral tunnel (LT) with atrial roll was applied in 18 patients (78.3%) and extracardiac conduit in 5 patients (21.7%) to create IVC to PA route. Pre-bypass assessment with TEE detected 2 major (8.7%) and 2 minor abonormalities (8.7%). In these 4 patients, TEE revealed moderate or severe AVVR, which was previously diagnosed as trivial or mild AVVR using preoperative echocardiography. Two of the 4 patients were determined to require additional valve surgery based on TEE findings (Table). Post-bypass TEE examination showed abnormalities in 12 patients (52.2%): 4 major abnormalities (17.4%) including 1 VOT obstruction and 3 venous stenoses, which localized at LT, pulmonary vein (PV) and intraatrium respectively, and 8 minor abnormalities (34.8%) (Table). TEE confirmed all major TEE abnormalities disappeared after additional surgery or revisions. All 6 patients with major abnormalities undergoing surgical intervention showed good outcomes postoperatively. Transient PV compression by TEE probe was noted in 2 patients (8.7%).

Conclusion: Intraoperative TEE detected critical undiagnosed or new abnormalities in 8.7% of patients during pre-bypass period and 17.4% during post-bypass period. Intraoperative TEE is extremely useful in diagnosing in a timely fashion otherwise undetectable critical abnormalities that warrant additional correction or revision during the Fontan operation.

	major abnormalities		minor abnormalities	
prebypass	2 patients 8.7%	2 AVVR	2 patients 8.7%	2 AVVR
postbypass	4 patients 17.4%	1 VOT obstruction 1 LT stenosis 1 PV stenosis 1 intraatrial stenosis	8 patients 34.8%	2 moderate AVVR 1 accelerated AVV inflow 1 trivial PR after D-K-S 1 mild VOT obstruction 3 mosaic appearance in atrium
total	6 patients 26.1%	6 abnormalities	10 patients 43.5%	10 abnormalities

Table. Incidence and contents of the detected TEE abnormalities (23 patients)