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Surgical Aspects of Taussig – Bing Heart

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"Taussig-Bing Heart" is a form of DORV characterized by subpulmonary VSD, Double conus and side by- side great arteries and it is frequently associated with aortic coarctation, arch hypoplasia, subsortic obstruction and atypical coronary arteries. It was first described in 1949 by Helen B.Taussig and Richard J.Bing at John Hopkins hospital, Baltimore in a 5.5 year old girl. Richard Van braagh differentiated it from transposition of great arteries in which pulmonary-mitral continuity is present, but it is absent in Taussig-Bing heart. The dilated pulmonary artery overrides the ventricular septum, but does not override the LV cavity at all and pulmonary stenosis does not occur. The VSD is not a membranous or conal septal or intrinsically defective and it is due to an abnormality of distal conal free walls and lies to the left of crista supraventricularis and above or antero-superior or postero-superior to the septal band. Subsequently described a spectrum of Taussig-Bing hearts depending on the overriding of pulmonary artery as right sided, intermediate, left-sided and malalignment of infundibular septum is a fundamental requisite to define these hearts, collectively termed as "Taussig-Bing complex".

Systemic AV valve regurgitation is a potential risk factor for morphologic RV dysfunction and without this complication, function well into late adult hood. Cardiac resynchronization therapy improves the hemodynamics of failing systemic right ventricle in patients with wide QRS on ECG, but is technically challenging. Early pacemaker placement is recommended in the setting of complete heart block with RV dysfunction, bradycardia or heart failure and urgently done during or after the surgical intervention when bradycardia is intolerable. The evolution of surgical repair for Taussig-Bing anomaly has progressed from atrial baffle procedures to arterial switch with VSD closure or intraventricular repair. Of these intraventricular repairs, Patrick-McGoon operation has been used for antero-posterior great artery anatomy by tunnelling the left ventricular flow anterior to the pulmonary valve. The other, Kawashima operation is used for side-by-side great artery anatomy by tunnelling left ventricular flow posterior to the pulmonary valve. The need for surgical interventions vary according to the associated defects and several options are available.

In Taussig Bing malformation, it is necessary to construct a tunnel from left ventricle to the right side of the pulmonary valve in order to connect the pulmonary artery to the left ventricle and then carry out the Mustard procedure as has been recently performed successfully by Kirklin. Physiologic or conventional repairs emphazises the correcting of associated defects without addressing the discordant connections and leaves the morphologic RV to propel the systemic circulation in case of associated corrected transposition. In physiological correction, the morphologic RV likely to fail over long-term. Timely performed systemic AV valve replacement may preserve ventricular function and improve long-term outcome and should be done prior to significant RV dilation in symptomatic cases with a preoperative ejection fraction of ≥ 40%. The anatomic repair ('switch procedures") are introduced in 1987 by Ilbawi and colleagues and its aim is to utilize the morphologic LV as systemic pumping chamber and mitral valve as the systemic valve. The goal of anatomic correction is re-routing of pulmonary venous return to morphologic LV and aorta and systemic venous return to morphologic RV and pulmonary artery and achieving a normal anatomic pattern of circulation. It represents a group of procedures as venous switch, arterial switch, double switch and choice of the procedure depends on the underlying anatomy of LVOT or morphology of VSD and hemi-mustard

technique in more complex defects. The anatomic repair remains the best choice for TGA type of DORV and for Taussig-Bing type of DORV, arterial switch still appears to be the procedure of choice and can be performed in the neonatal period in patients with all types of great artery anatomy without ventriculotomy. The anterio-superior great arteries are most suitable for arterial switch with closure of VSD and the arterial switch of Taussig-Bing heart was first reported in 1981. Kawashima repair is applicable to side-by-side great arteries with unsuitable coronary anatomy or pulmonary valve is not considered adequate to function as a systemic valve and the distance between the pulmonary and tricuspid valve is more important for intraventricular tunnelling. The operative mortality for arterial switch is 13 %, intraventricular repair is 3% and late mortality for both is 5 to 6% Single –ventricle palliation (Fontain circulation), the redirection of systemic (deoxygenated blood) into the pulmonary artery without traversing a ventricle) should be considered in more complex and unfavourable anatomy due to small LV, Chordae straddling and remote VSD. PA banding is a challenge practice to expand anatomic repair as a bridge to double switch surgery in those who suffering from persistent late LV failure due to LV retraining. Single stage repair is advised for neonates with Taussig-Bing anomaly associated with arch obstruction in 1-2 weeks of age as initial coarctation repair and PA banding followed by delayed arterial switch and VSD closure and hybrid approach as ductal stenting and bilateral PA branch banding. Closed technique of coronary transfer is helpful for atypical coronary anatomy.

Biography

Ramachandran Muthiah, Consultant Physician & Cardiologist, Zion hospital, Azhagiamandapam, Morning Star hospital, Marthandam, Kanyakumari District, India. Completed M.D. in General Medicine in 1996, D.M. in cardiology in 2003 under Tamil Nadu Dr.MGR Medical University, Chennai, India. Worked as medical officer in Rural health services for 5 years and in teaching category as Assistant Professor at Madras medical college, Coimbatore medical college, Thoothukudi medical college and Professor at Dr.SMCSI Mission hospital & Medical college, Karakonam, Trovandrum and Azeezia Medical college, Kollam. Published many papers in Cardiosource, American College of Cardiology Foundation, Case Reports in Clinical Medicine (SCIRP) and Journal of Saudi Heart Association. Special research on Rheumatic fever and Endomyocardial fibrosis in tropical belts, Myxomas, Infective endocarditis, apical hypertrophic cardiomyopathy, Ebstein's anomaly, Rheumatic Taussig-Bing Heart, Costello syndrome and Tetralogy of Fallot.

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