

Cardio Care 2021: Surgical Aspects of Tausig – Bing Heart

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“Tausig-Bing Heart” is a form of DORV characterized by sub pulmonary VSD, Double cones and side-by-side great arteries and it is frequently associated with aortic coarctation, arch hypoplasia, subcortical obstruction and atypical coronary arteries. It was first described in 1949 by Helen B. Taussig and Richard J. Bing at Johns Hopkins hospital, Baltimore in a 5.5 year old girl. Richard Van Braugh differentiated it from transposition of great arteries in which pulmonary-mitral continuity is present, but it is absent in Tausig-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 canal septal or intrinsically defective and it is due to an abnormality of distal canal 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 Tausig-Bing hearts depending on the overriding of pulmonary artery as right-sided, intermediate, left-sided and misalignment of infundibula septum is a fundamental requisite to define these hearts, collectively termed as “Tausig-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 Tausig-Bing anomaly has progressed from atrial baffle procedures to arterial switch with VSD closure or intraventricular repair. Of these intraventricular repairs, Patrick-McGowan operation has been used for antero-posterior great artery anatomy by tunneling the left ventricular flow anterior to the pulmonary valve. The other, Kawashima operation is used for side-by-side great artery anatomy by tunneling left ventricular flow posterior to the pulmonary valve. The need for surgical interventions varies according to the associated defects and several options are available.

In Tausig-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 Kirkland. Physiologic or conventional repairs emphasize 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 $\geq 40\%$. The anatomic repair (“switch procedures”) is introduced in 1987 by Elbow 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 Tausig-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 anterior-superior great arteries are most suitable for arterial switch with closure of VSD and the arterial switch of Tausig-Bing heart was first reported in 1981.

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