The Palliative Definitive Surgery for Congenital Heart Diseases

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Congenital heart diseases are still a main problem of Thailand and other countries over the world. There are many factors which cause them such as genetic determinants, external and internal environments etc. Simple congenital heart diseases such as ventricular septal defects, atrial septal defects, aortic coarctation etc. can be completely corrected and cured. However, there are many complex cardiac lesions with anatomically uncorrectable malformations which we can only do palliation by changing their physiology to maintain their normal function. The palliative corrections such as pulmonary artery banding, systemic to pulmonary shunt are still the common palliative surgery. There is another term that we called the definitive palliative correction such as atrial switch procedure, fontan type procedure. The pulmonary artery banding is done to reduce the size of the pulmonary artery to decrease the pulmonary blood flow for the lesions with left to right shunt. On the contrary the systemic to pulmonary artery shunt will increase the pulmonary blood flow by shunting of systemic arterial blood to the pulmonary artery. Both of them are only physiologic correction and then they will undergo the second operation for the anatomical correction again. Some lesions are more complicated for anatomical correction such as the complex transposition of the great artery, tricuspid atresia and the group of functional single ventricle abnormalities etc. The transposition of the great artery (TGA) was firstly corrected by using a physiologic correction at the atrial level. The concept of a palliative definitive correction of TGA by switching the atrial septum so that systemic venous blood from the SVC and IVC was passed directly through the left atrium and the left ventricle and pulmonary venous blood to the right atrium and the right ventricle. There are many techniques such as the Mustard and Senning procedure. In the Mustard procedure, the atrial septum is excised and a piece of pericardium baffle is used to redirect the systemic and pulmonary venous blood flow. However, the Senning procedure used the atrial wall and a piece of pericardium to redirect systemic and pulmonary venous blood and also to create a larger atria. However, the atrial switch operation was replaced by the arterial switch operation because of problems with baffle obstruction and arrhythmias. The arterial switch operation is both anatomical and physiological correction and is the treatment of choice for TGA except in some cases of the complex TGA.

Tricuspid atresia and single ventricle are the complex congenital heart diseases which cannot undergo the anatomical correction. The physiologic correction is the treatment of choice. The Bidirectional Glenn shunt operation is performed by anastomosis of the superior vena cava to the right pulmonary artery and then followed by the total cavopulmonary connection. Total cavopulmonary connection is the palliative definitive correction to bypass systemic venous blood directly to the pulmonary artery and the single ventricle is functionally the systemic ventricle. We call this the Fontan type operation in which we can do both one stage Fontan or two stage Fontan operation. Some situations of the functional single ventricle can apply the Fontan type operation for correction. The modified Fontan operation has also been used to treat a group of patients who have two adequate ventricles and two atroventricular valves, but who are judged by some surgeons to have intracardiac morphology too complex for biventricular repair. We believe that in these types of complex morphology there is more high surgical risk for biventricular repair. The Fontan procedure can be applied for these situations with low surgical risk. The modified Fontan procedures is composed of extracardiac conduit and a lateral tunnel techniques. In the young children (younger than 6 years old) the lateral tunnel Fontan procedure is preferable and the extracardiac conduit Fontan for the children who were older than 6 years. The very young children less than 3 years old or considered high surgical risk undergo a two stage Fontan procedure. Our study compared the outcomes of one stage and two stage modified Fontan procedures performed over the last 10 years at Ramathibodi hospital. The two stage group had a lower mortality rate. The one stage modified Fontan procedure remains the procedure of choice for suitable selected patients except...
in the high risk group and younger children. There are many other palliative definitive procedures such as Glenn with additional flow, one and a half repair (Glenn with antegrade flow via the pulmonary artery) in which the choice depends on the patient’s anatomy and the surgical decision of the surgeon.