What heart that Fontan operation can help?

Prakul Chanthong MD.
Department of Pediatrics
Faculty of Medicine, Siriraj Hospital
Mahidol University
Surgical treatment for CHD

• Definitive
• Palliative
Surgical treatment for CHD

• Two-ventricle repair
• One-ventricle repair
• One and a half-ventricle repair
Survival following palliation for HLHS

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Univentricular Atrioventricular Connection

• Single ventricle
• Univentricular heart
• Common ventricle
• Single functional ventricle
Univentricular Atrioventricular Connection

- Atrioventricular connection
- Ventricular morphology
- Ventriculoarterial connection and interventricular connection
Atrioventricular connection

• Double inlet
• Single inlet
• Common inlet
Double Inlet

Single Inlet

Common Inlet
Ventricular morphology

• Left ventricular morphology
• Right ventricular morphology
• Undifferentiated or intermediate morphology
Ventricular arterial connection and interventricular connection

• Right outflow tract obstruction
• Left outflow tract obstruction
• The physiologic derangements and clinical manifestations depend on
  • The absence, presence, and degree of
    • Pulmonary vascular disease
    • Pulmonary stenosis
    • Subaortic stenosis
  • Morphology and functional state of the atrioventricular connections
• The physiologic derangements associated with univentricular hearts -
  related to
  • Inherent mechanics of a single ventricle
  • Mechanics of a morphologic RV versus a morphologic LV
  • Morphology and functional state of the AV valves that guard the inlet to a
    single ventricle
  • Degree of mixing within the single ventricle
  • Pulmonary vascular resistance
  • Presence and degree of PS or sub AS
• The physiologic derangements associated with univentricular hearts - related to
  • Inherent mechanics of a single ventricle
    • No ventricular interdependence
    • Abnormal systolic and diastolic function
• The physiologic derangements associated with univentricular hearts - related to
  • Mechanics of a morphologic RV versus a morphologic LV
    • Volume handled by a univentricular heart is increased and provokes an adaptive increase in ventricular mass
    • Poor adaptation of univentricular hearts of RV morphology
• The physiologic derangements associated with univentricular hearts - related to
  • Morphology and functional state of the AV valves that guard the inlet to a single ventricle
    • AV valve regurgitation - the volume overload of the single ventricle
    • Atretic of one AV valve – should have adequate of inter atrial communication
• The physiologic derangements associated with univentricular hearts - related to
  • Degree of mixing within the single ventricle
    • Right atrial venous blood and left atrial arterialized blood remain remarkably separate within the single ventricular chamber
    • Separation of the streams is greater when PVR is low and when the outlet chamber is inverted
• The physiologic derangements associated with univentricular hearts - related to
  • Pulmonary vascular resistance
  • Presence and degree of PS or sub AS
Biventricular Hearts
Not Amenable to Biventricular Repair

• DORV with Remote VSD
• PA and IVS
• Hearts with an Imperforate AV valve
• Hearts with crossed AV Connections
• Hearts with superoinferior ventricles
• Straddling AV valve
Choussat’s ten commandments

- Age > 4 years
- Sinus rhythm
- Normal systemic venous return
- Normal right atrial volume
- Mean pulmonary artery pressure < 15 mm Hg
- Pulmonary arteriolar resistance < 4 Wood units/m2
- Pulmonary artery–aorta ratio > 0.75
- Left-ventricular ejection fraction > 0.60
- Competent mitral valve
- Absence of pulmonary artery distortion
Prevent

- Systemic ventricular dysfunction (EDP > 12)
- Increased pulmonary arterial pressure (mean > 15)
- Increased pulmonary vascular resistance (>2)
- AV valve regurgitation
- Distorted pulmonary artery
- Anomalous pulmonary venous connection
Summary

• What heart that Fontan operation can help?
  • Univentricular heart
  • Some forms of CHD
    • DORV with Remote VSD
    • PA and IVS
    • Hearts with an Imperforate AV valve
    • Hearts with crossed AV Connections
    • Hearts with superoinferior ventricles
    • Straddling AV valve