What heart that Fontan operation can help?

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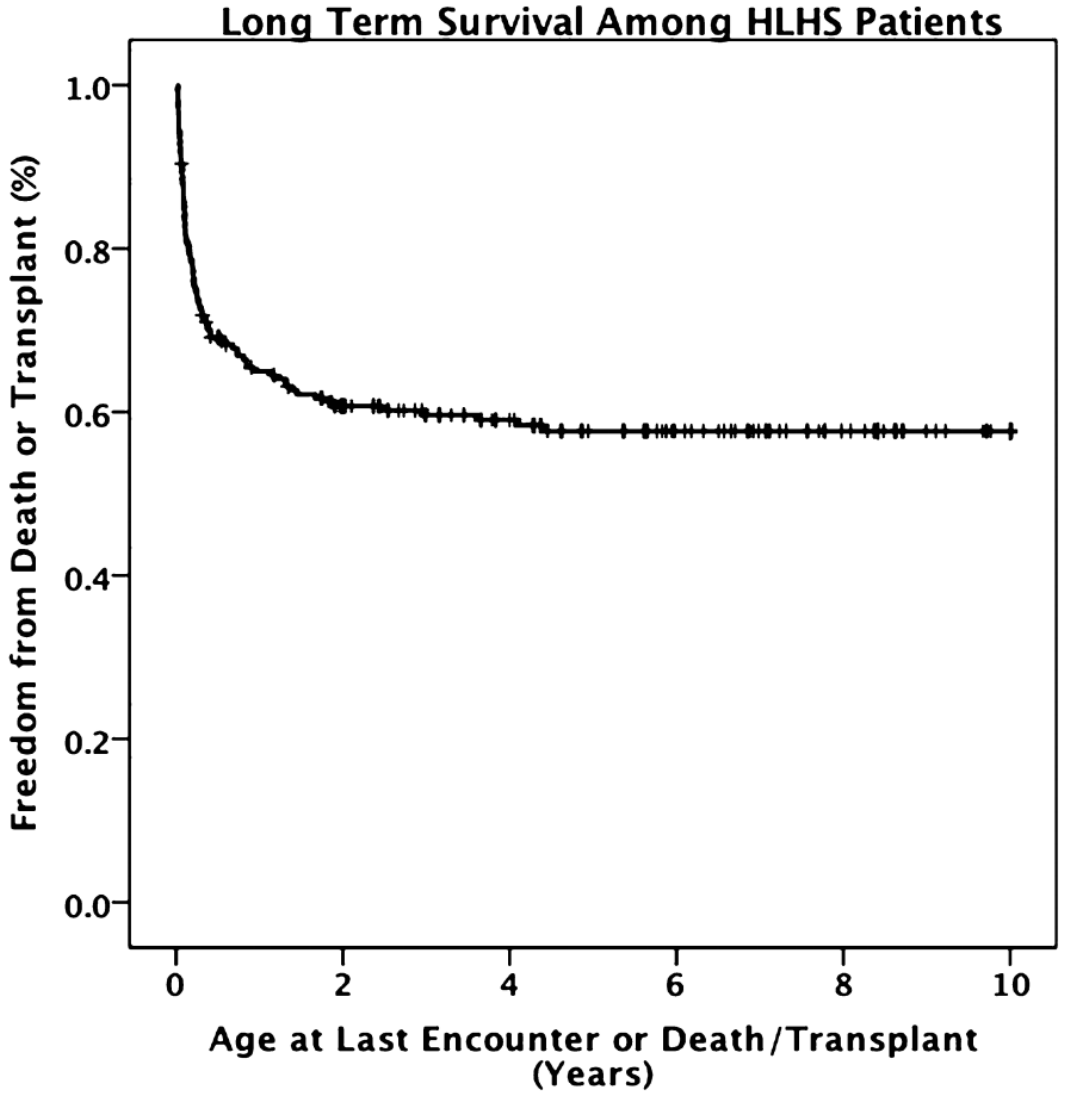
Surgical treatment for CHD

- Definitive
- Palliative

Surgical treatment for CHD

- Two-ventricle repair
- One- ventricle repair
- One and a half- ventricle repair



Survival following palliation for HLHS

Congenit Heart Dis. 2011;6:406–416

Univentricular Atrioventricular Connection

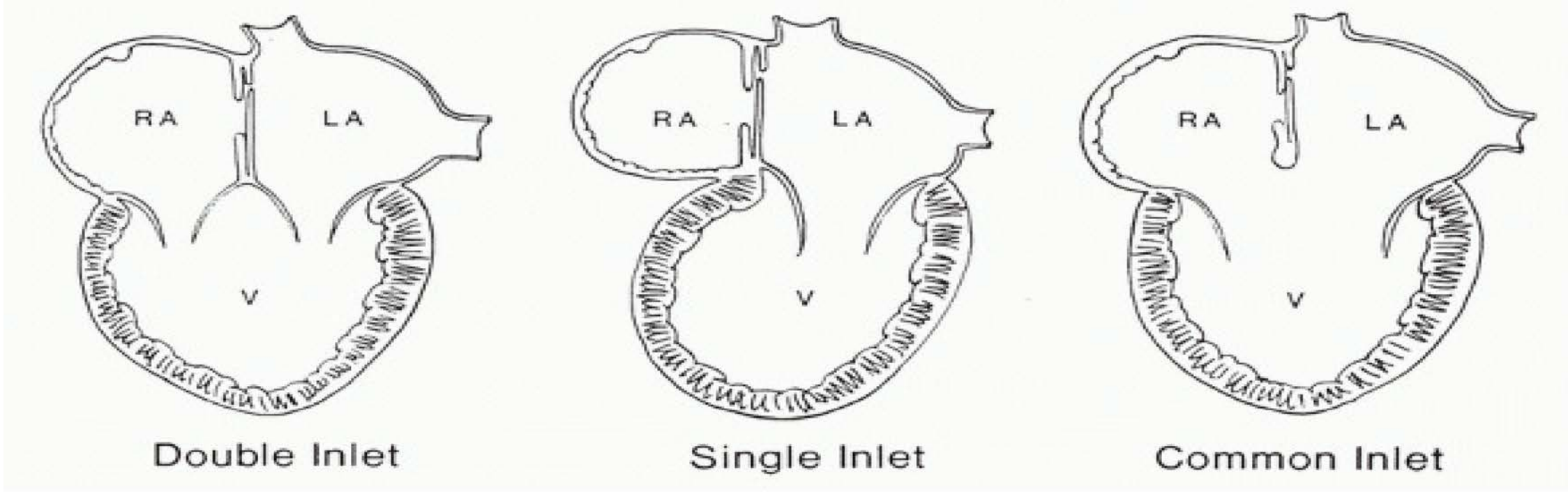
- Single ventricle
- Univentricular heart
- Common ventricle
- Single functional ventricle

Univentricular Atrioventricular Connection

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

Atrioventricular connection

- Double inlet
- Single inlet
- Common inlet


RA
LA
V
Double Inlet
RA
LA
V
Single Inlet
RA
LA
V
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 $\geq$ 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