

Surgery for Single Ventricles



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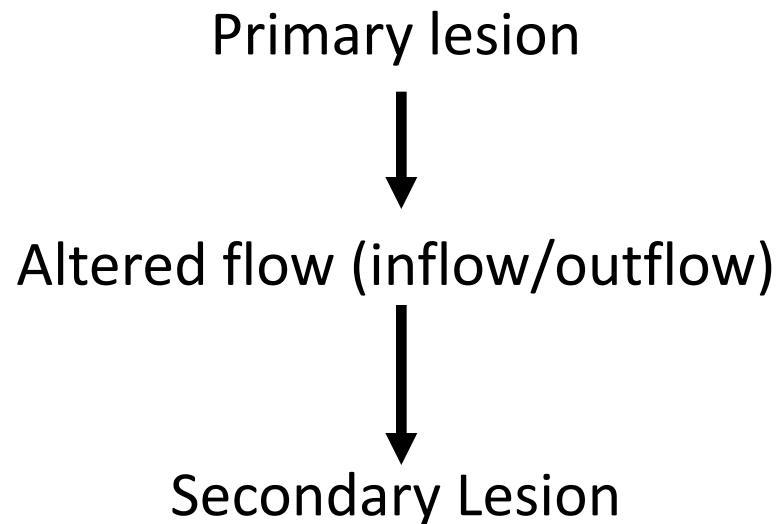
Single Ventricle;

Too small - flow related theory of
cardiac development

Too complex - cAVSD/DORV
- Straddling mitral valve

Pulmonary atresia intact IVS

Flow Related Theory of Cardiac Development



Ultimate end point;

Child will be pink; nothing else

Systemic venous blood draining directly to lungs

Therefore need to keep pulmonary artery pressure as low as possible

- pulmonary artery resistance
- afterload

Therefore need to look after heart and lungs

Protect lungs

Avoid too much blood flow under too high a pressure

Natively

- too little blood
- too much blood
- balanced

What increases afterload?

Valve regurgitation

Outflow obstruction

Ventricular function - rhythm
- function

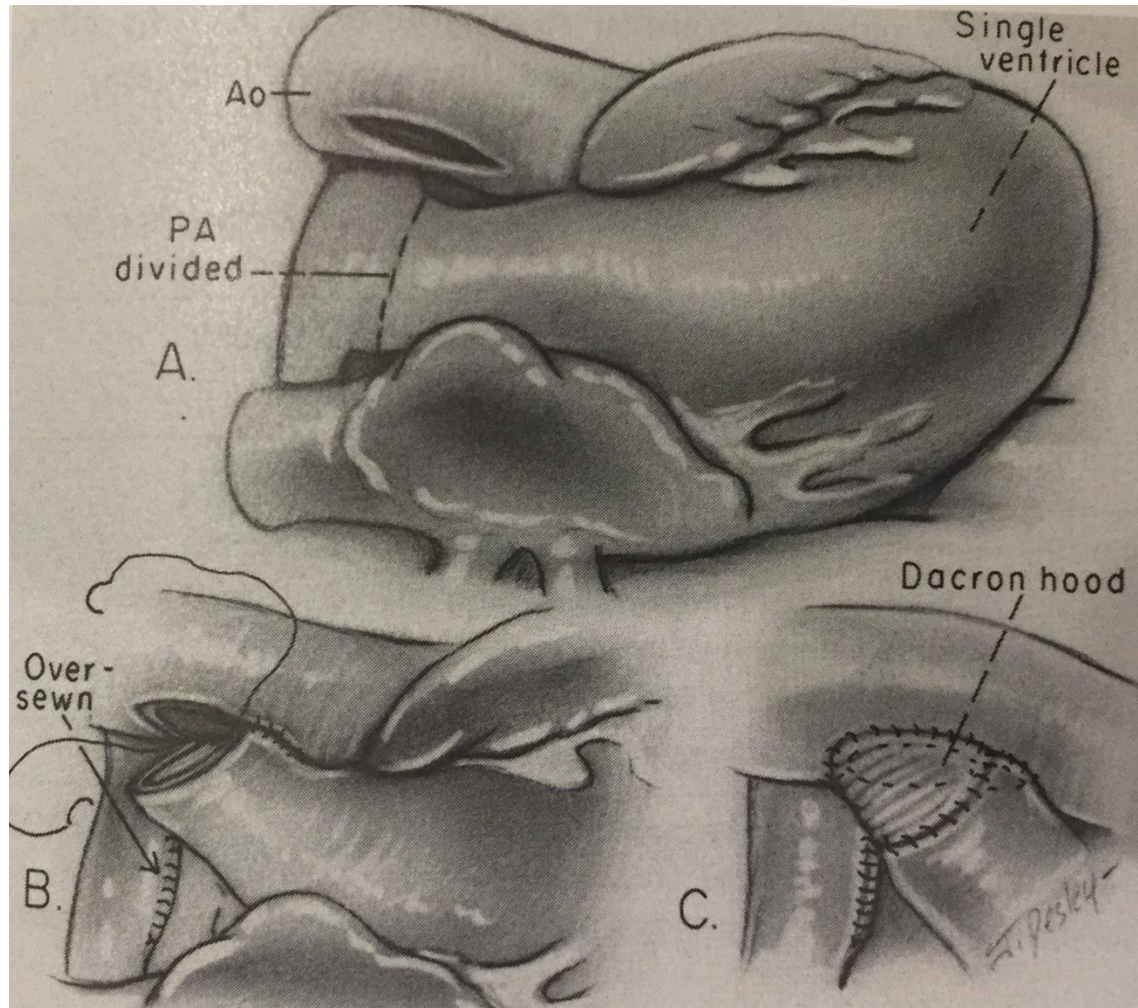
Surgery

Repair valves

Relieve outflow tract obstruction

- resection
- VSD enlargement
- Damus/Kaye/Stansel

Damus-Kaye-Stansel operation



Three stages;

- | | |
|---------|---|
| Neonate | - too much blood flow
- too little blood flow
- balanced blood flow |
| Glenn | - 4 – 6 months |
| Fontan | - 12 – 15 kgs |

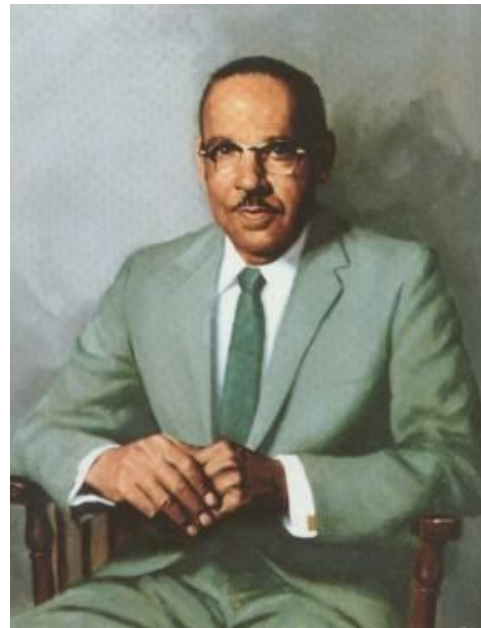
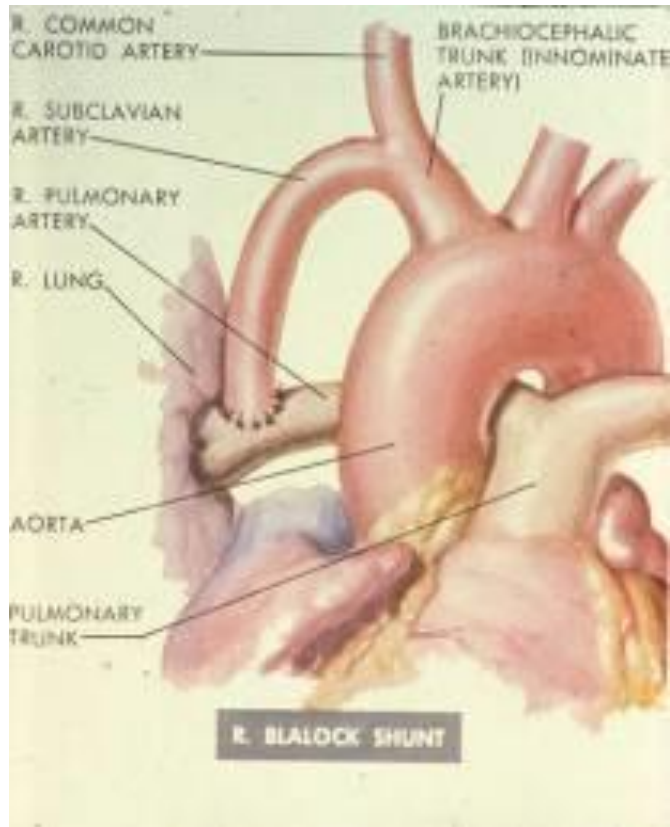
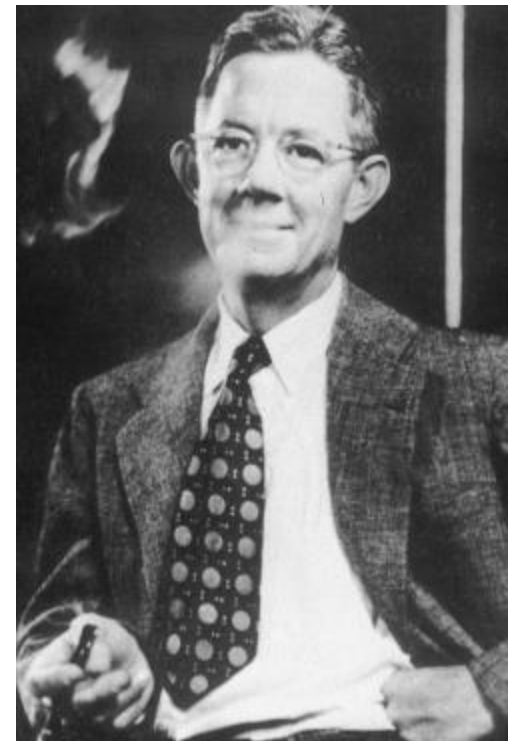
Shunts

- Blalock-Taussig
- Waterston-Cooley
- Potts
- Other central shunts
- MPA to ascending aorta

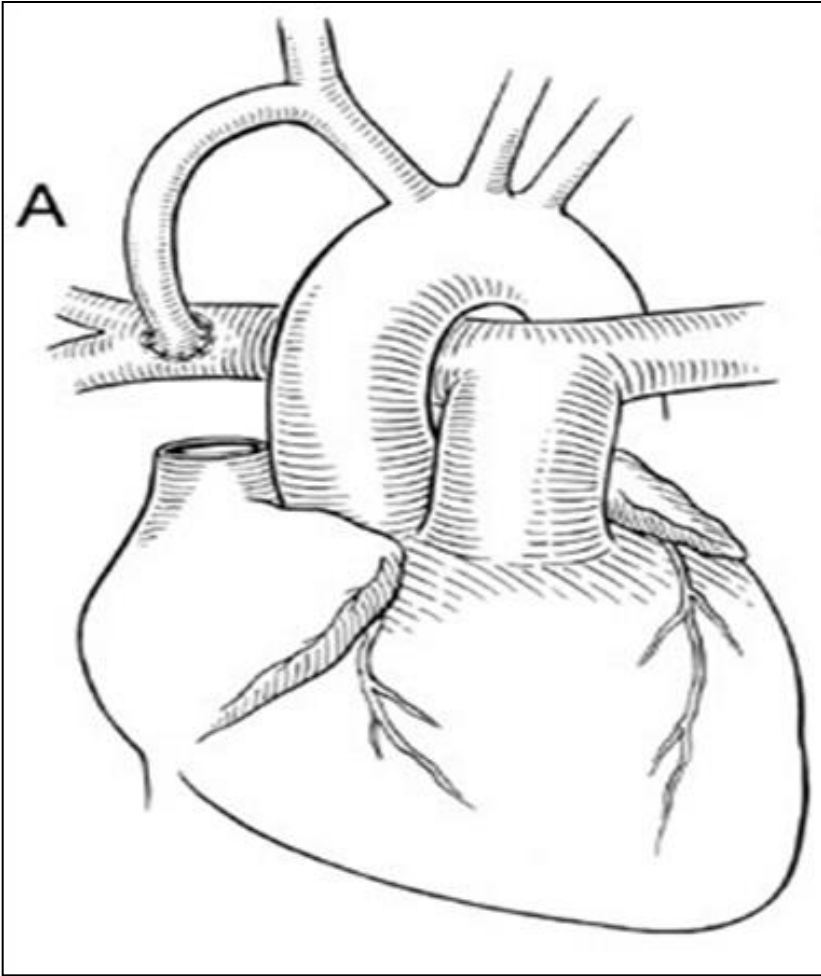
A. Blalock, H. B. Taussig:

The surgical treatment of malformations of the heart in which there is pulmonary stenosis or pulmonary atresia.

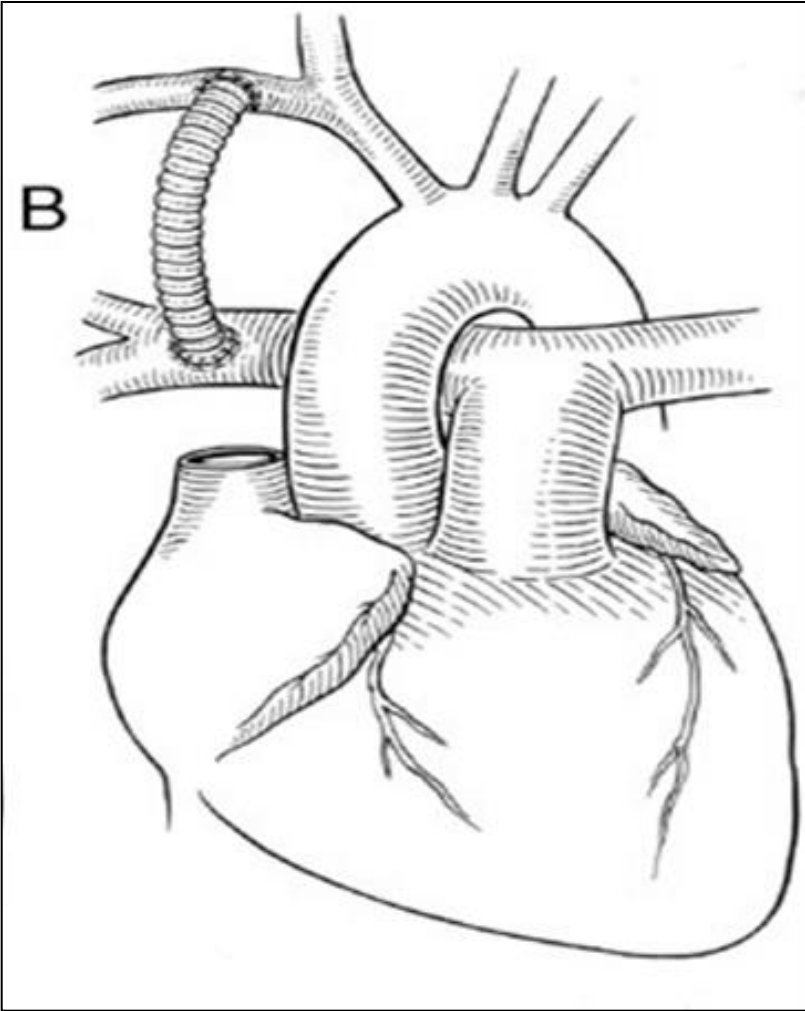
The Journal of the American Medical Association, Chicago, 1945, 128: 189-202.



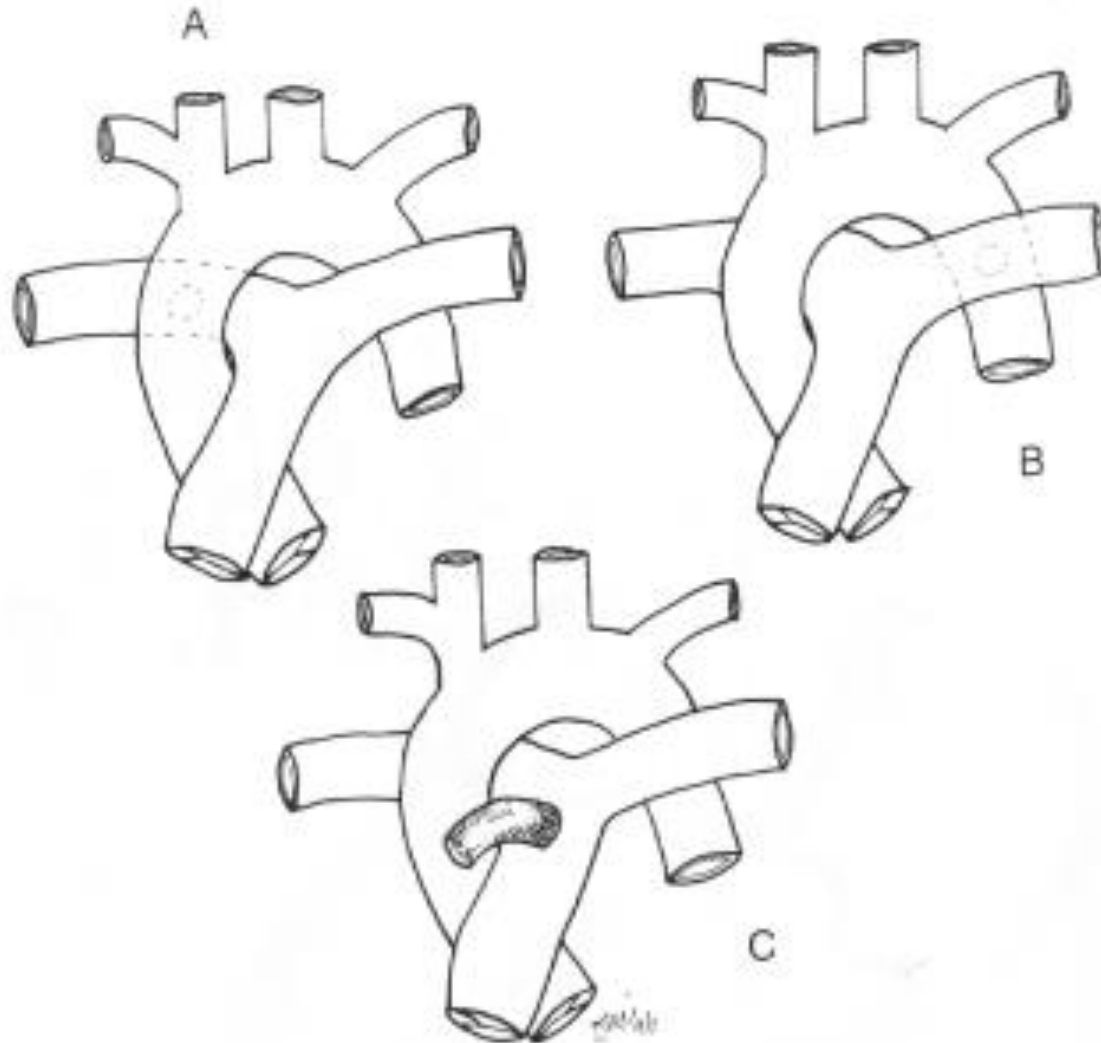
Classic BT shunt (Blalock-Taussig)



Modified BT shunt



Waterston and Potts shunts



Anomalous coronary artery repair	Surgery	2012-13	15	100%
Aortic root replacement (not Ross)	Surgery	2012-13	63	96.8%
Aortic valve replacement - Ross	Surgery	2012-13	61	100%
Aortic valvoplasty	Surgery	2012-13	32	100%
Aortic valvotomy	Surgery	2012-13	22	90.9%
Aortopulmonary window repair	Surgery	2012-13	9	100%
Arterial shunt	Surgery	2012-13	153	91.5%
Arterial switch (for isolated transposition)	Surgery	2012-13	150	97.3%
Arterial switch + VSD closure	Surgery	2012-13	61	95.1%
ASD repair	Surgery	2012-13	334	100%
Atrioventricular septal defect (complete) repair	Surgery	2012-13	192	99%
Atrioventricular septal defect (partial) repair	Surgery	2012-13	95	100%
Atrioventricular septal defect and tetralogy repair	Surgery	2012-13	15	100%
Bidirectional cavopulmonary shunt	Surgery	2012-13	247	98.8%
Cor triatriatum repair	Surgery	2012-13	19	94.7%
Fontan procedure	Surgery	2012-13	199	99.5%
Interrupted aortic arch repair	Surgery	2012-13	23	95.7%
Isolated coarctation repair	Surgery	2012-13	291	99%
Isolated Pulmonary artery band	Surgery	2012-13	128	95.3%
Mitral valve replacement	Surgery	2012-13	74	95.9%
Norwood procedure (Stage 1)	Surgery	2012-13	128	90.6%
PDA ligation (surgical)	Surgery	2012-13	372	97%
Pulmonary atresia VSD repair	Surgery	2012-13	46	97.8%
Pulmonary valve replacement	Surgery	2012-13	328	100%
Rastelli procedure	Surgery	2012-13	17	100%
Repair of TAPVD	Surgery	2012-13	70	94.3%
Senning or Mustard procedure	Surgery	2012-13	3	66.7%
Subvalvar aortic stenosis repair	Surgery	2012-13	167	98.8%
Supravalvar aortic stenosis repair	Surgery	2012-13	11	90.9%
Tetralogy repair	Surgery	2012-13	307	99.3%
Tetralogy with absent pulmonary valve repair	Surgery	2012-13	16	93.8%
Tricuspid valve replacement	Surgery	2012-13	40	97.5%
Truncus and interruption repair	Surgery	2012-13	1	100%
Truncus arteriosus repair	Surgery	2012-13	32	87.5%
VSD Repair	Surgery	2012-13	359	99.7%

Stenting of the *ductus arteriosus*

95.1% (72.4%) survival at 30 days

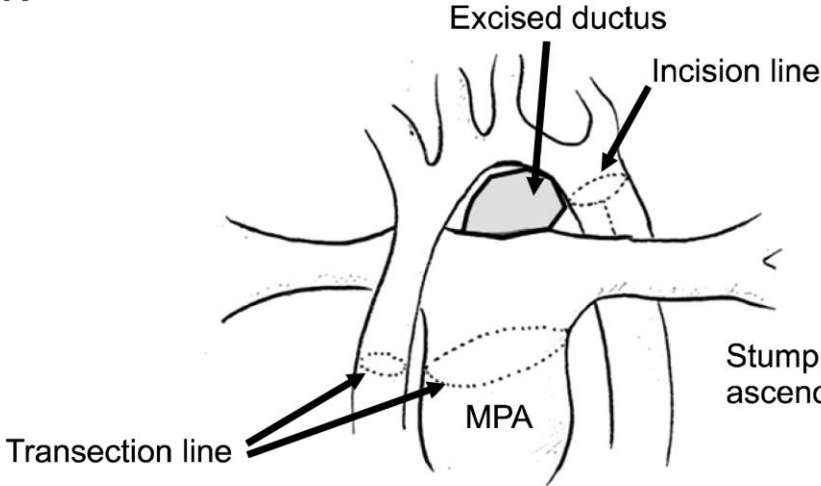
Not all ducts can be stented

- too serpiginous
- cannot access
- too big

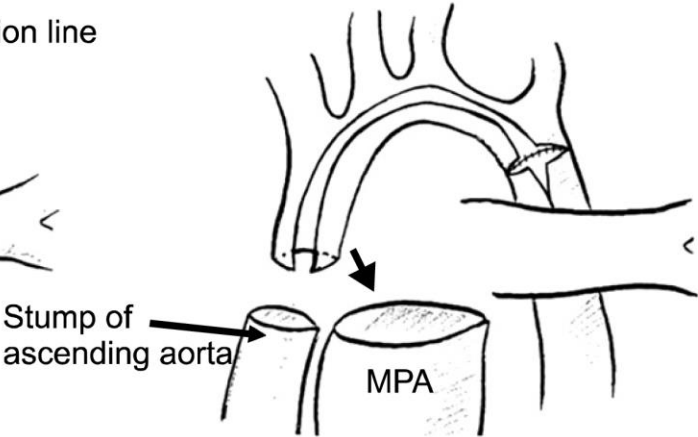
Relatively uncontrolled flow

Norwood procedure

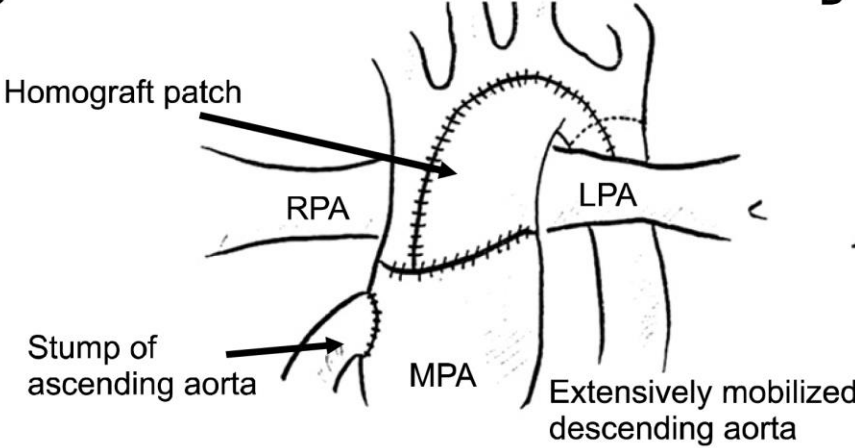
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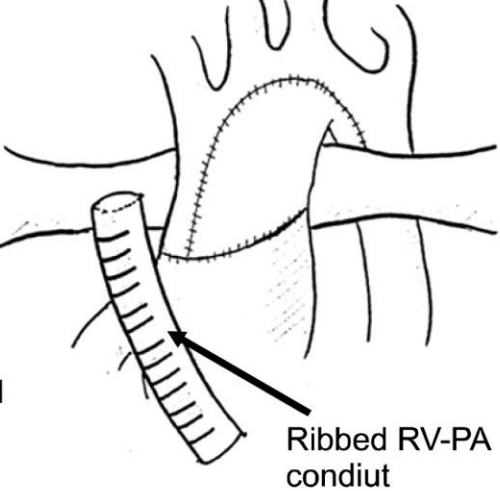
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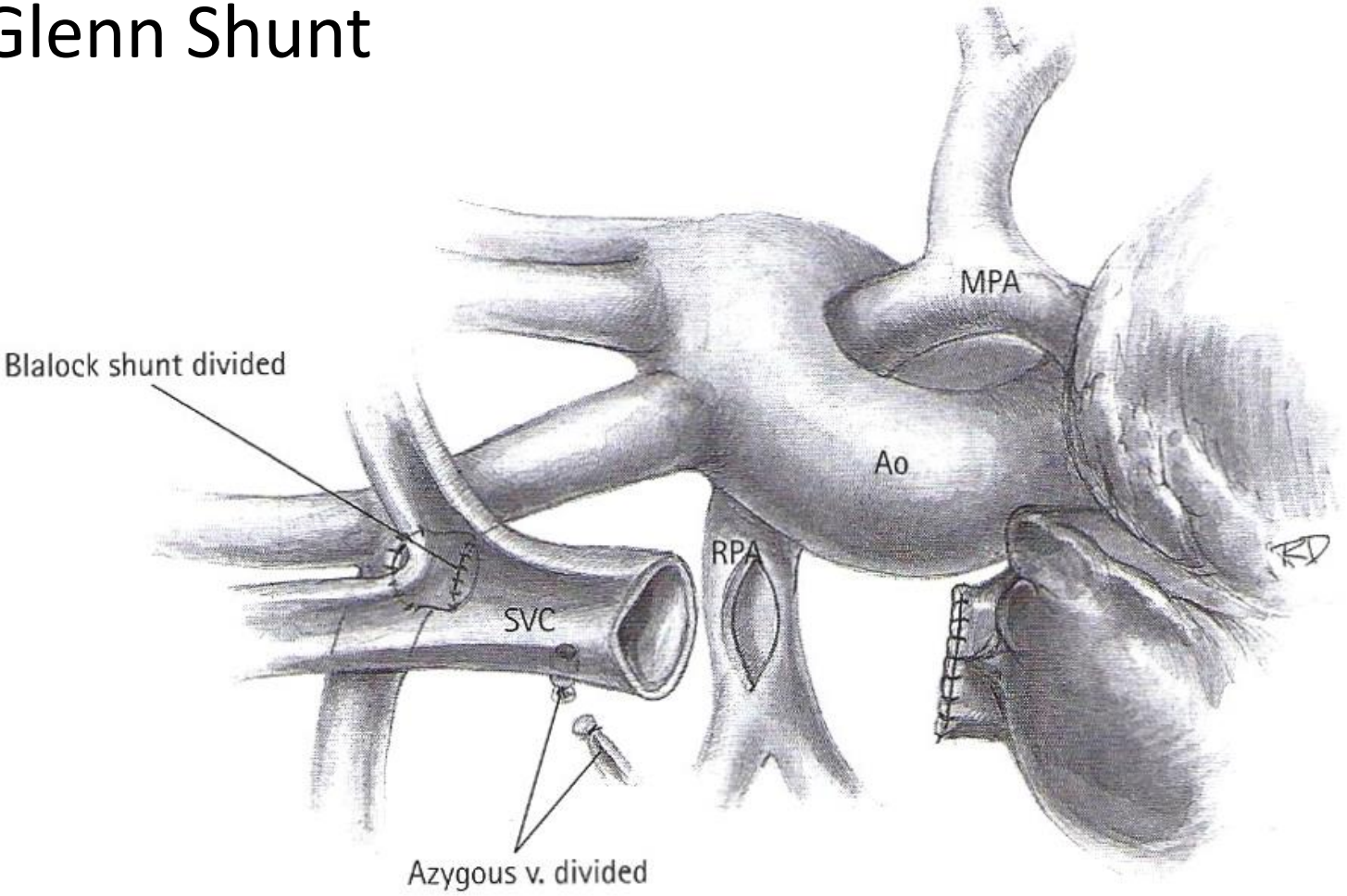
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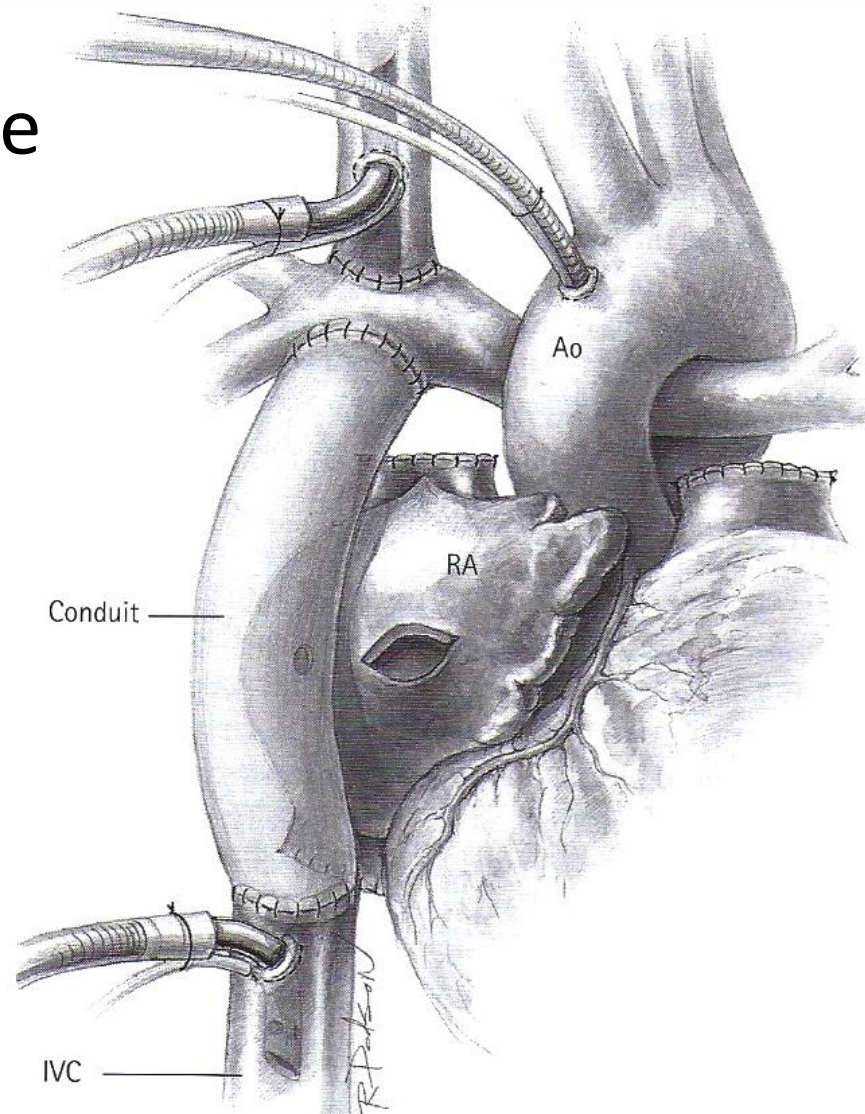


Glenn Shunt



Fontan procedure (extracardiac)

+/- fenestration



Long term problems;

- Failing Fontan - exclude anatomical obstruction
- Fontan conversion
 - protein losing enteropathy (PLE)
 - ascites etc

Dysrhythmias/Pacing issues