Surgical B-T Shunt vs. percutaneous ductal stenting : which is better for branch pulmonary artery growth and patient survival

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Hetz Project

Introduction

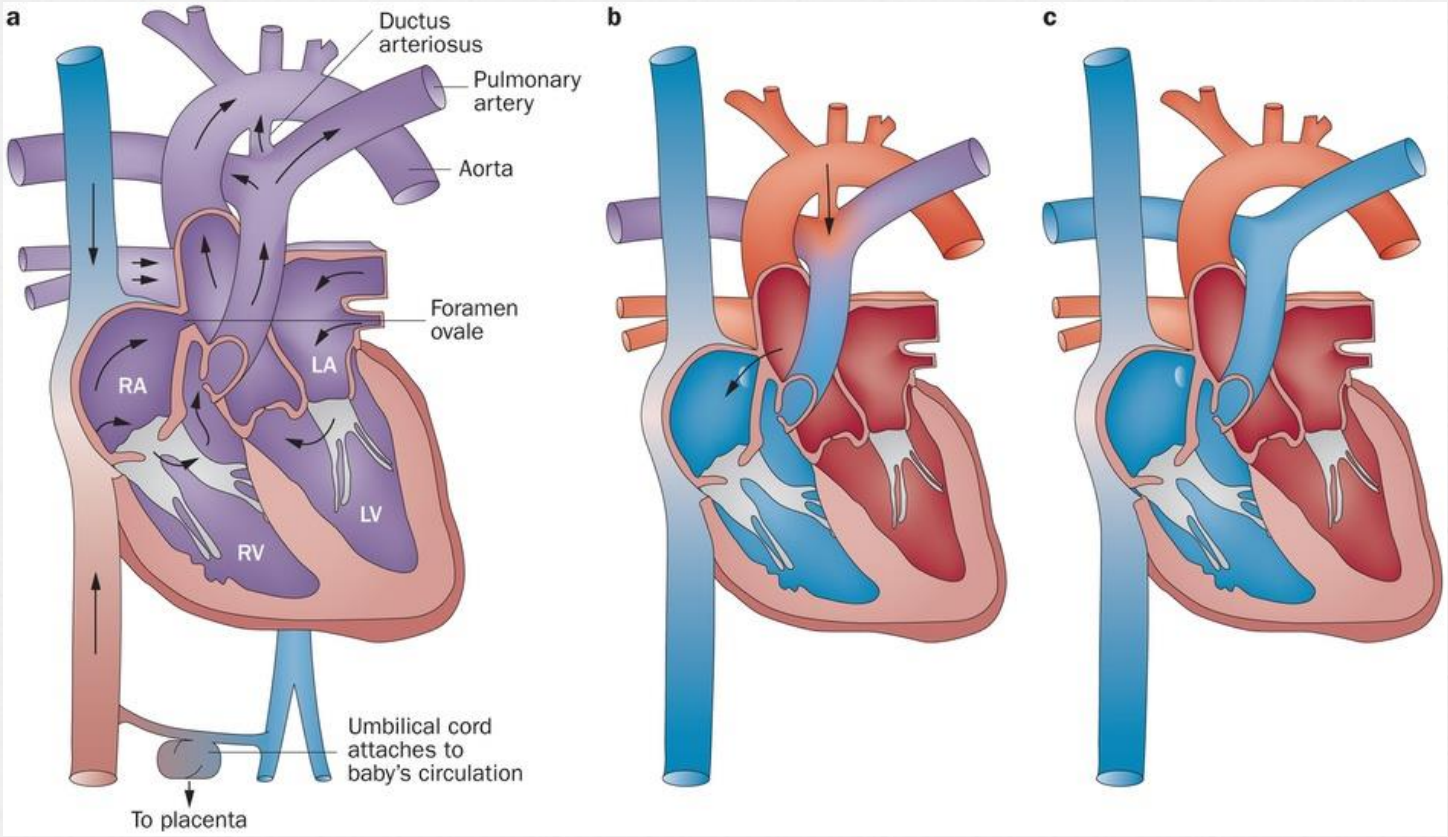
- Prevalence of congenital heart disease is 8/1000 live births
- Congenital heart defects can change the way blood flows through the heart and lungs
- Non-oxygenated blood is pumped out to the body without going through the lungs to pick up oxygen
- Less oxygen delivered to the body and can cause cyanosis
- Approximately 5 g/dL of unoxygenated hemoglobin in the capillaries generates the dark blue color appreciated clinically as cyanosis
- If not treated on time might be life threatening

Low oxygen levels in the blood cause the lips, fingers, and toes to look blue (cyanotic)

PDA

Fetal circulation

Postnatal circulation

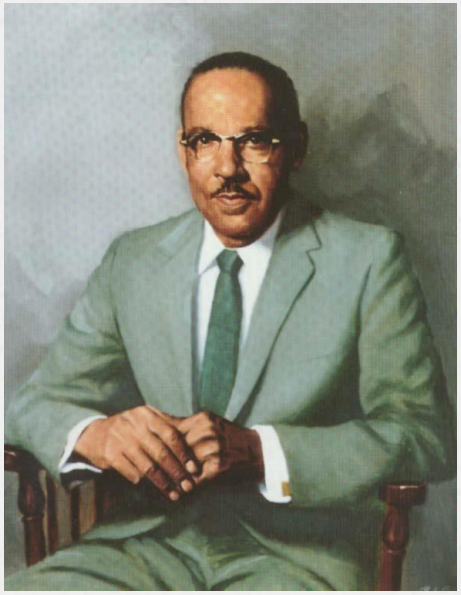


Blalock-Taussig shunt

- Surgical procedure used to increase pulmonary blood flow for palliation in duct dependent CHD

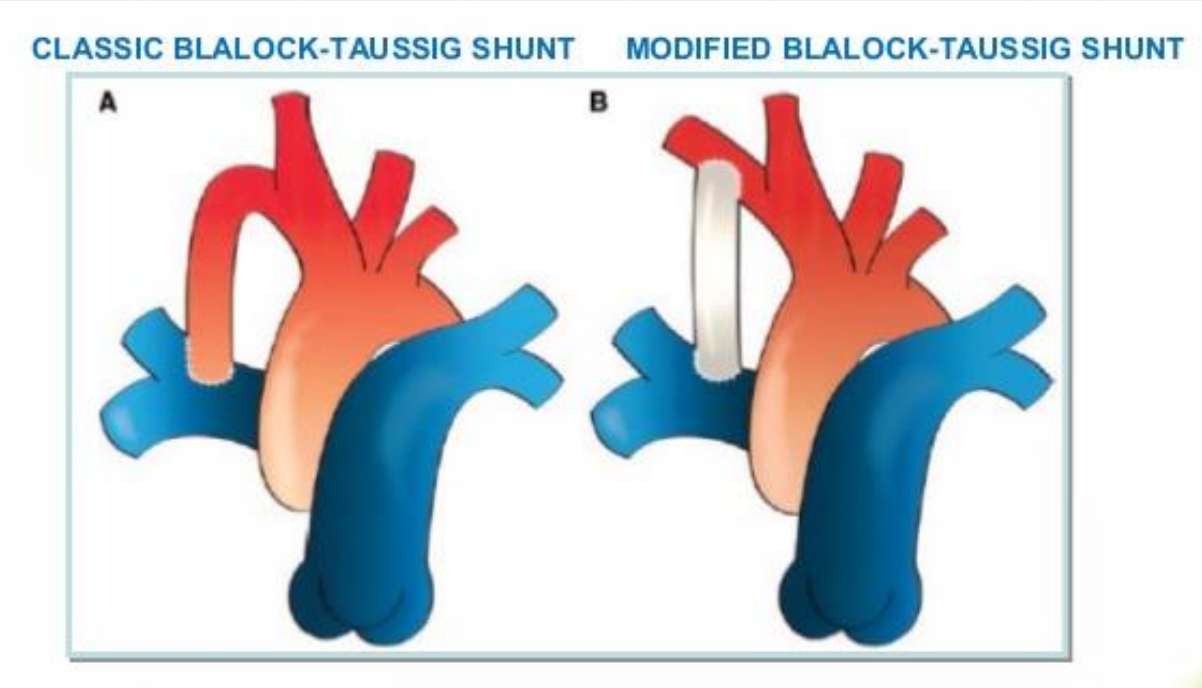
Helen B. Taussig

Alfred Blalock



Vivien Thomas

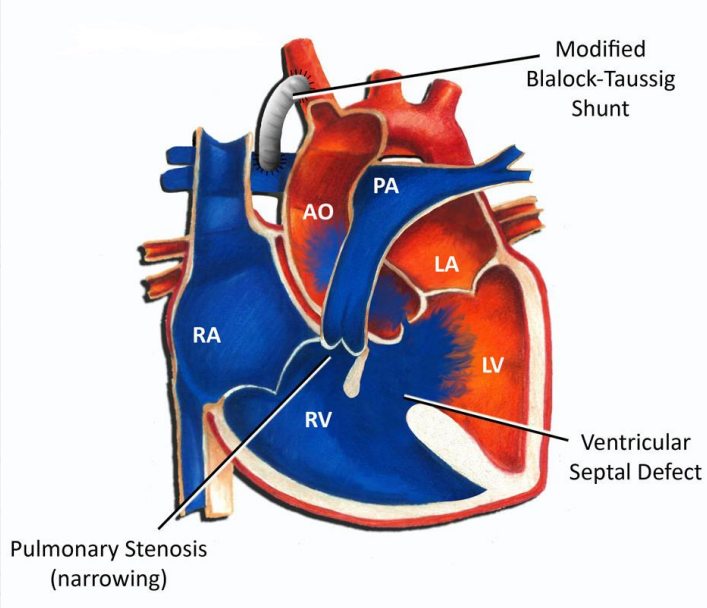
Blalock-Taussig-Thomas shunt



Relieve cyanosis and allow for growth of the pulmonary arteries

Indications for BT shunt

- The first area of application was Tetralogy of Fallot:



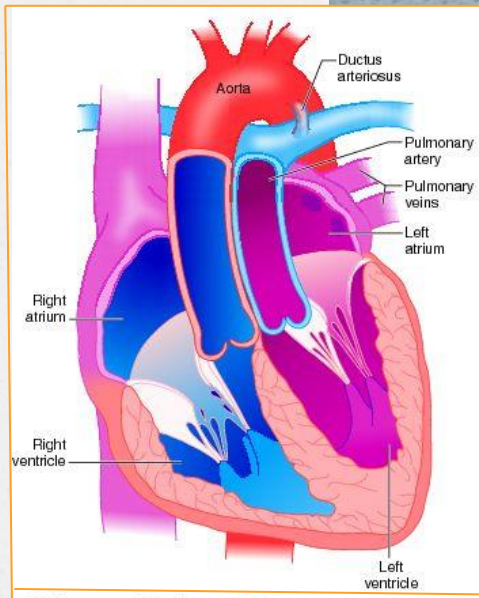
Indications for BT shunt

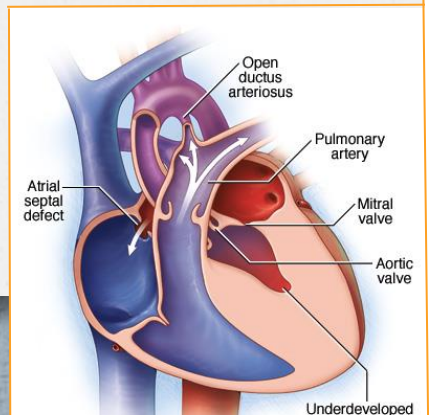
Biventricular circulation

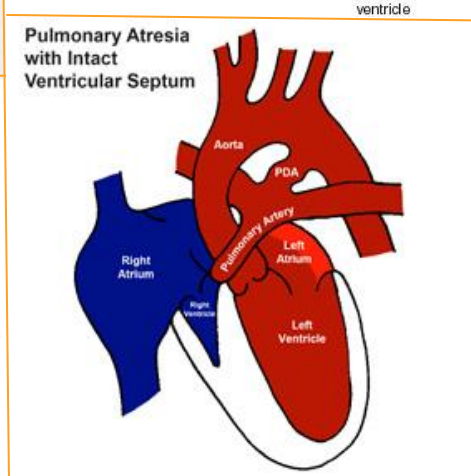
- Tetralogy of Fallot w/ severe pulmonary stenosis or atresia
- Transposition of great arteries with pulmonary stenosis
- Severe Ebstein's Anomaly

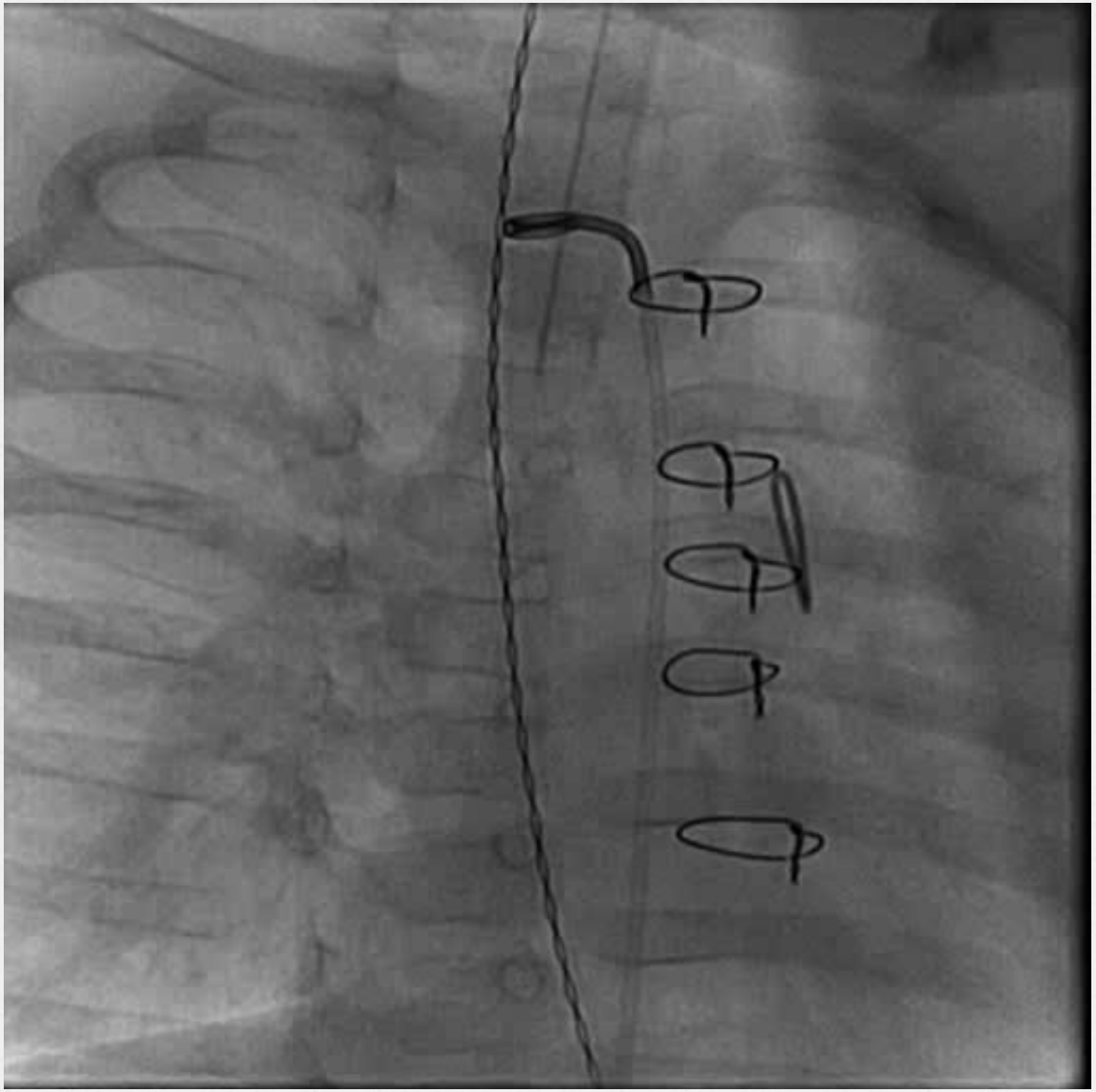
Univentricular circulation

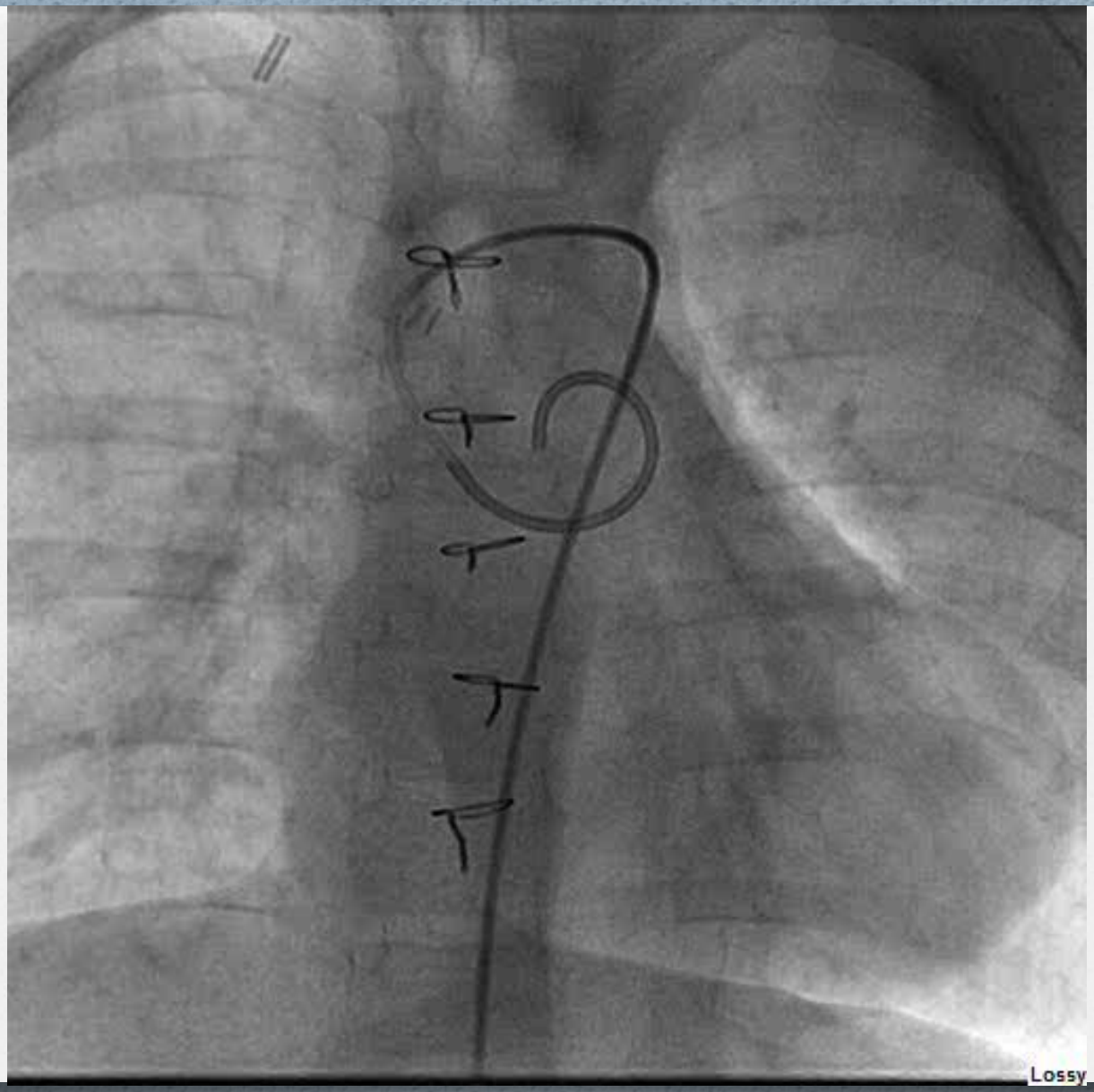
- Tricuspid atresia
- Pulmonary atresia, intact ventricular septum
- Complex single ventricle with duct dependent pulmonary circulation
- Hypoplastic left heart syndrome







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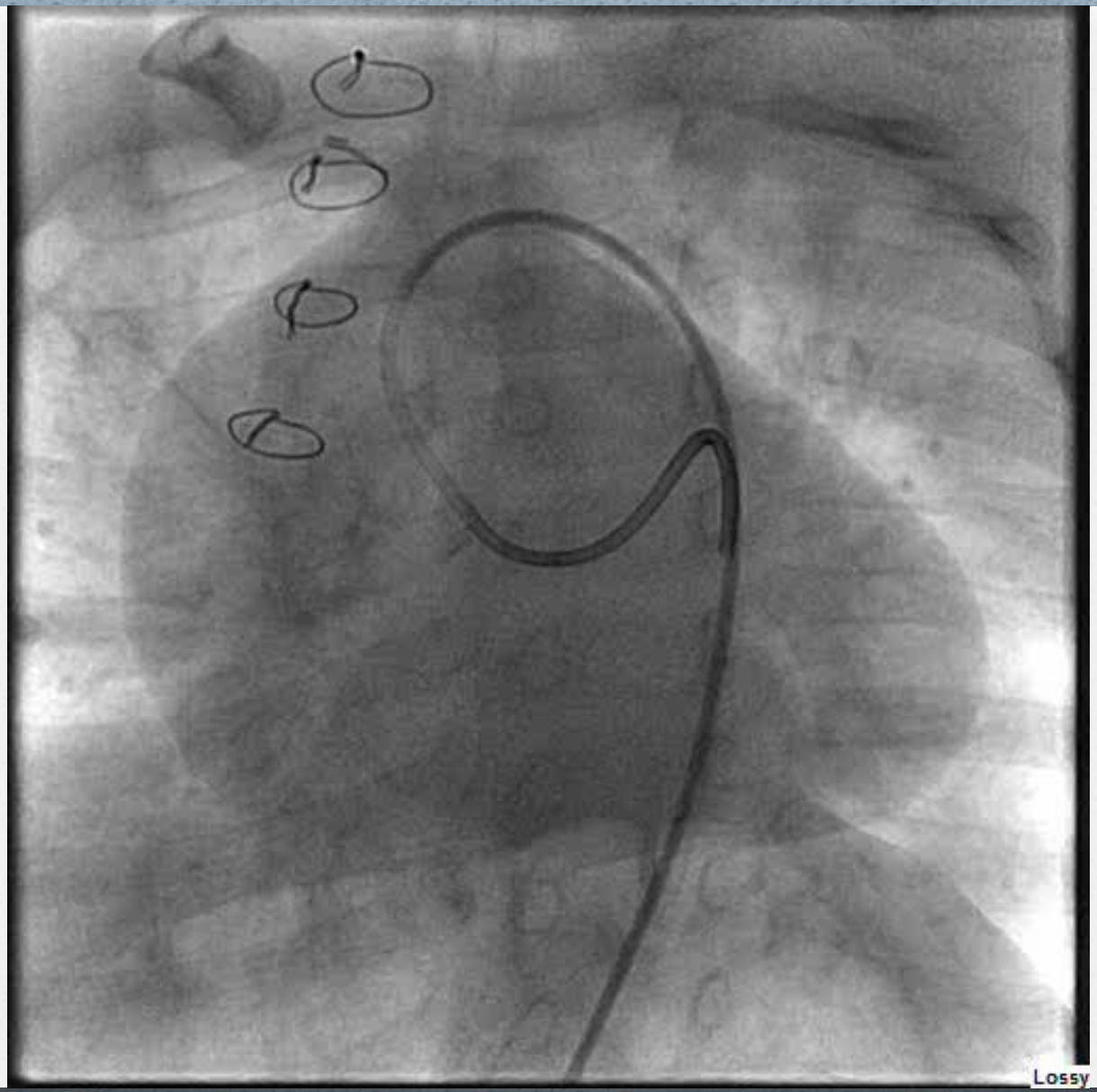
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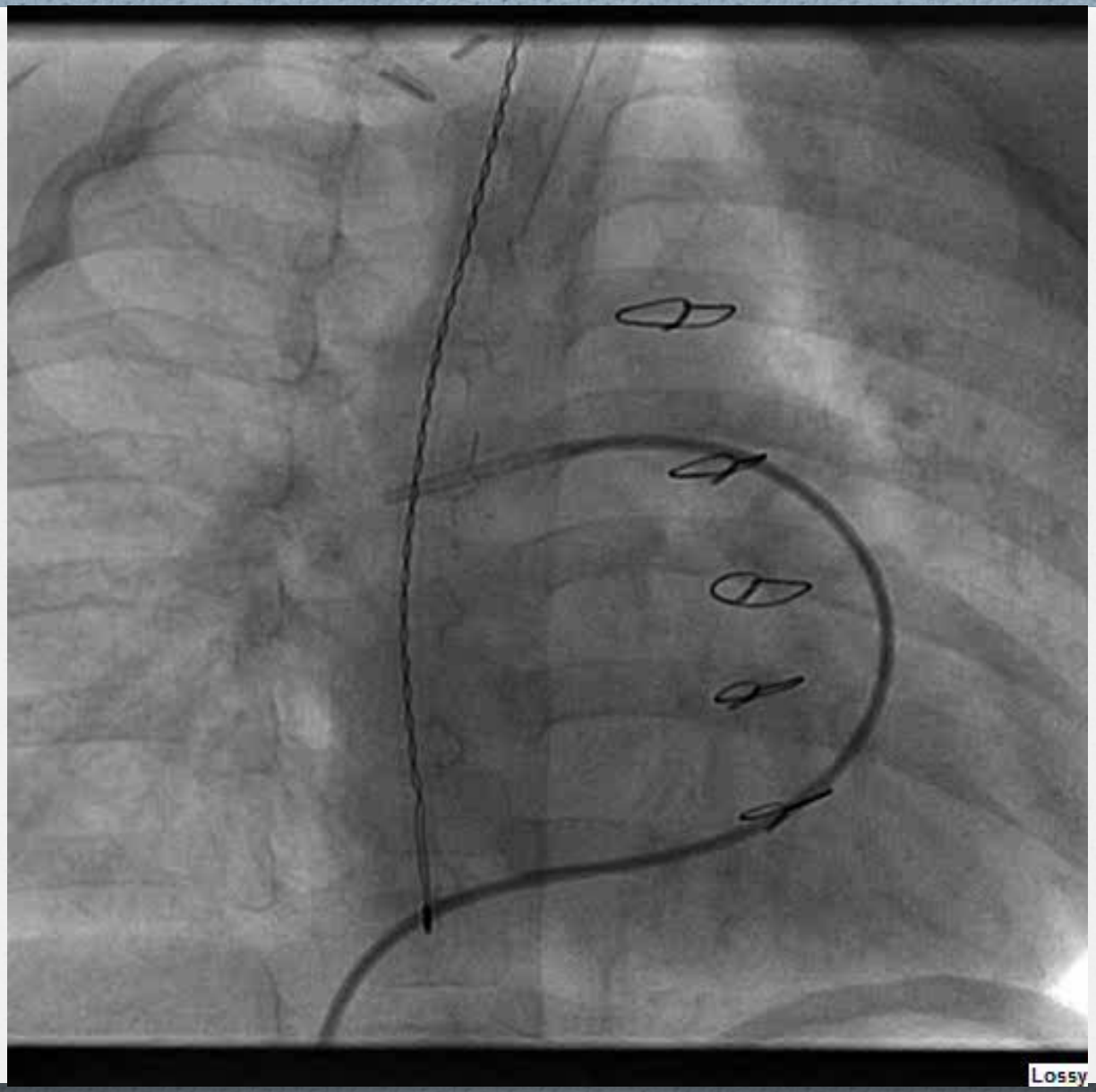
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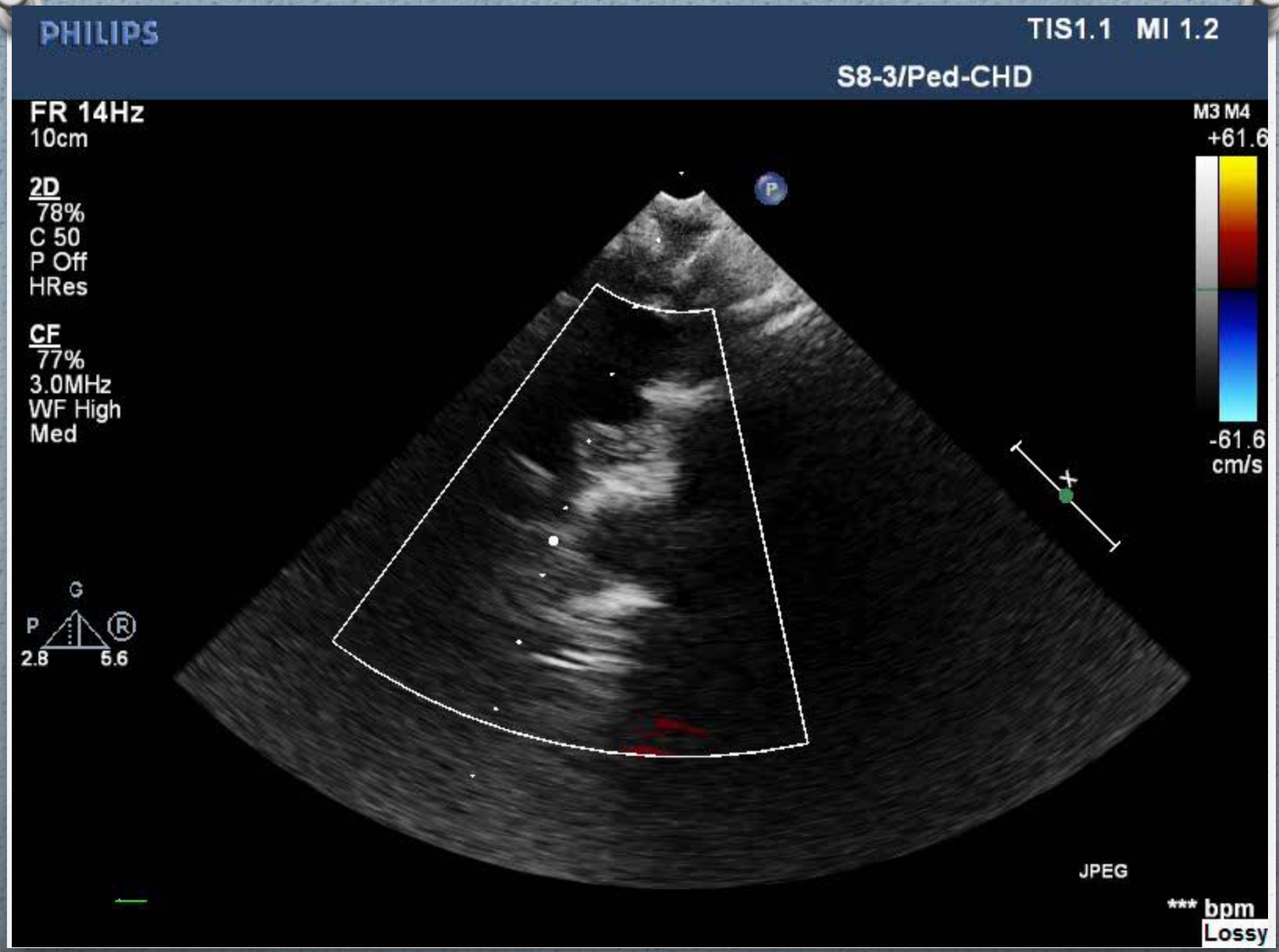
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C 50
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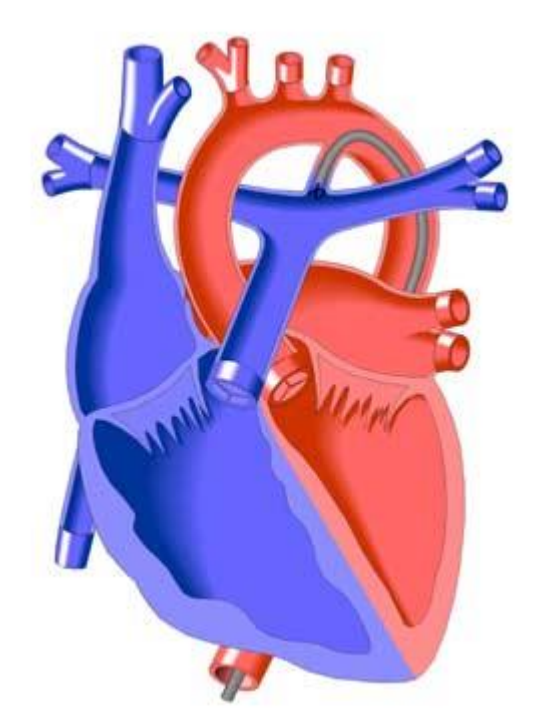
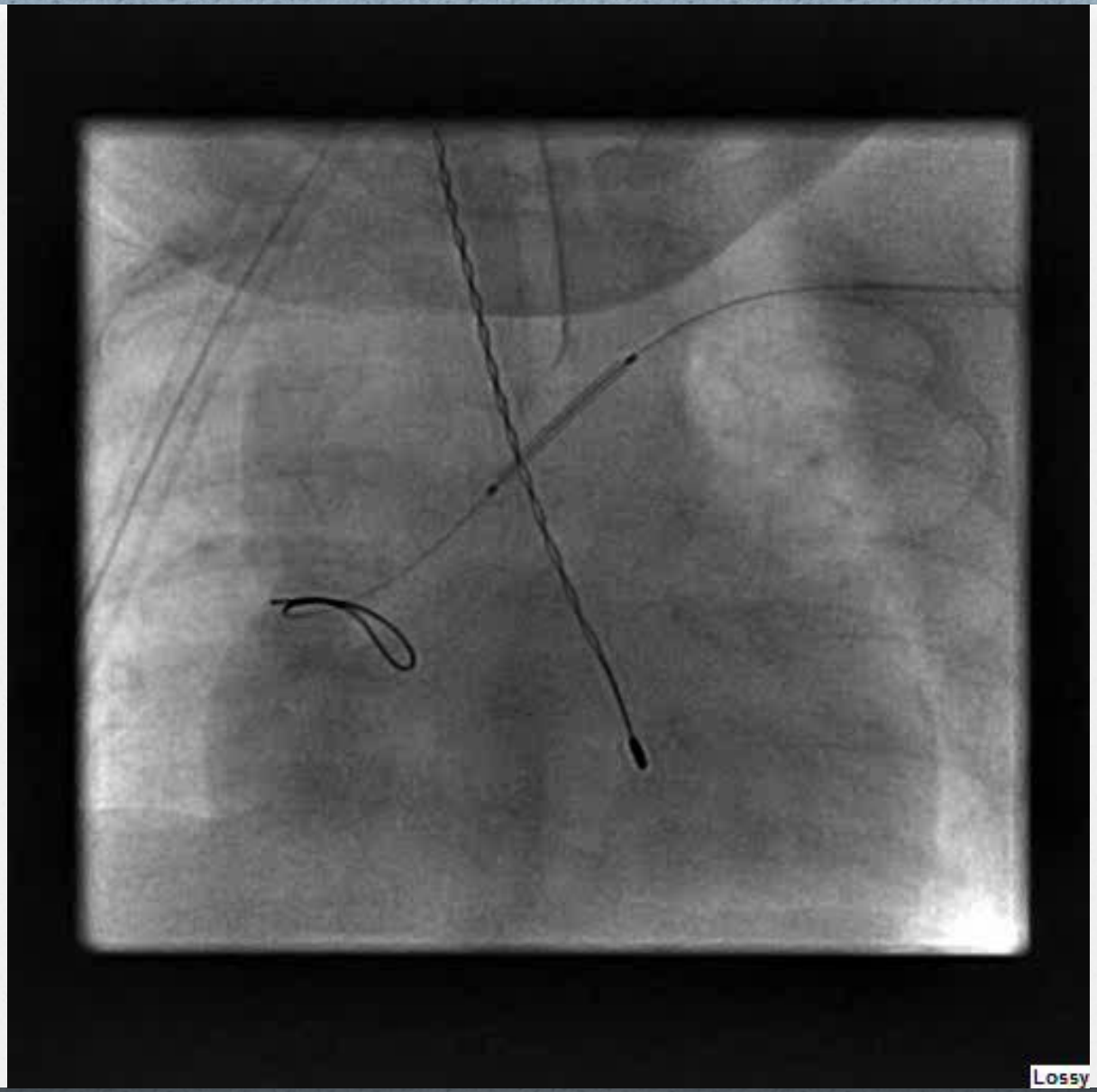
TABLE 1
A Prognostic Comparison between Modified and Classic Blalock-Taussig Shunts[30,38,48-57]

	Modified	Classic
Rise in SaO_2	Greater	Smaller
Post-shunt increase in the pulmonary arterial arterial index (mm^2/m^2)	158 ± 21	117 ± 52
Post-shunt pulmonary arterial index (mm^2/m^2)	431 ± 188	189 ± 106
Pulmonary arterial distortion (%)	6.1–50	17–75
Postoperative diaphragmatic paralysis requiring subsequent operation for placation (%)	4	10
Interval for an additional shunt/repair (month)	12.4	26.1–27.7
Adequate overall palliation (%)	98 (at eight months), 91(at 12 months), 58 (at 18 months)	87 (> one month of age) and 54 (< one month of age) (at four years)
The freedom from cardiac event (%)		80.5 (at one year) 54.9 (at three years)
Shunt patency (%)	88.8 (three and five years)	90 (at one year) 62 (at two years) 78.0 (at three years)
Early shunt failure (%)	20.8	51.7
Reoperation (%)	15.4	
Overall hospital mortality (%)	3.1–11	2.3–8 50 (< two weeks of age) 28 (two weeks to six months of age)

Percutaneous PDA stent

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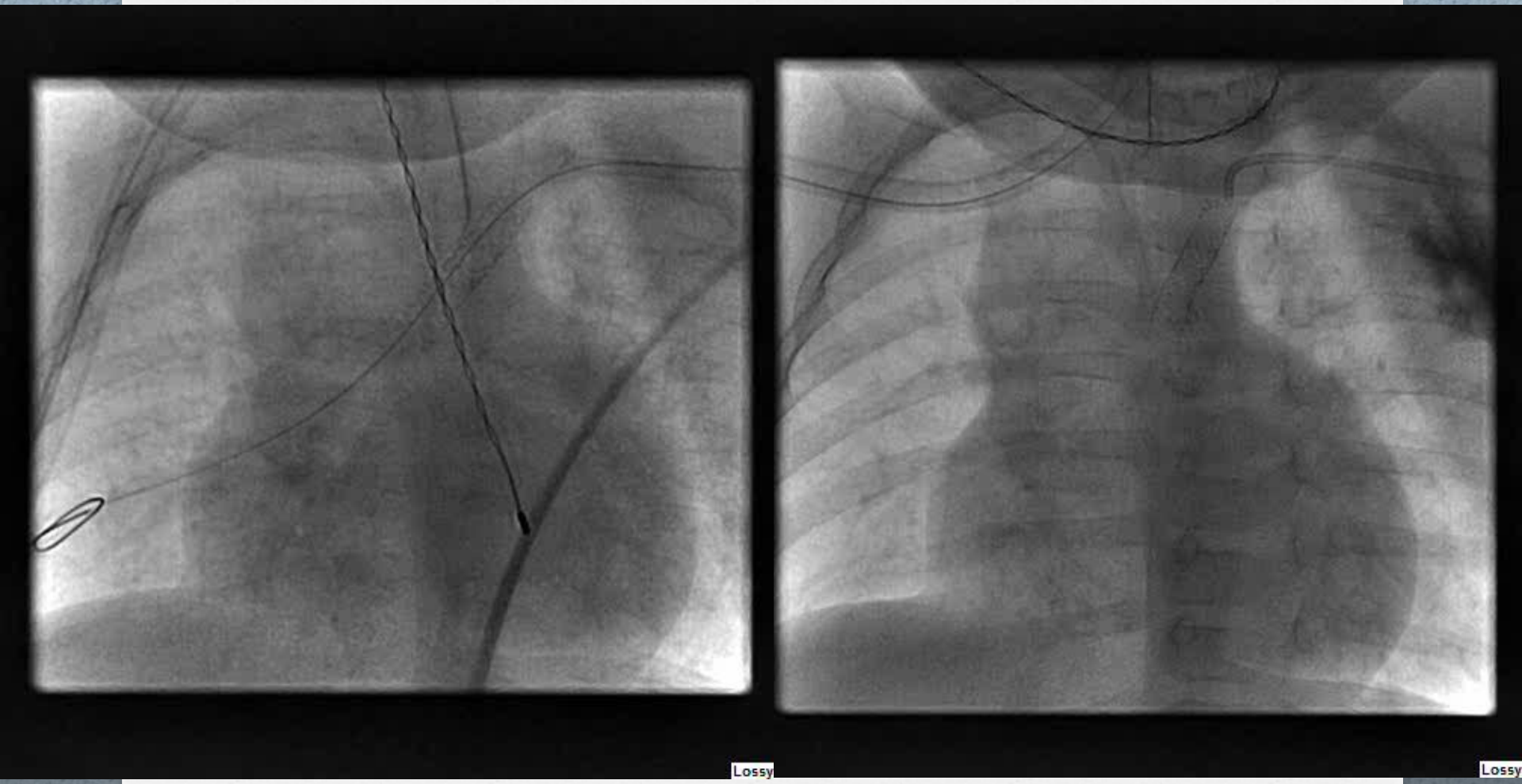
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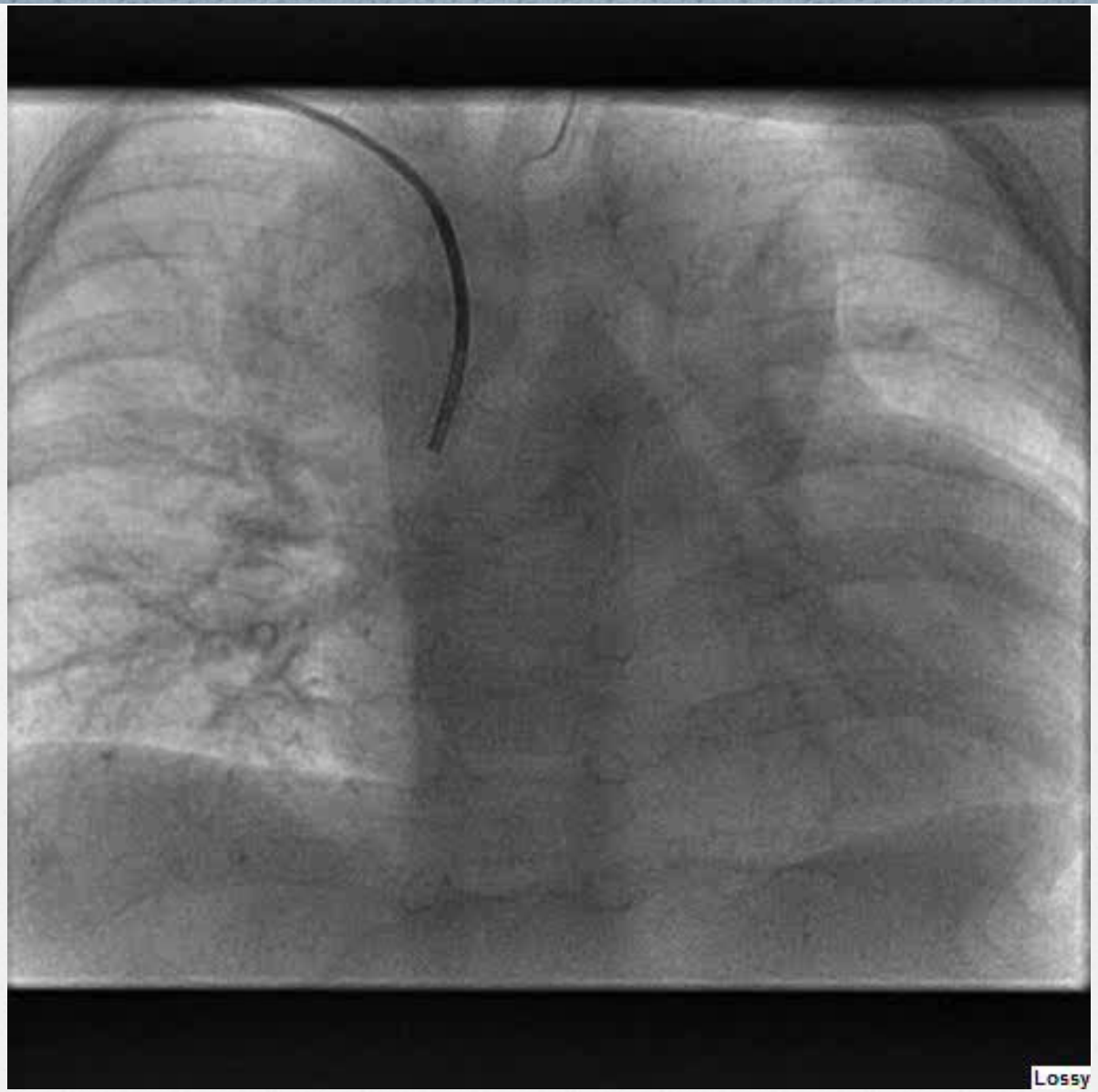
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Initial Results and Medium-Term Follow-Up of Stent Implantation of Patent Ductus Arteriosus in Duct-Dependent Pulmonary Circulation

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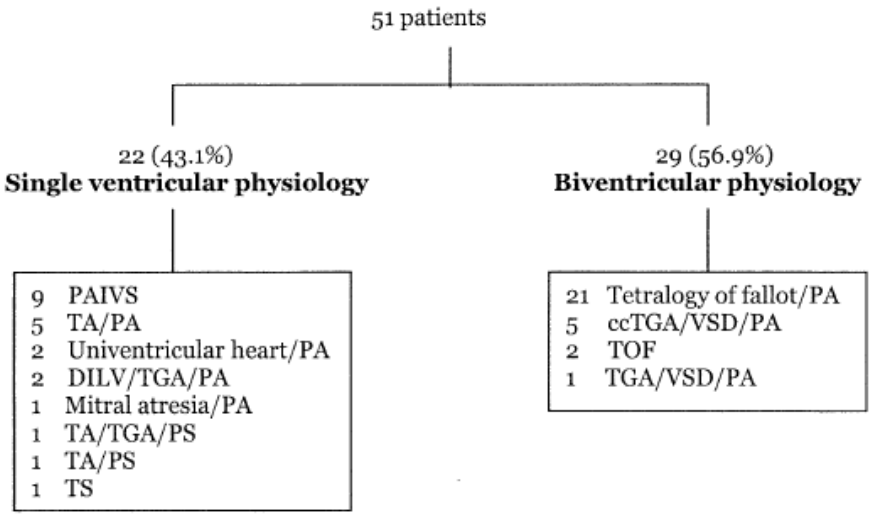

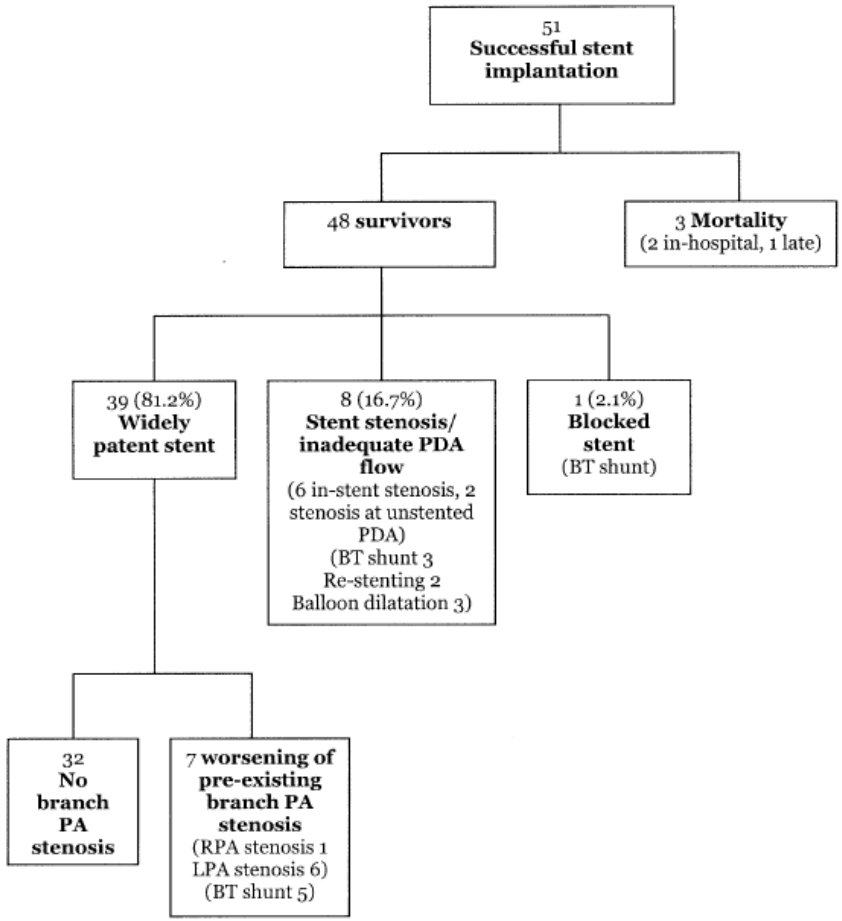

Objectives

- Assessment of :
  - Morbidity and mortality associated with BT shunt at our institution
  - Frequency and severity of pulmonary artery stenosis associated with BT shunt
- Subgroup comparison to PDA stenting

Methods

- Retrospective study following patients who underwent BT shunt and patients who underwent PDA stenting at our institution
- Clinical data of patients were collected:

Diagnosis
Patient demographics (gender, age at operation, weight)
Percentage of complicated cases (prematurity/heterotaxy/genetics/low birth weight)
Circulation type (univentricular or biventricular physiology)
Early mortality and survival to second operation
Presence of antegrade pulmonary blood flow
Non cardiac diagnoses
Complications

Methods

- Review of imaging including: echocardiogram, angiography and CT/MRI before the procedure and at set intervals in follow up
- Hypoplastic left heart syndrome patients were excluded

Initial results

- 149 patients were reviewed, 140 following BTS and 9 after PDA stenting (1 after both).
- 127 underwent modified BTS and 13 underwent classical BTS.

	BTS	PDA stent
Number	140	9
Gender M/F (%)	59/41	67/33
Survival (%)		
Survival to second surgery	54	44.5
Waiting for second surgery	2	44.5
Early mortality after procedure	12	0
Late mortality after procedure	4	11
Unknown	28	0

Summary

- Both procedures are good for pulmonary artery growth
- There is a high percentage of pulmonary arterial distortion and stenosis after BT shunt
- Therefore, our study examines the effect on the pulmonary arteries and examines the option of alternatives for the surgical BT shunt


Thank you!