

# Treatment of Obstructed BT Shunts: Stent Therapy



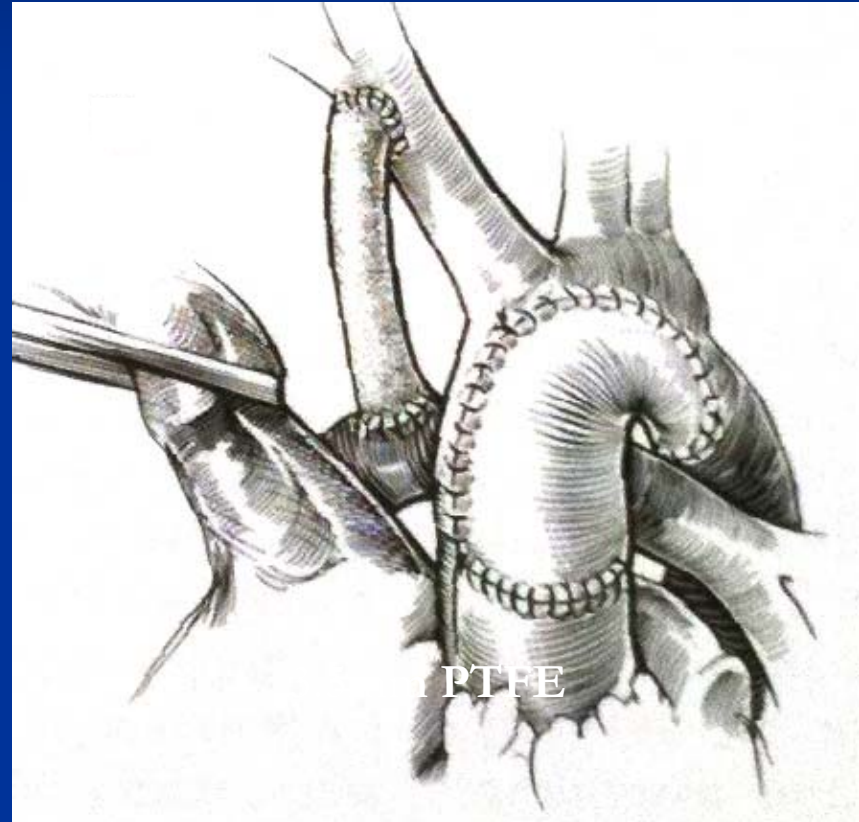
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# Background

- PTFE (Gore-Tex) graft as an AO-PA shunt has been performed since **1970's**
- Modified BT shunt (3.5 mm) is the most commonly used AO-PA shunt for Norwood Stage I and for other CHD requiring PBF
- BT shunt obstruction is rare but lethal, when present in SV



# CHIF Data: BT shunt



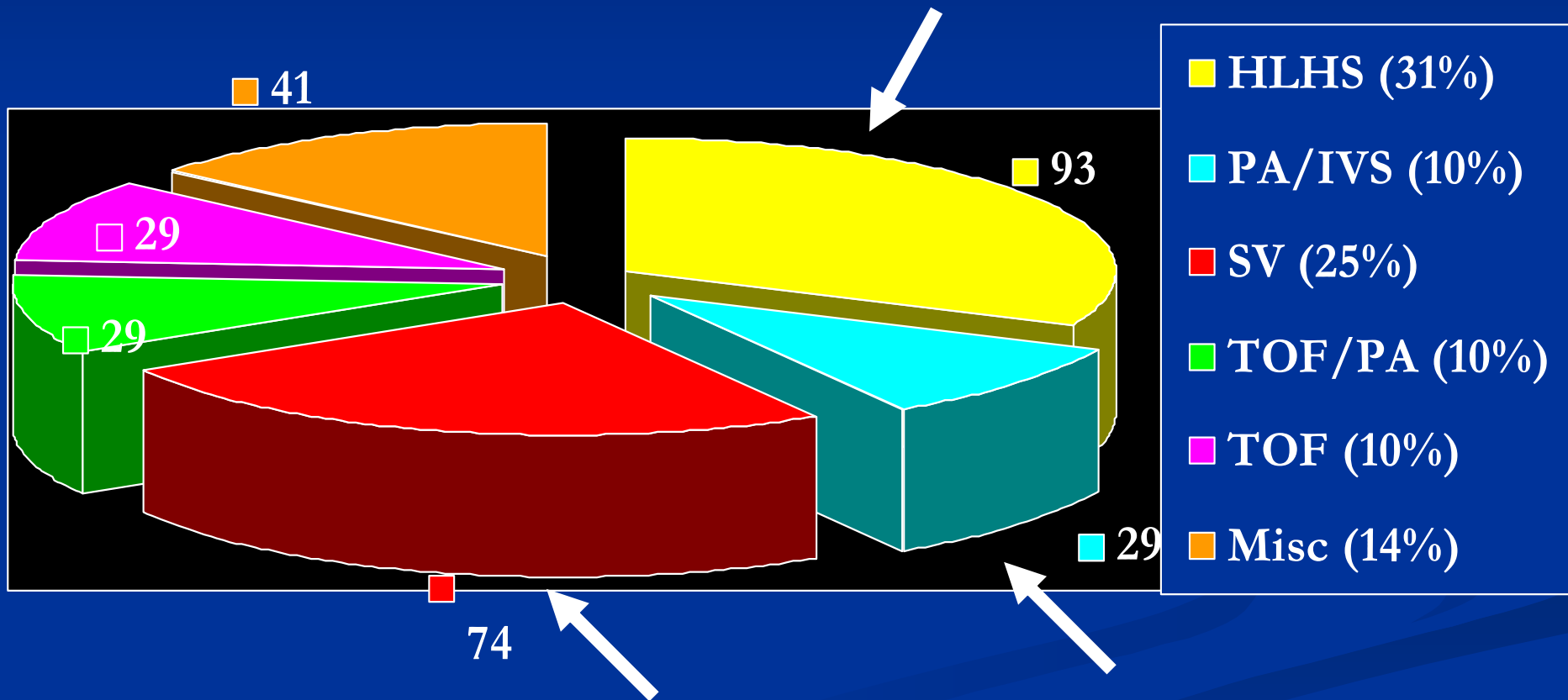
- Dates: 2000- 2010
- Total= **295** patients
- Age: 1-60 days (m=8 days)
- Sex: Female=125 Male=169
- Size: 3.5 mm PTFE graft (3-4mm)

Congenital Heart Institute of Florida (CHIF)

# Cardiac Diagnosis

Total=295

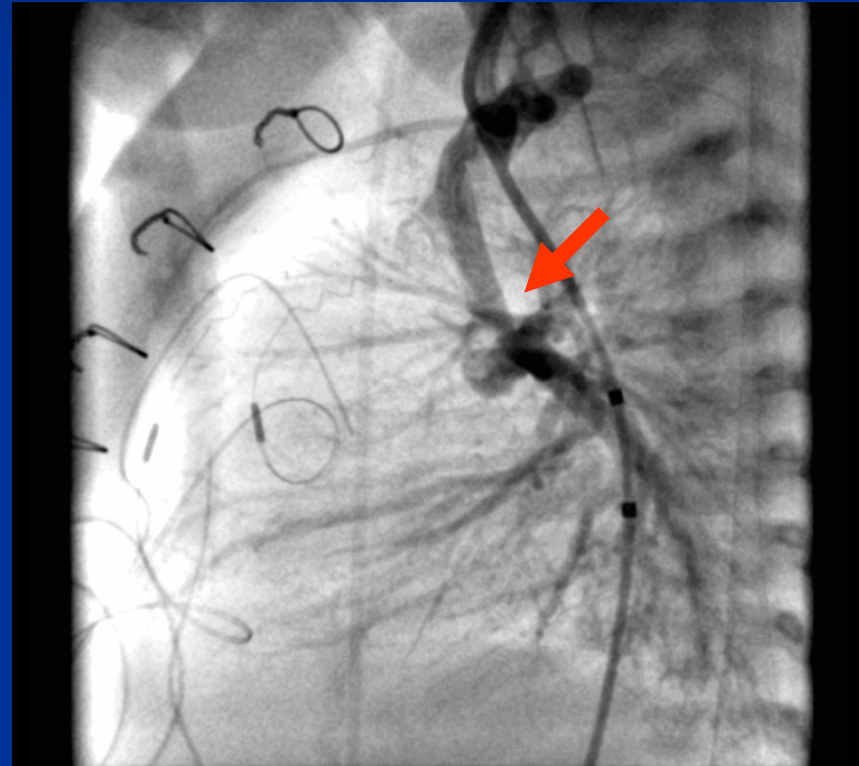
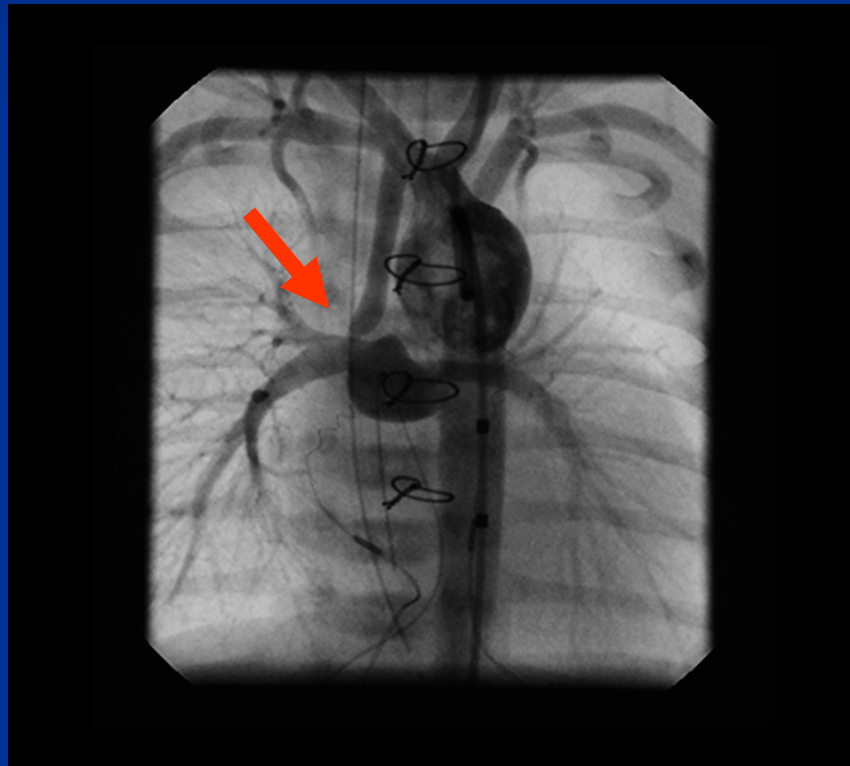
“SV” Physiology=196 (66%)



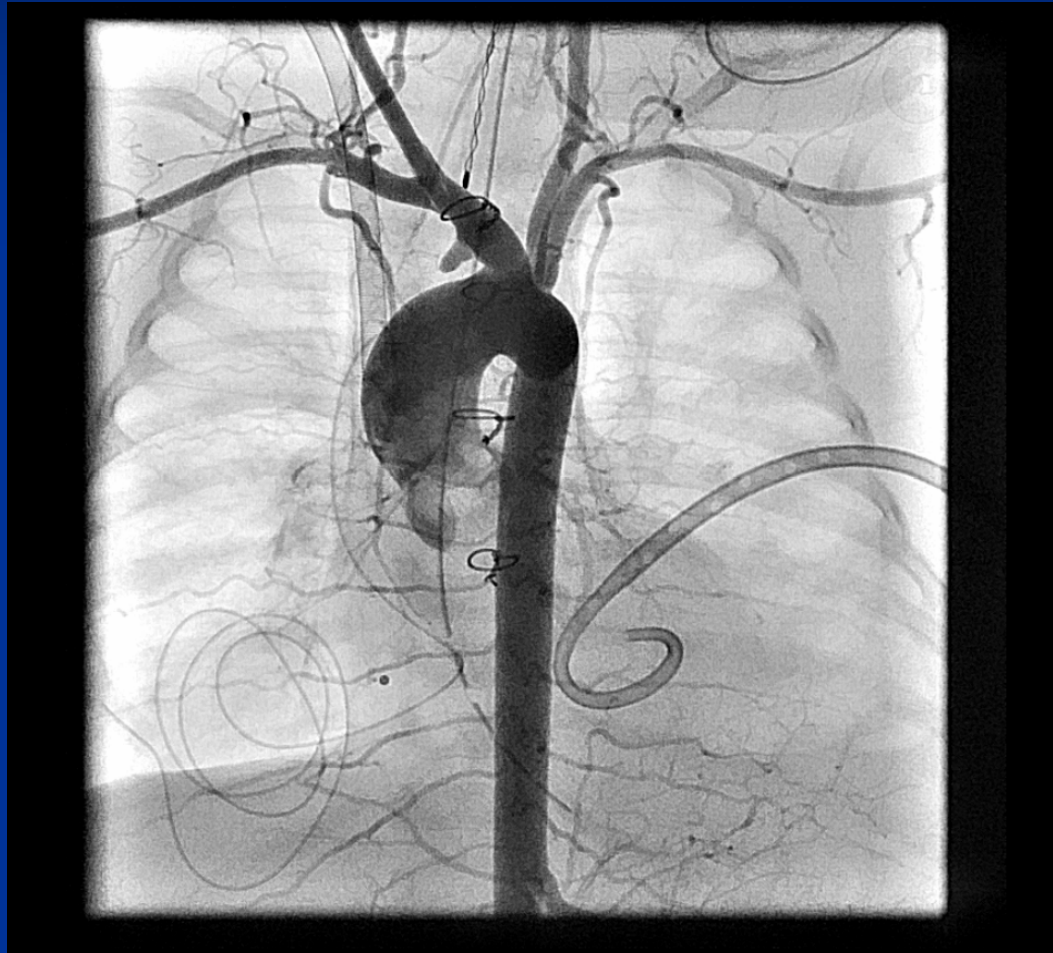
# BT Shunt Obstruction Requiring Intervention

- Total : 19 patients (6.4%)
- **\*\* 18 patients had SV anatomy (10.8 %)**
- Stent= 18 (balloon angioplasty=1)
- 1 patient underwent 2 BT stenting procedures (2 months apart for recurrent obstruction)
- Age : 9-131 days (m=46 days)
- POD: 5-119 days (m=25 days)
- Sex: Male=10 Female=9
- Wt: 2.6-6.2 kg (m=3.8 kg)
- **ECMO = 3 patients (1 patient twice on ECMO)**

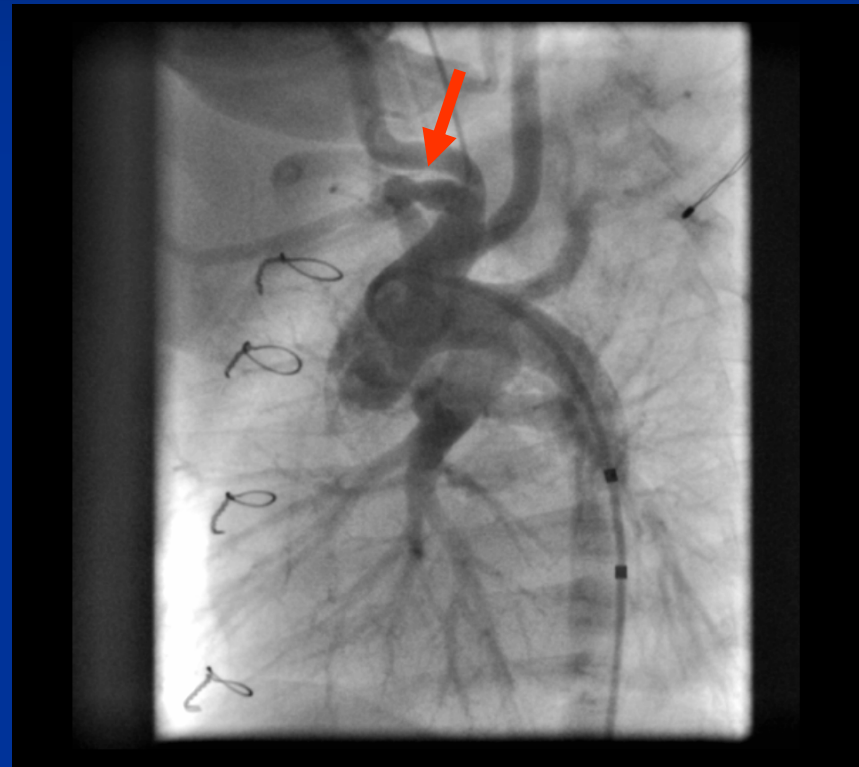
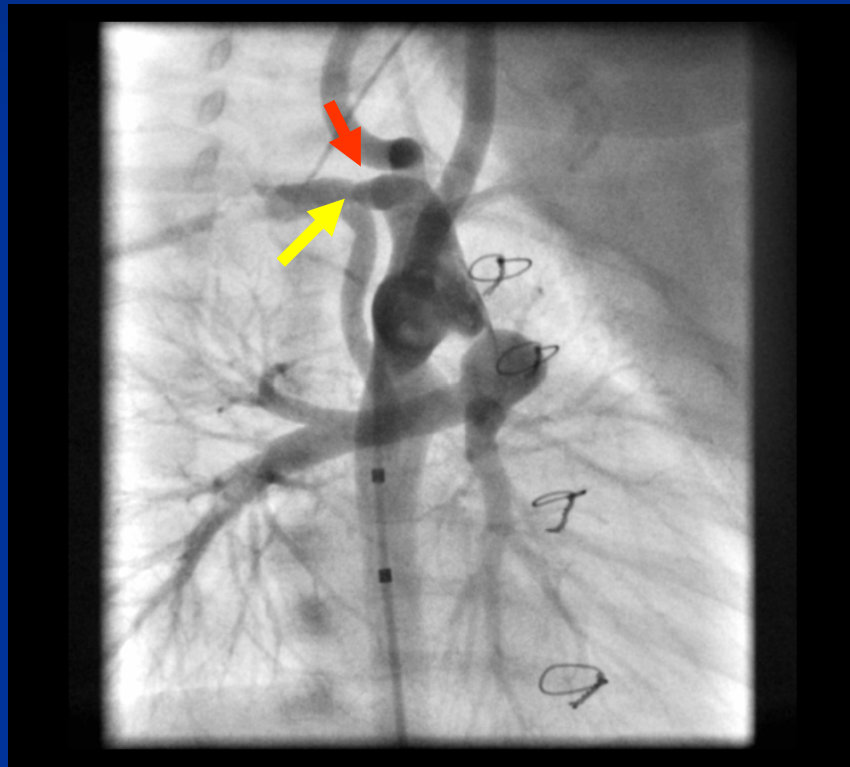
# Distal Shunt Stenosis (n=13)



# Types Shunt Obstruction Complete (n=3)

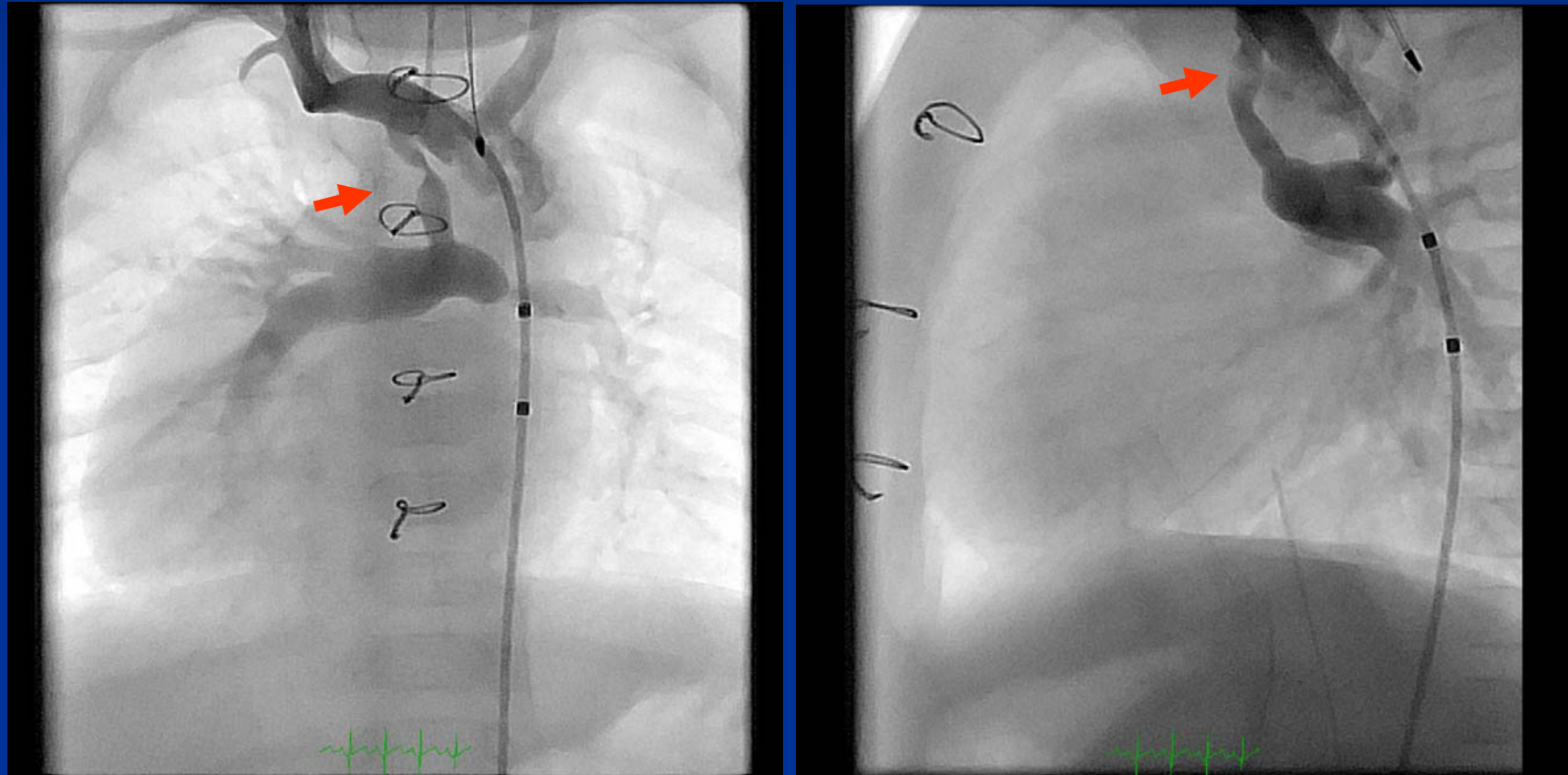


# Proximal Obstruction/Stenosis (n=2)





# Mid Shunt Stenosis (n=1)

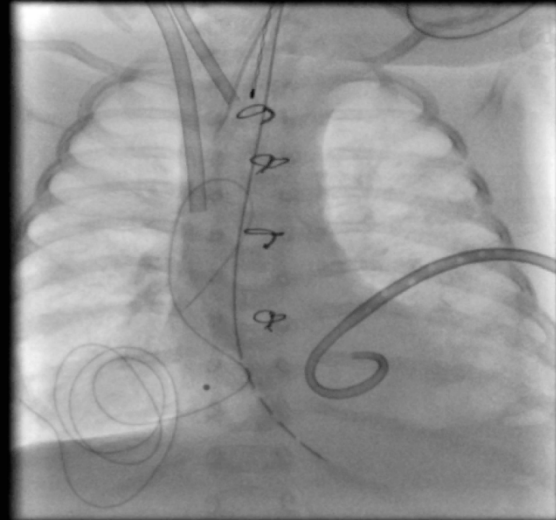


# Technique

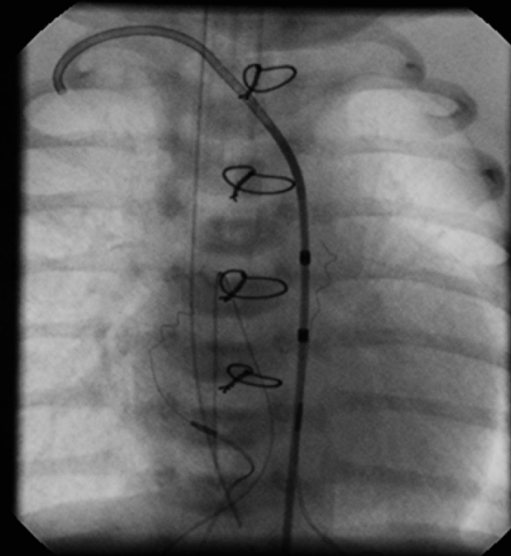
## 1. Diagnostic angiogram

- a) ECMO
- b) Retrograde
- c) Antegrade

## 2. Fully Heparinized ( 100 u/kg)

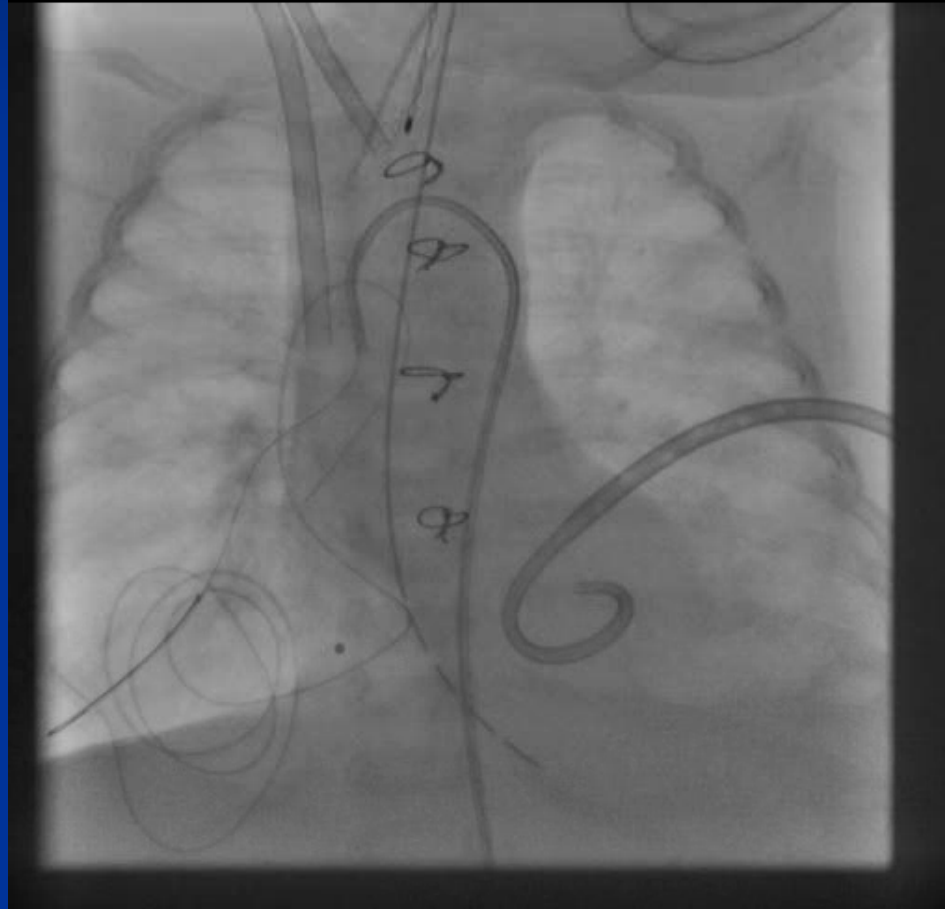


Lossy Compression - not intended for diagnosis



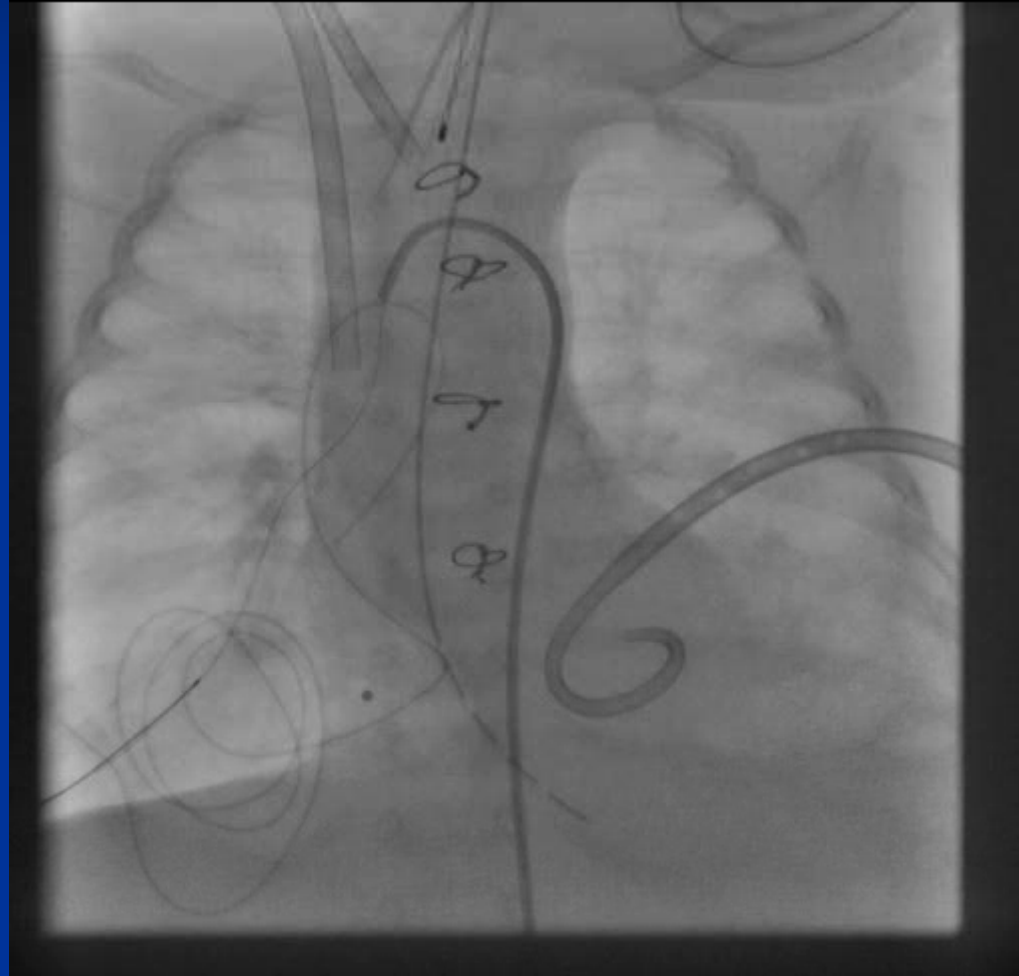
# Coronary Wire Placement

Lossy compression - not intended for diagnosis



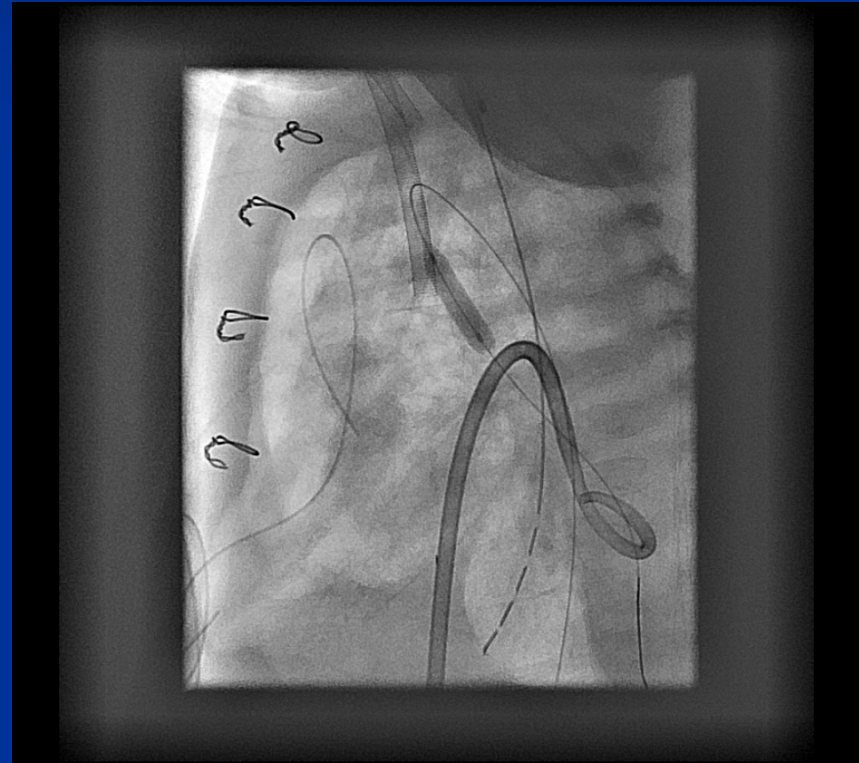
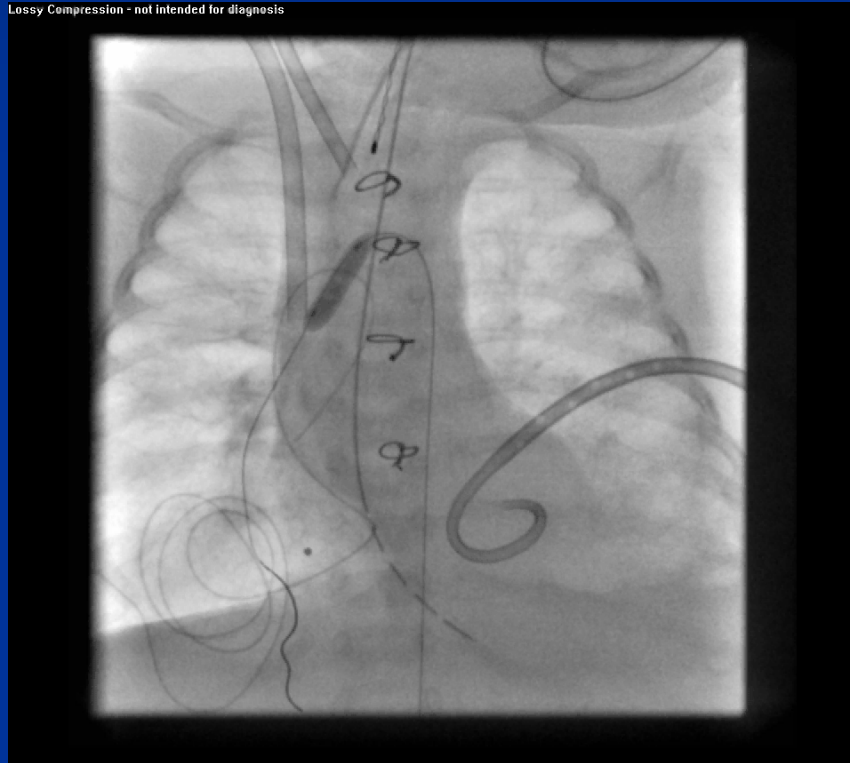
# Distal PA Patency

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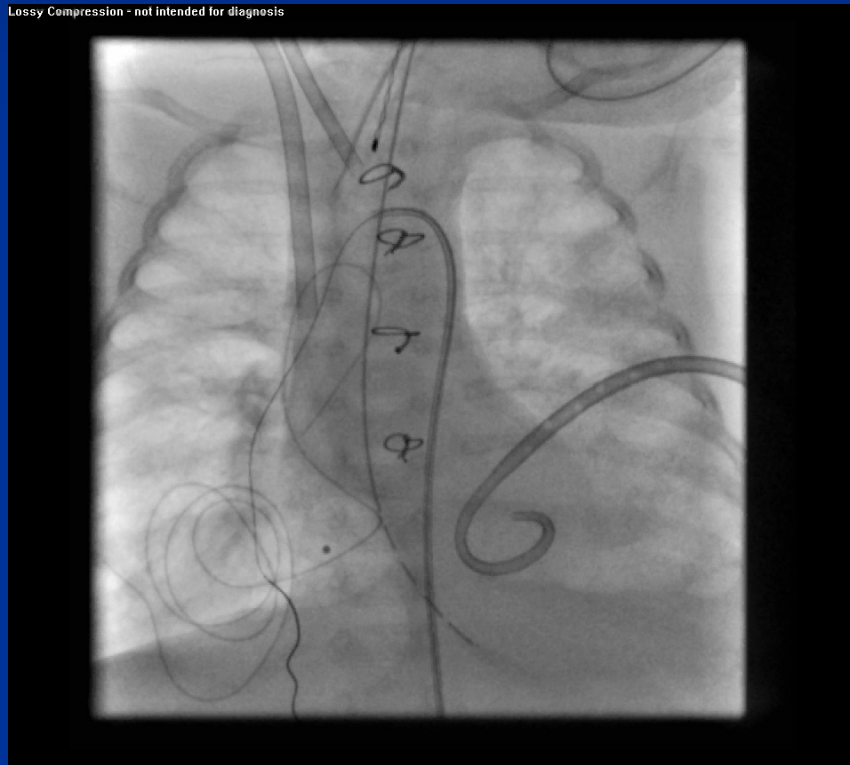
# Coronary Balloon Angioplasty/Thrombotomy

Lossy Compression - not intended for diagnosis



# Post Balloon

Lossy Compression - not intended for diagnosis

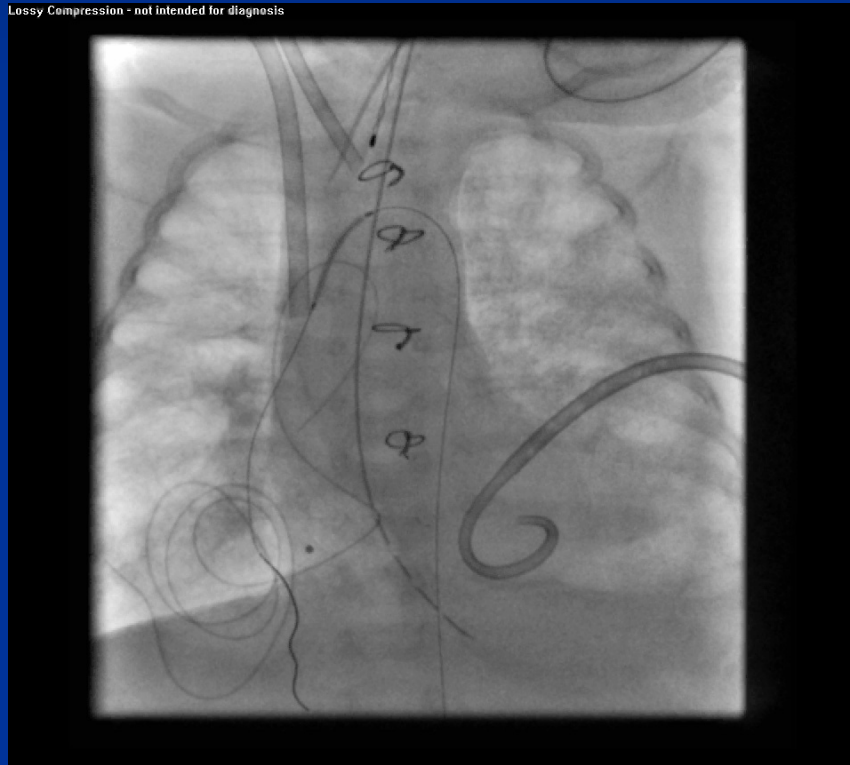


Lossy Compression - not intended for diagnosis



# Stent Position

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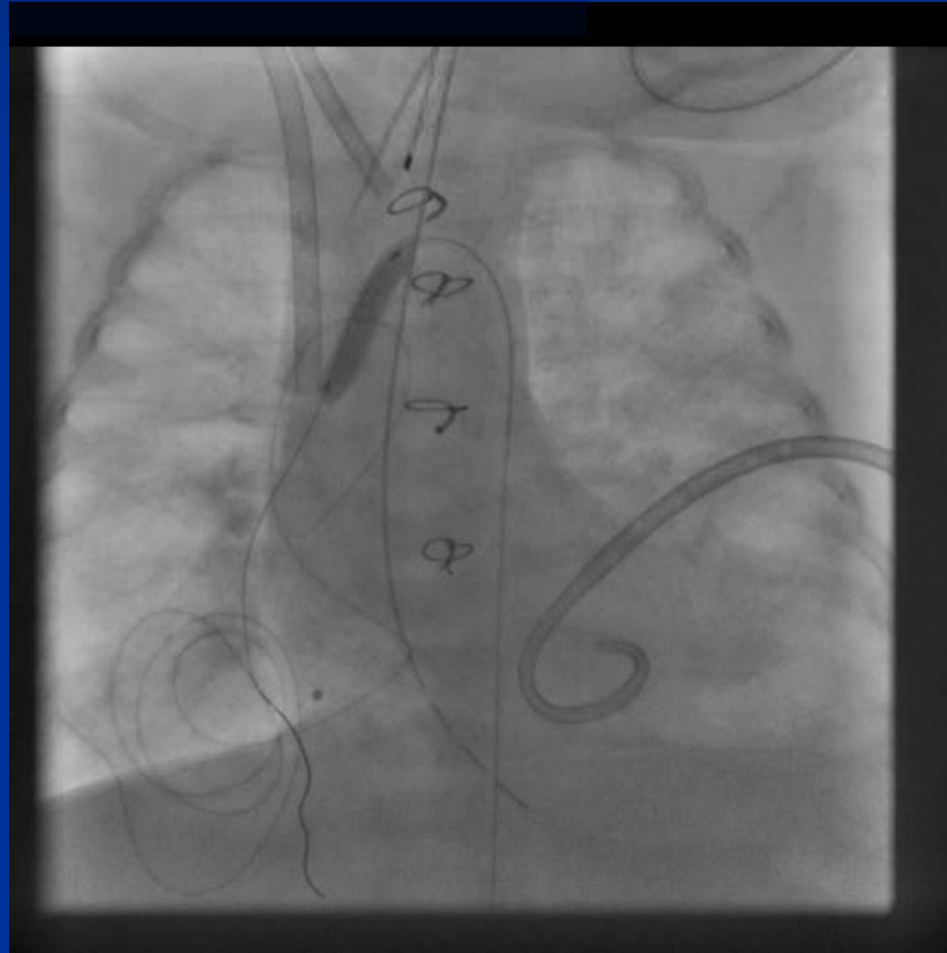
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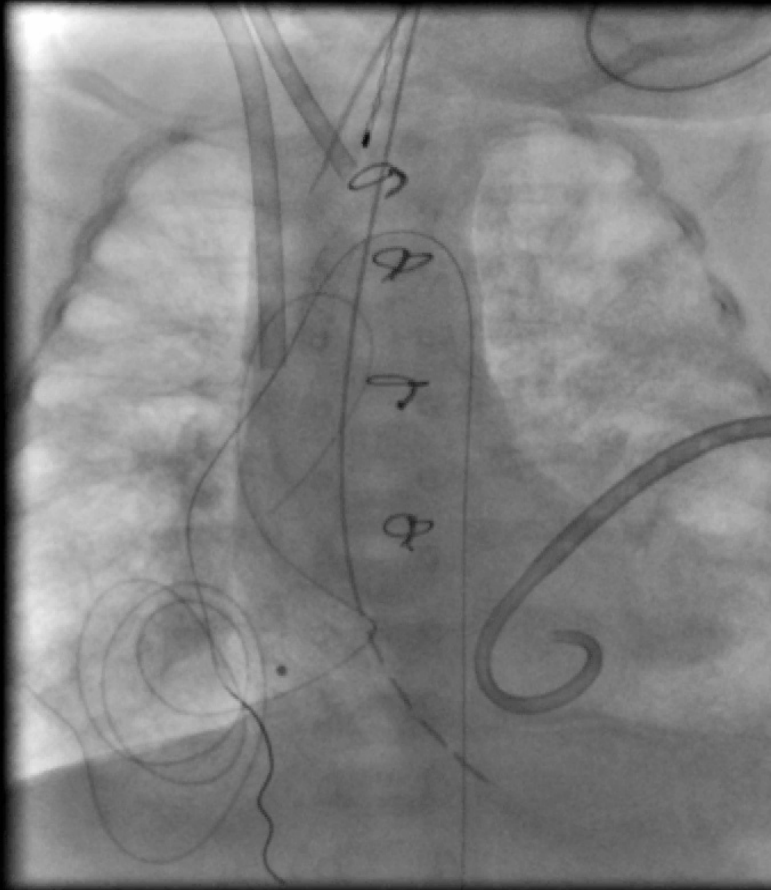
# Stent Deployment



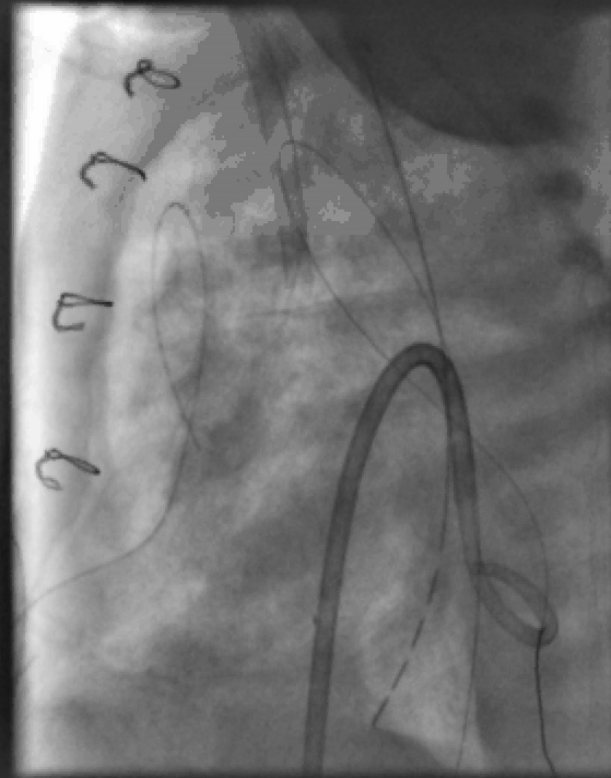


# Post Stent Implantation

Lossy Compression - not intended for diagnosis



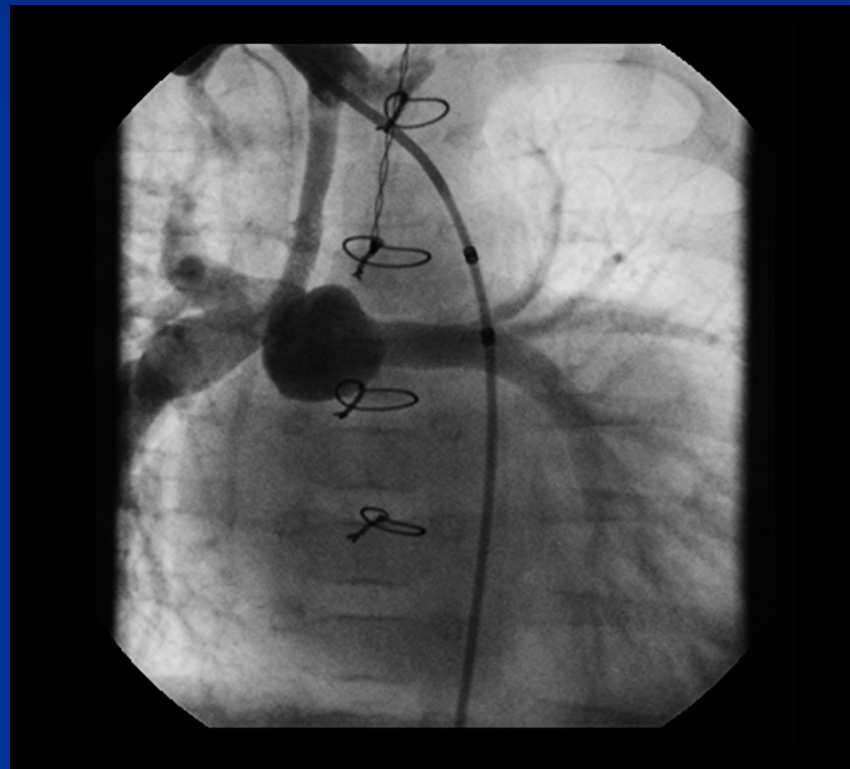
Lossy Compression - not intended for diagnosis



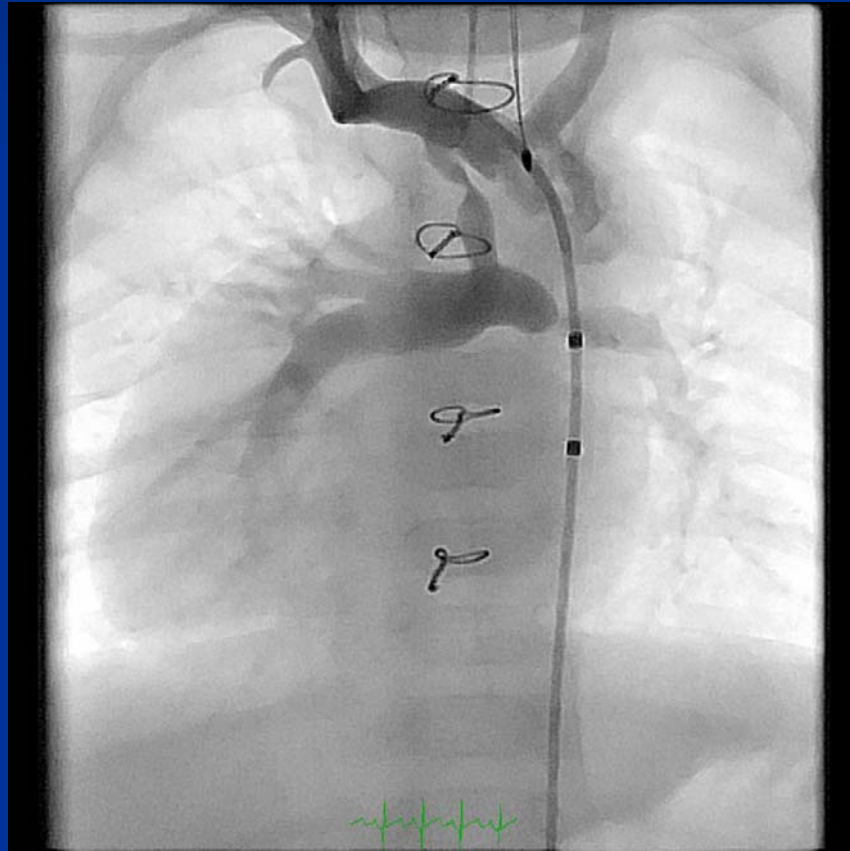
Pre



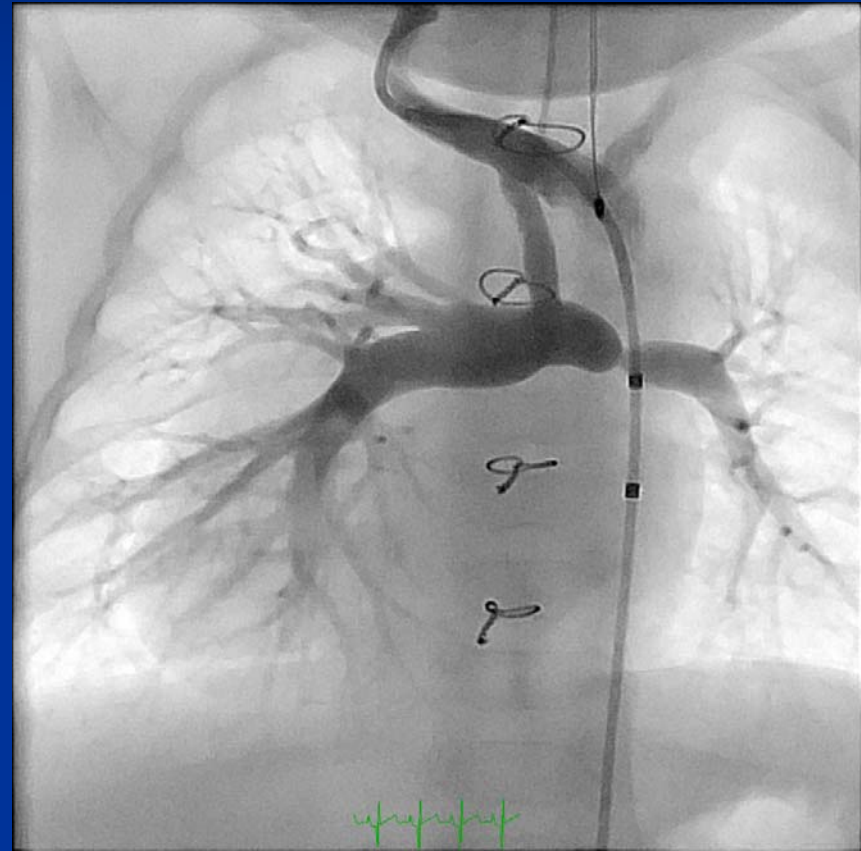
Post



Pre



Post



Pre



Post



# Vascular Approaches to Stent Deployment

## Retrograde (13):

- most commonly utilized approach.
- More direct and less tortuous approach than antegrade.
- Less likely to cause arrhythmia

## Antegrade(1):

- less vascular complication, but even 014 wire placement may cause significant TR and neoAI i.e. hemodynamic instability

Carotid Cut down (4): most direct pathway. Useful in extremely small infants.

ECMO Cannula (1): if no vascular approach is available.

# Post Stent Management

1. Heparinize overnight ( 50u/kg bolus with continuous infusion 15-20 u/kg/hr)
2. Continue with ASA in PO fed patients
3. In patients with thrombotic shunts, ASA + Plavix (0.2 mg/kg) or ASA + Lovenox

# Complications

1. Retroperitoneal hematoma (1)
2. Femoral artery compromise requiring heparinization >24 hr (4)
3. PRBC Transfusion during the procedure (9)
4. Arrhythmia requiring treatment (3)
5. No death during the procedure

# Results

- 30 day Mortality: 0
- Total PreGlenn Mortality: 4/19 (21%)
- \* Total *Long-term* Survivors: 15/19 (79%)

\* Definition of *Long-term*: survival to Bidirectional Glenn stage



# Conclusion

1. BT shunt stenting procedure is an effective palliation for shunt obstruction.
2. A bridge to Bidirectional Glenn (hemi-Fontan) in reducing overall first stage mortality

# Incidence of Shunt Obstruction

