CATHETERIZATION PROTOCOL
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Cath Procedure Diagnosis  Native Coarctation and Recoarctation of the Aorta Balloon Dilation/Stent Implantation

Indications: > 20 mmHg BP gradient or systemic hypertension
Contra-indications: Infants less than 3 months - high incidence of restenosis (>80%)

Hospitalization Requirement  Same day admission

Blood on hold  1 unit PRBC

Pre-Cath Preparation:
Physical examination: 4L BP, pulses
Echocardiogram: arch anatomy & measurements, peak gradient, LVH, function, associated intra-cardiac defects
CXR
ECG
MRI/CT: to further delineate arch anatomy (often needed in non-infants)

Cardiac Catheterization:
Access: femoral artery
 +/- femoral vein (RA→LA via PFO/transeptal puncture→LV→AscAo (generally for older patients undergoing stent implantation)

Heparinize: 50-150 u/kg (dose staff-dependent)

Catheters: *Pigtail (marker Pigtail available)/Gensini/Cobra for femoral artery
Berman angio for femoral vein

Baseline Hemodynamics/Angiography:
Aortic arch gradient – simultaneous or pullback
Angiography: Aortogram - straight lateral and LAO (15-20°) or RAO (RAA).
  If overlap of isthmus on descending aorta try caudal tilt (10-20° on LAO)

Measurements: ascending/transverse aorta, isthmus, coarctation, post coarctation aorta, descending aorta at diaphragm

Intervention:

A. Angioplasty – balloon sizing principles (NOT ABSOLUTE – just guidelines!!!)
  1. ≤ aorta at diaphragm
  2. within 1-2 mm > aorta at level of LSA
  3. 2-3 x minimal diameter but < 1.5X transverse aorta just distal to LSA
  4. = isthmus diameter
5. 2x coarctation segment but less than aorta at diaphragm level (>3x higher risk of deep, extensive tears)

Technique: Short inflation times 5-10 seconds but repeated (2-4 times) by hand inflation

B. Stent implantation:
Stents: Palmaz or Genesis stents
Balloons: Z-Med, Cordis NOT low pressure e.g. Tyshak (higher risk of rupture)
Balloon size: variable depending on surrounding aorta
Technique: Exchange guide-wire in AscAo, RSA, LSA depending on anatomy
Mullins sheath loaded with stent/balloon
Advance stent/balloon out of sheath except proximal portion.
Dilate distal portion first (decreases risk of stent migration), then advance pull back sheath over proximal portion of balloon/stent and inflate fully by hand.
Balloon catheter out keeping Mullin’s sheath in aorta for pressures/angio.

Antibiotics if stent implanted, 1 dose during catheterization

Post stent implantation
Repeat pressure measurements & angiography.

Post-Cath Management:
Pulses: Treat decreased pulses aggressively.
BP: 4 L BP’s prior to discharge
Special: Attention to paradoxical arterial hypertension (treat aggressively to prevent dissection)

Follow-up: 3-6 months clinic with echo/ECG
CT angio: 1 year after stent implantation to monitor for aneurysm formation

Discharge medications: No ASA needed. Anti-hypertensive drugs if indicated

References:

Lock- Diagnostic and Interventional Catheterization in Congenital Heart Disease. 2000

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Comparison of Angioplasty and Surgery for Neonatal Aortic Coarctation, Ann Thorac Surg, 2005

Endovascular Management of Aortic Coarctation, International Journal of Cardiology, 2004
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