Coarctation of Aorta accounts for approximately 7% of all congenital cardiac defects, with high occurrence in males.

- Associated arch hypoplasia is common.
- Associated lesions: bicuspid aortic valve, PDA, VSD, anomalous right subclavian artery.
Diagnosis and patient selection

• Clinical examination
• Echocardiography
• MSCT
• MRI

Echocardiography
Indications of Balloon Angioplasty/ stenting

**Balloon Angioplasty**
- Neonatal period and/or first 6 months of life in case of poor LV systolic function, sepsis, hemorrhage
- Discrete coarctation whether native or S/P surgery < 15 Kg
- Children below 6-8 years
- Adults with favorable anatomy.

**Stenting**
- Native or s/p surgery - weight > 15-20 Kg
- Long segment coarctation
- Associated hypoplasia of isthmus and/or aortic arch
- Tortuous coarctation
- Recurrent after surgery or aneurysm following prior balloon or surgery
**Equipment – neonates and children**

- 4-5F introducer
- Multipurpose, pigtail, JR
- 0.018, 0.025, 0.035 GW
- Tyshak mini in neonatal period
- Older children – Tyshak II, Opta, Z-med, Powerflex

Tyshak mini Double Tapered Balloon
- Super thin for a low deflated profile that maintains tip flexibility.
- Exceptionally low profile
- Requires the smallest introducer possible.

**Stents for neonates and small children**

**Formula Balloon expandable stent**
- Cook
  - Open cell
  - Low crossing profile
  - No shortening
  - 5-10mm can be redilated
  - 4-5F flexor sheath – 6F coronary guide cath

**VALEO Balloon expandable stent**
- BARD
  - Uniquely flexible stent
  - Competitive radial strength with minimal recoil
  - 6-10mm can be redilated - forshortens
  - 6-7F sheath – 7F coronary guide cath
The Z-MED™ high pressure dilatation catheter is a coaxially constructed catheter with a distally mounted non-compliant high pressure balloon.

**BIB balloon**
An inner balloon 1/2 of the balloon diameter of the outer balloon, 1cm shorter and has a burst pressure of 45-5atm.

**Equipment**

- Balloon expandable stainless steal.
- Closed cell design which gives them high radial strength but makes them less flexible.
- Hand mounted and crimped on the delivery balloon.
Equipment

- Composed of 0.013” platinum/iridium wire that is arranged in a “zig” pattern, laser welded at each joint and then over brazed with 24K gold.
- It allows expansion from 12.0mm to 24.0mm.

The **Covered CP Stent™** is comprised of the Bare CP Stent that is covered with an expandable sleeve of ePTFE.

Hand crimped or balloon mounted

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Balloon Angioplasty – step by step

- Femoral artery access – 18G needle or 19G scalp
  - Anatomic or ultrasound guided
- <10kgs 3-4F sheath
- Heparin 100 units/kg
- Crossing Multipurpose catheter or JR
- PTCA wires (hydrophilic)
- Pressure gradient and Angiography – pigtail catheter
- Balloon positioning – inflation
- Final Pressure gradient and angiogram
- Hemostasis to avoid complications
Femoral artery access

- The bifurcation of the CFA occurs in zones 2, 3, 4 and 5, 1%, 9%, 43% and 47% of the time, respectively.
- Occurs within the lower third of the femoral head or below the lower border of the femoral head in 90% of patients.

A 18 G needle could be ideal. 
Puncture the skin at zone 5 inferior border of head of femur. Enter the artery at mid point in the Zone 3. 
The chances of hitting the femoral artery is near 95%.

Step by Step Stenting

- Femoral artery access – heparin 100U/KG – ACT > 200
- Angiogram in descending aorta
- Crossing the coarctation
- Angiogram above coarctation – measurements
- Crossing with the stiff wire
- Long mullins sheath [ size depending on balloon and stent used ]
- Preparing balloon and crimping the stent
- Confirming position
- Stent deployment
- Withdrawing the balloon inside sheath
- Final pressure gradient and angiogram
Size of balloon and stent

Long sheath
Preparing balloon

Crimping the stent
Stent positioning - Rotational angio

In conclusion

• Balloon angioplasty in children, and stent deployment in adolescents and adults are considered the standard of care.
• The anatomy of the coarcted aortic segment and the aortic arch would greatly influence the method of therapy in a given patient.
• Depending on the experience of the center most coarctations can be treated in the cath lab with only cases with very complex anatomy to be referred to surgery.
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For more information please visit the website:
http://wwwcsi-congress.org/csi-africa.php