How to Perform Percutaneous Balloon Aortic Valvuloplasty in Children?

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Mumbai

Agenda

- Indications
- Pre procedural evaluation
- Anesthesia
- Access
- Crossing the aortic valve
- Choice of the balloon
- Use of ventricular pacing
- Complications

Indications

- Symptomatic AS with a PPG of 50 mm Hg with normal LV function
- Presence of LV dysfunction
- Asymptomatic AS:
  - ST-T changes on ECG and transaortic gradient of > 60 mm (PPG)
  - PPG of > 50 mm Hg: competitive sports/pregnancy

Preprocedural Evaluation

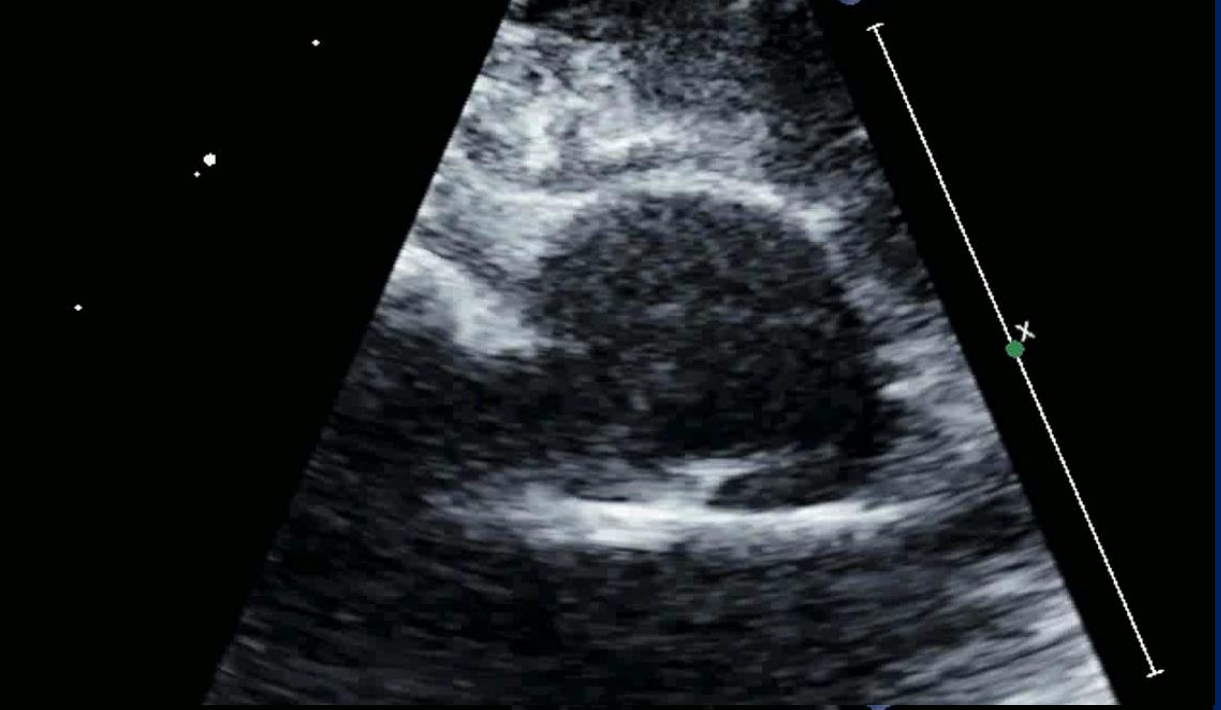
- Clinical evaluation
- Hb, CBC
- ABG and S Electrolytes
- BUN, S Creatinine
- X-ray chest
- ECG
- Comprehensive Echo: Extremely essential

Echo

- Aortic valve morphology:
  - True unicommissural
  - Functional unicommissural
  - True bicommissural
  - Functional bicommissural (raphe)
  - Tricommissural
  - Dysplastic
- LV function

Echo

- Aortic annulus
  - Zoomed image
  - In systole
- Presence of AR
- Assessment of aortic root and ascending aorta
- Associated lesions (CoA, PDA)
- Helps you plan, prognosticate, contemplate problems and take necessary actions

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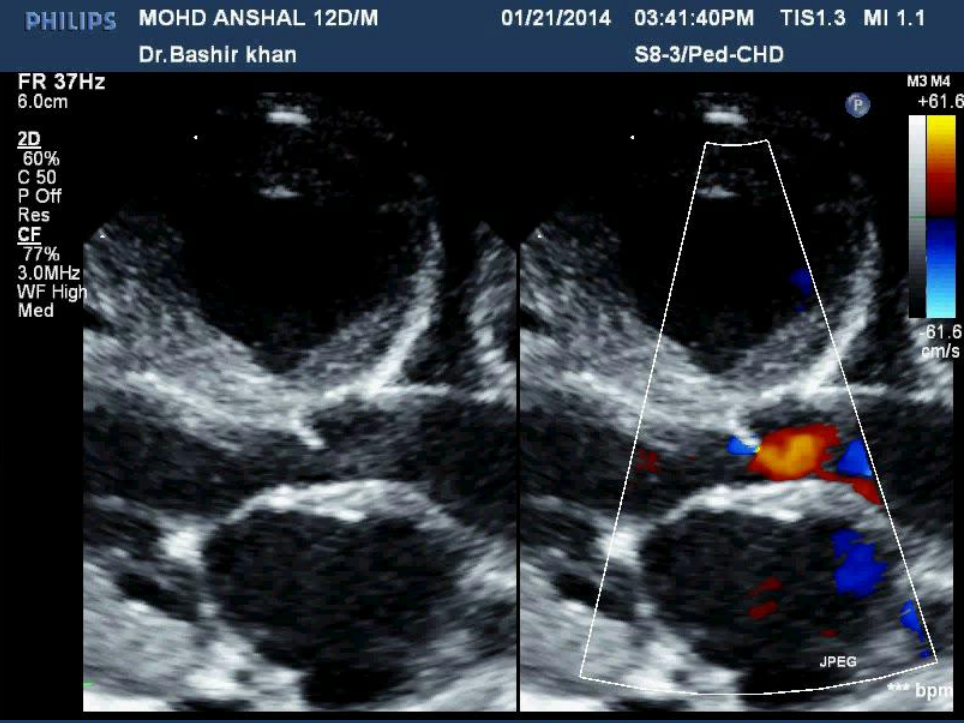
*** bpm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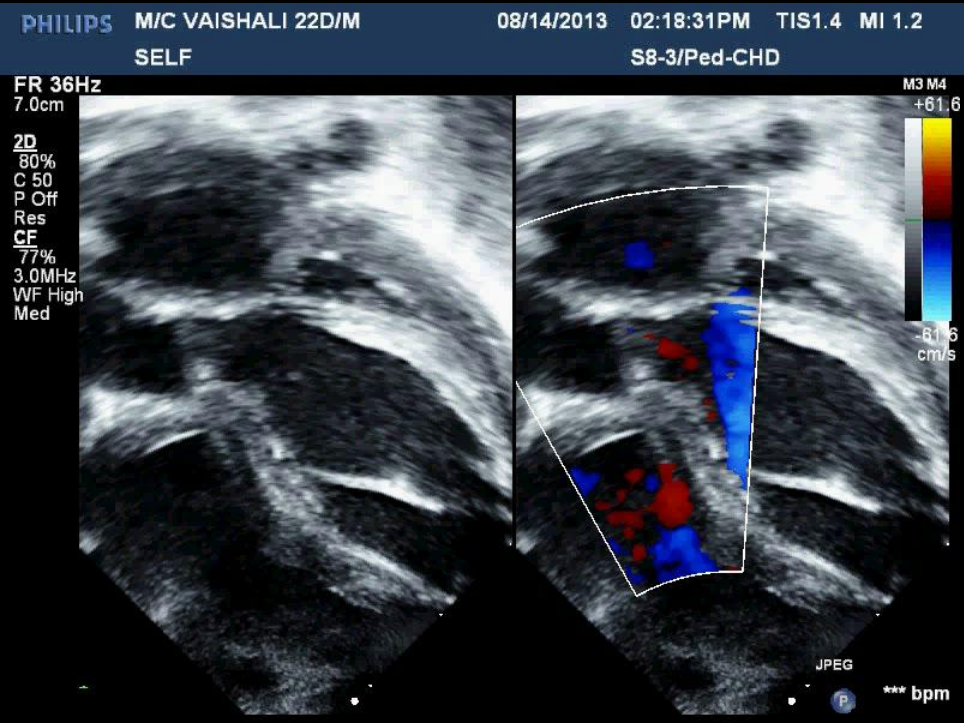
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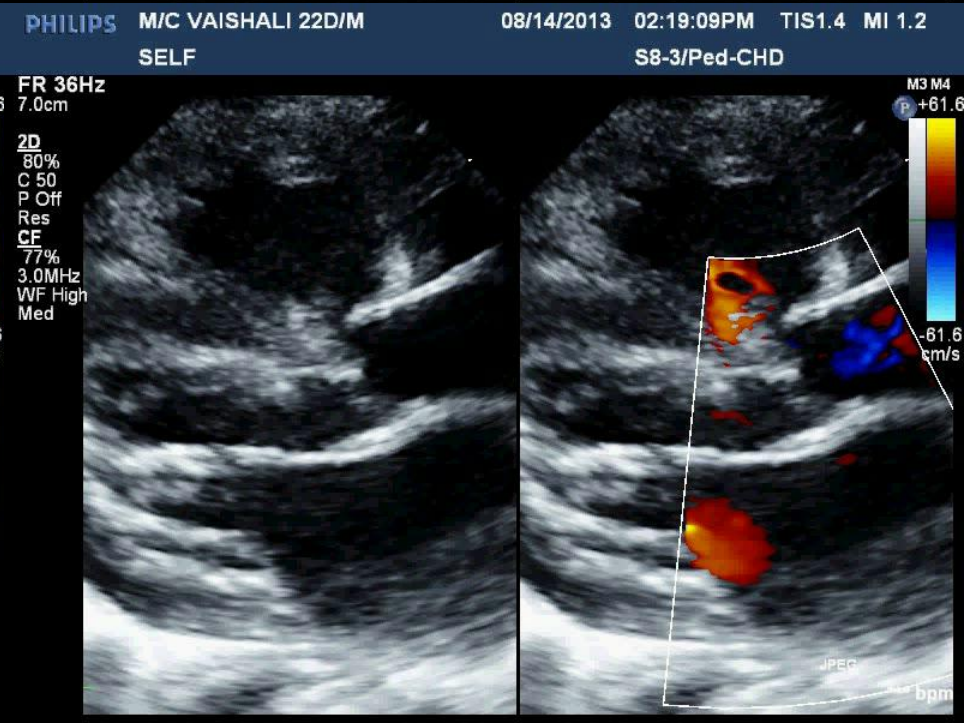
*** bpm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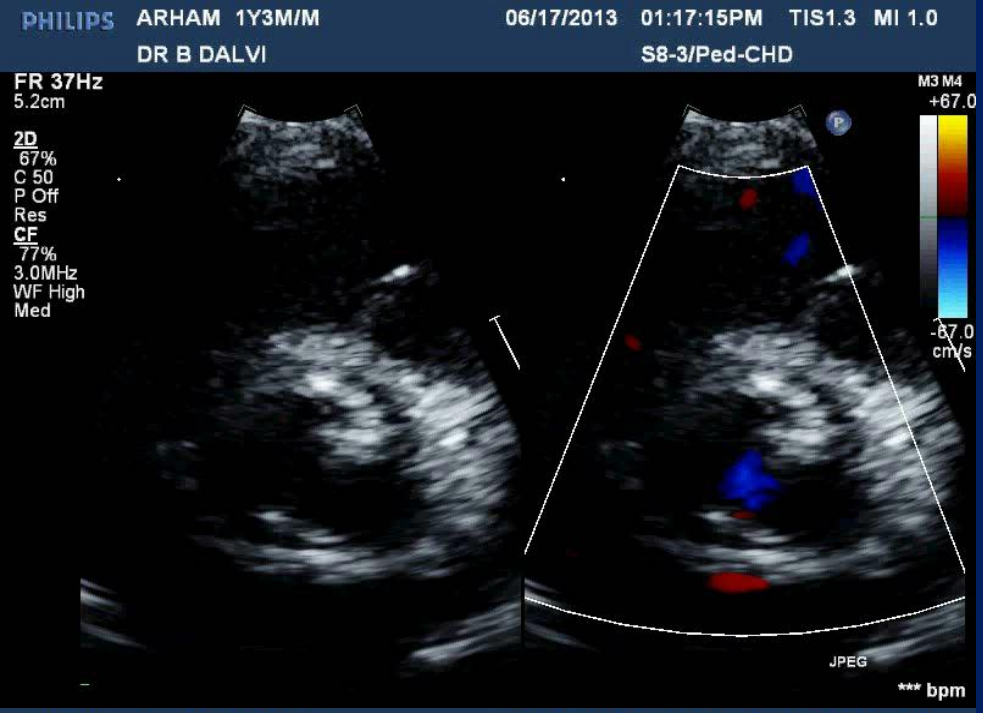
cm/s
JPEG
*** bpm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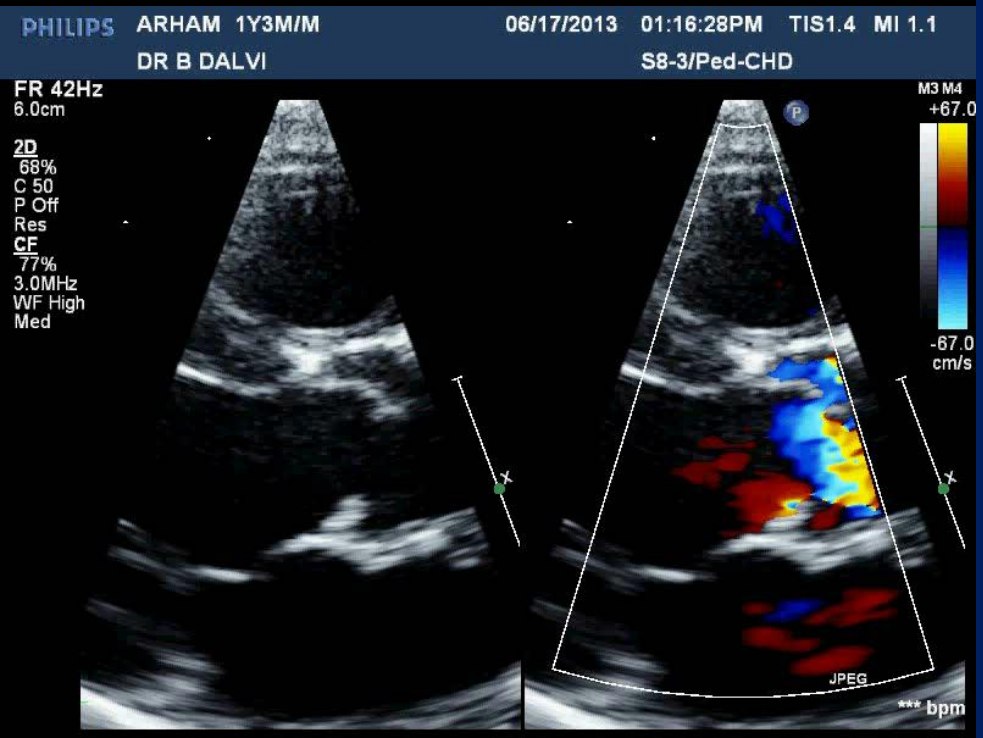
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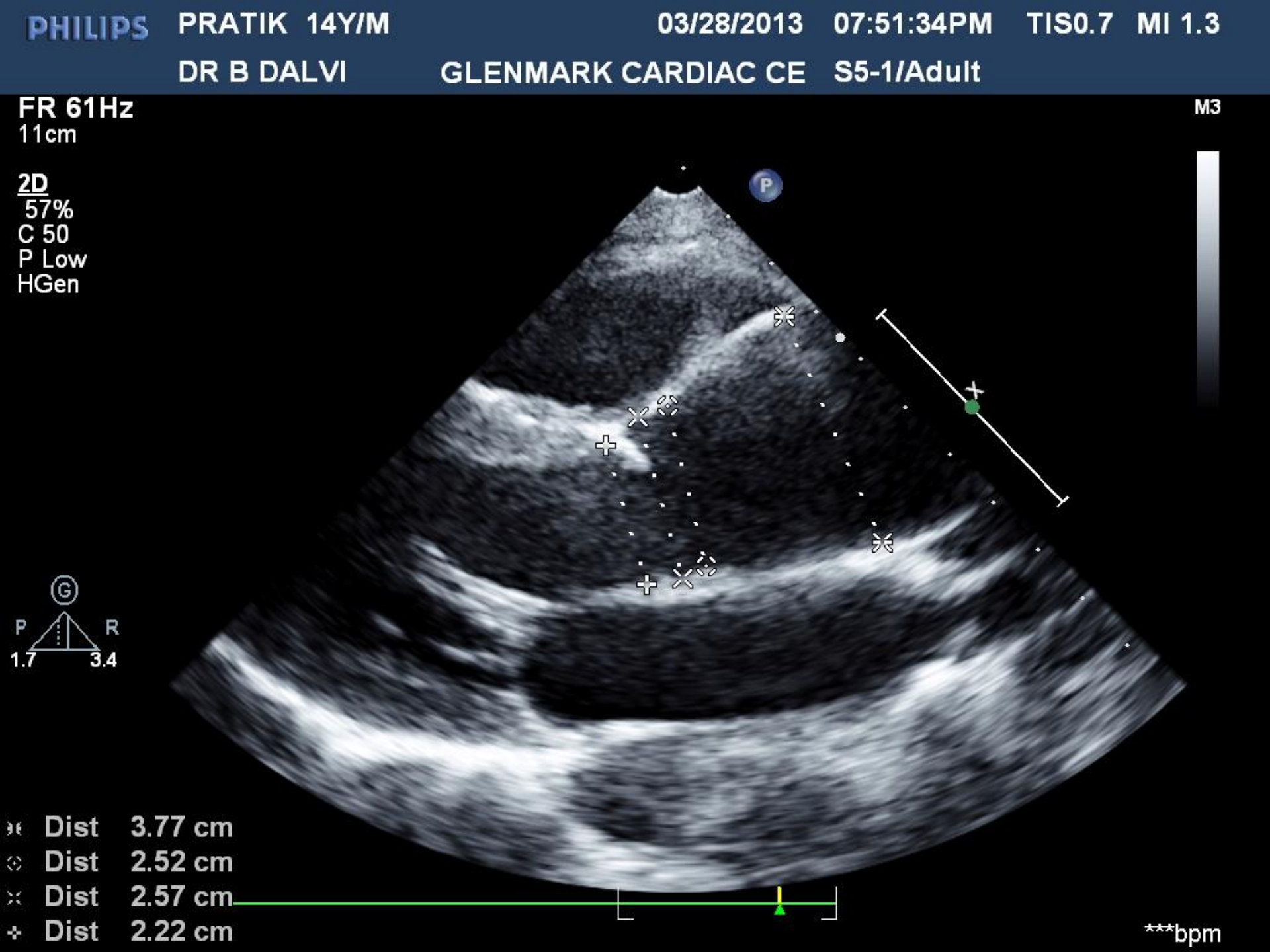
*** bpm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HGen
G
P
R
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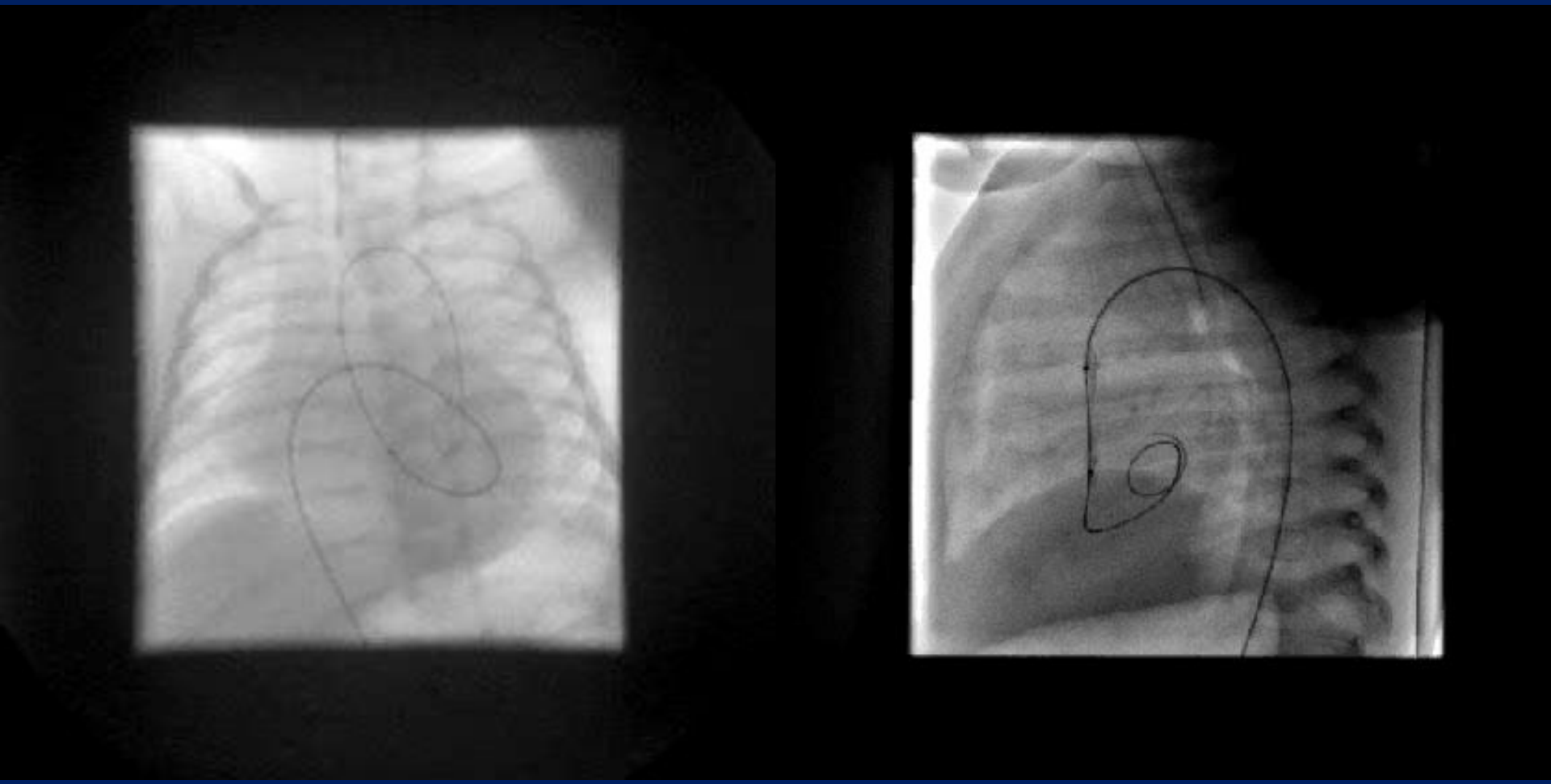
Dist 3.77 cm
Dist 2.52 cm
Dist 2.57 cm
Dist 2.22 cm
***bpm

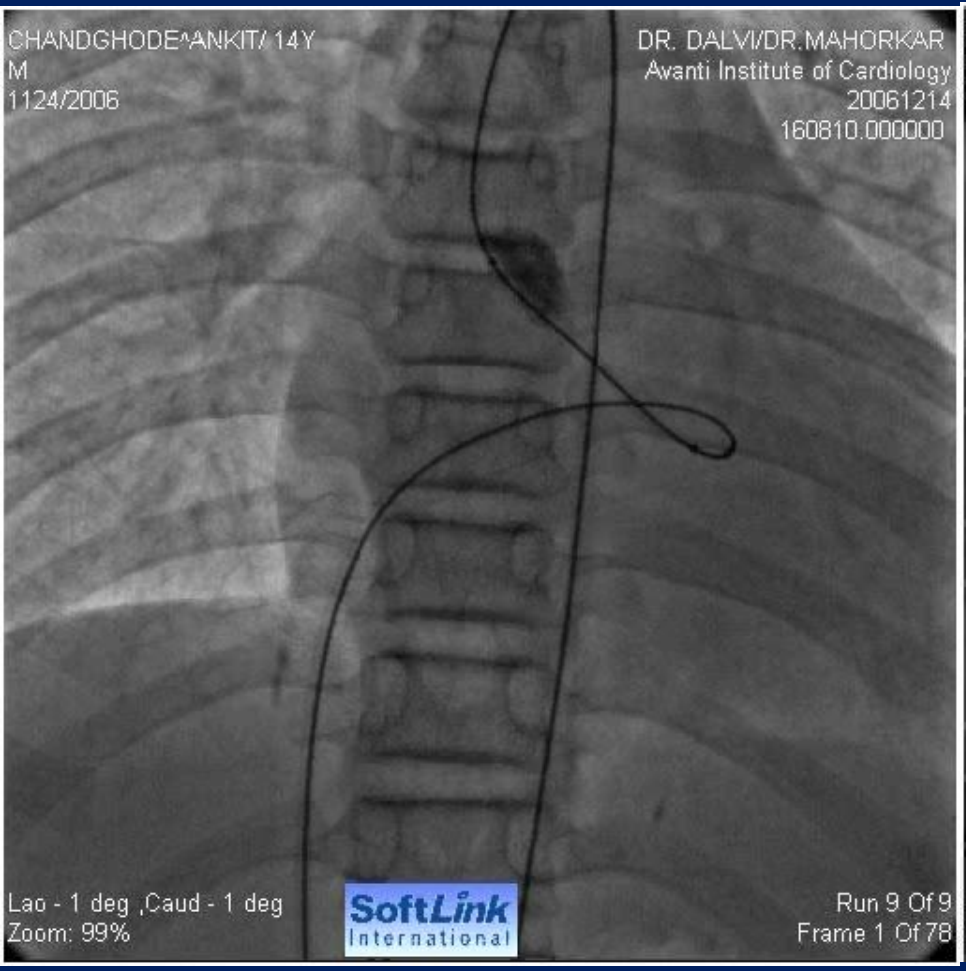
Anesthesia

- GA
- LA with sedation

Access

- Arterial:
  - Femoral
  - Axillary
  - Carotid
- Venous
  - Femoral
- Transapical

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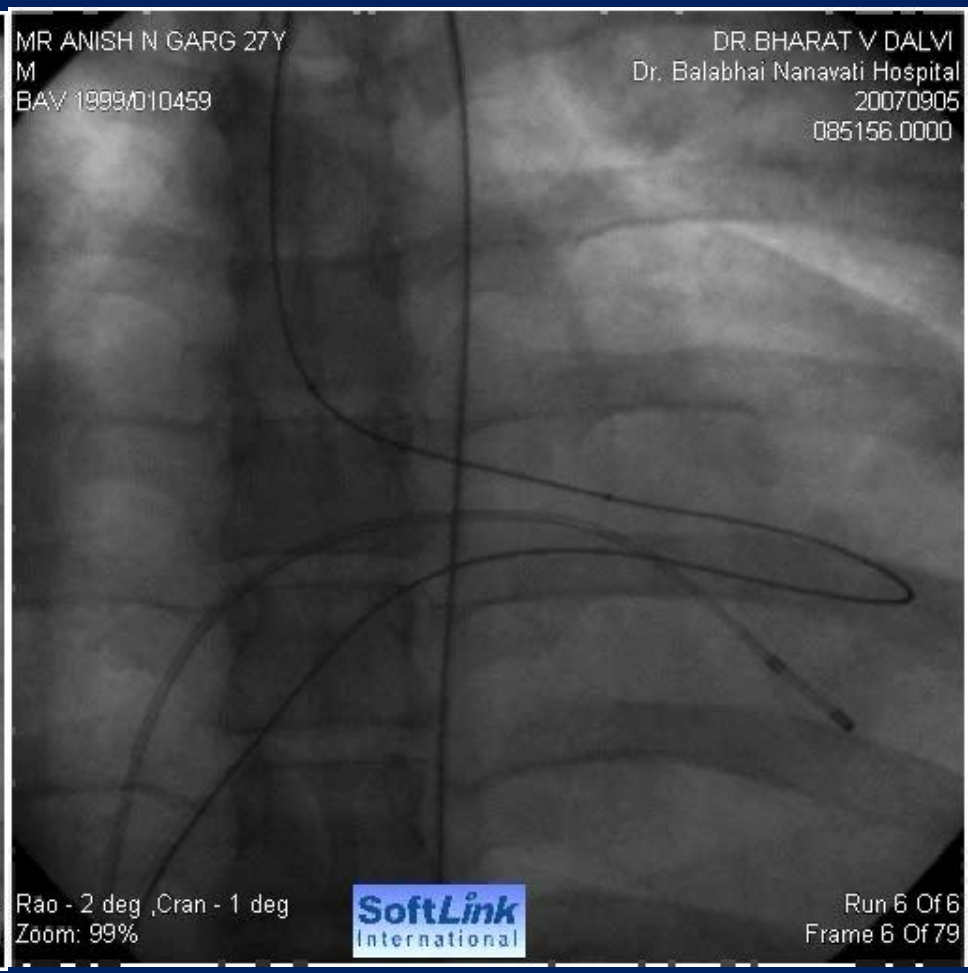
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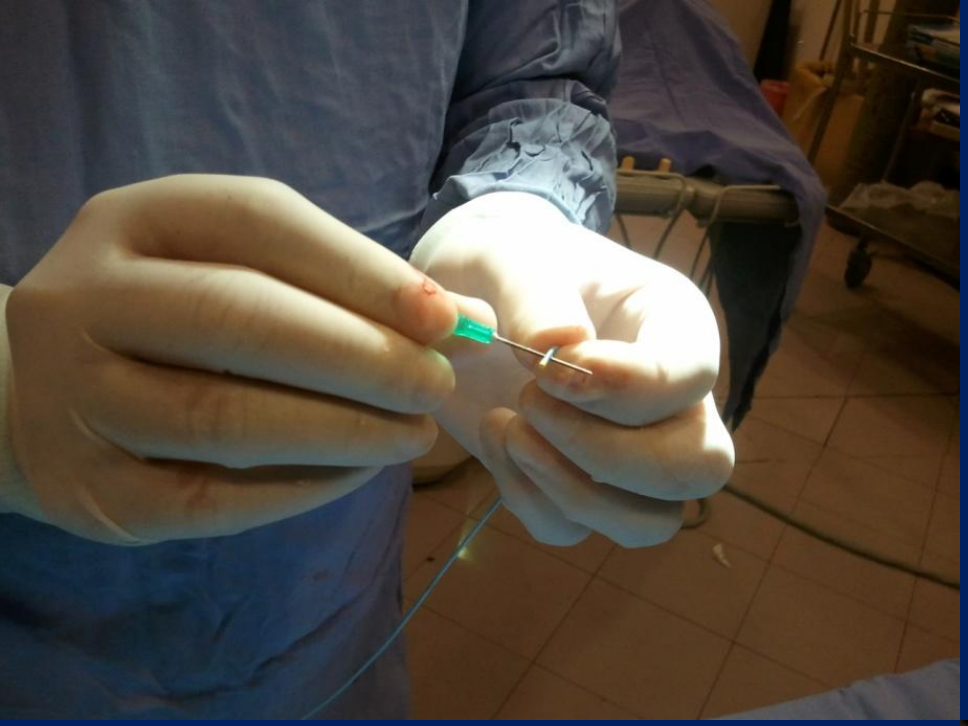
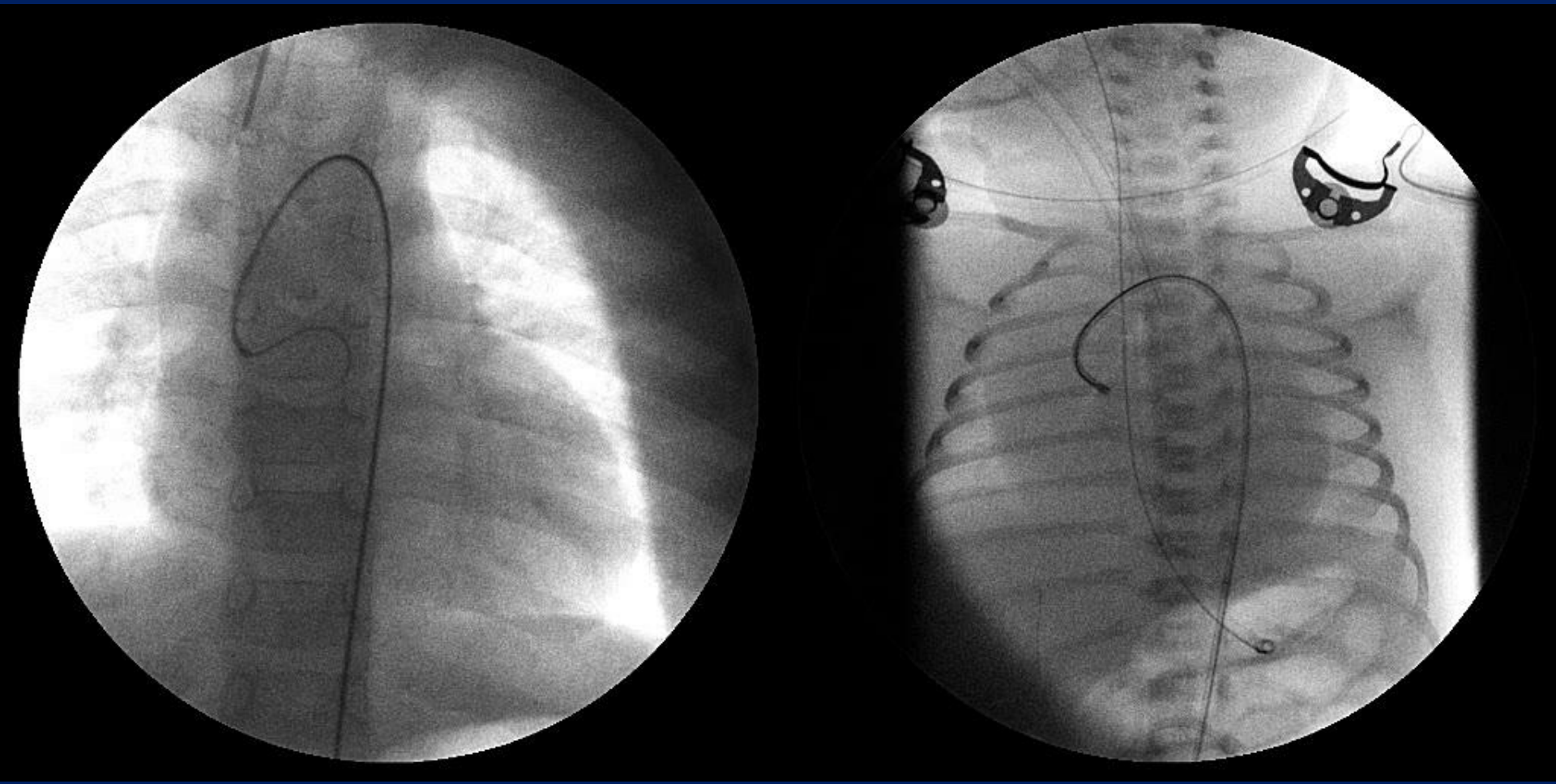
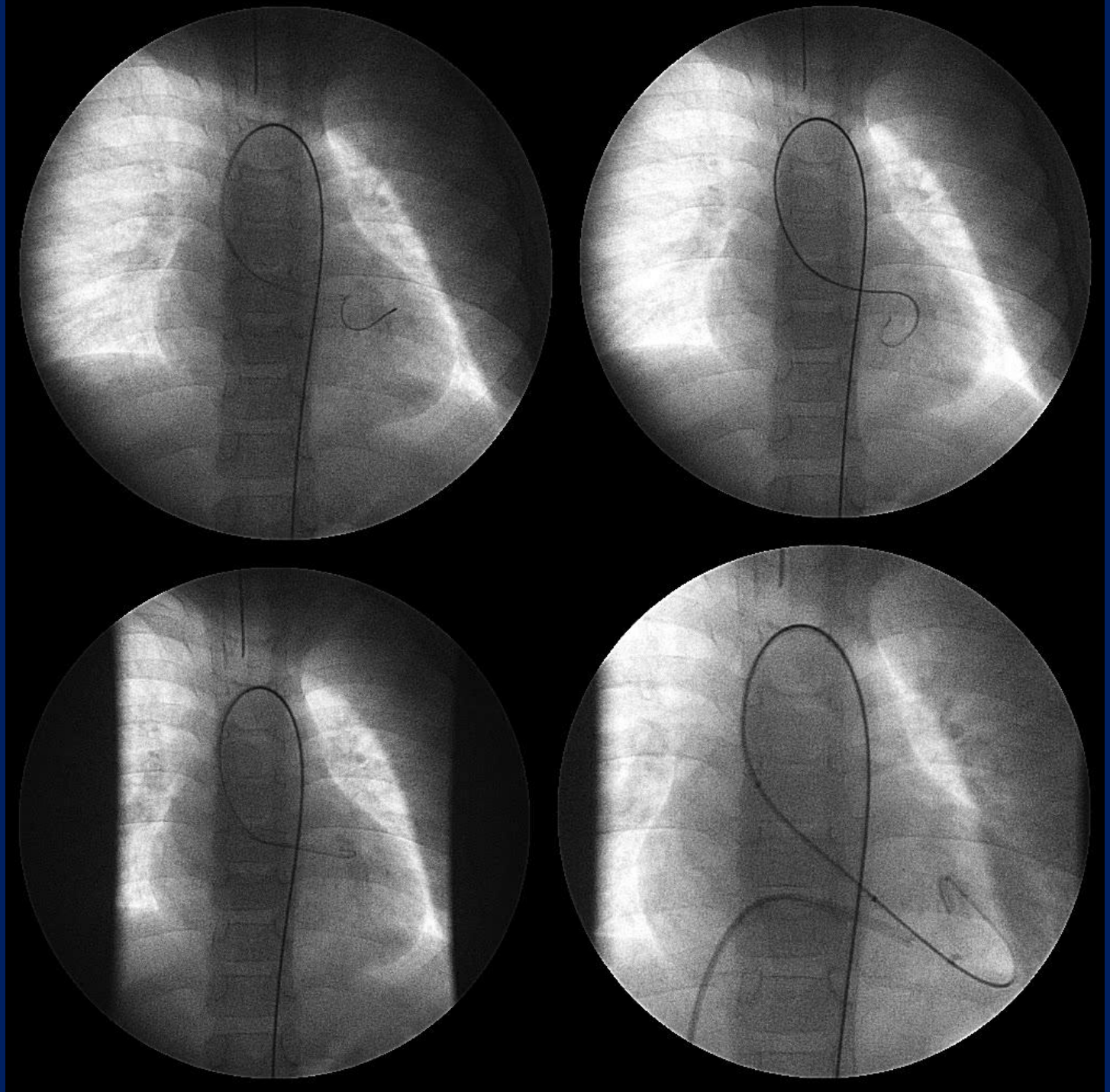
SoftLink International
Run 6 Of 6
Frame 6 Of 79

Crossing the aortic valve

- Catheter: JR, AL 1 and 2, MP
- Wires:
  - Straight tipped or angled
  - Glide or Teflon coated
  - 0.014, 0.025 or 0.035
- Views: AP, lateral or LAO with caudal







Choice of the balloon

- Diameter:
  - Start 90% of annulus size
  - ***Almost*** never to exceed 100%
- Length:
  - Newborns and infants 2-3 cm
  - Toddlers 3-4 cm
  - Adolescents 4-6 cm
- Single Vs Double

Use of ventricular pacing

- Almost always
- Exception:
  - Newborns and small infants especially if you have 3 or 4 cm long balloons
  - Severe LV dysfunction
- Beware of VT or even VF!!!!!!

Complications

- Failure of the procedure
- Aortic regurgitation
- Ventricular arrhythmias
- Vascular issues
- Infective endocarditis

Failure of the procedure

- Not able to cross, not able to track the balloon : Almost never in the current era
- Dysplastic valve is the commonest cause
- Higher sized balloon upto 125%

Aortic regurgitation

- Commonest complication
- Trivial to mild is GOOD
- More than mild may have long term implications
- Oversizing of balloon Vs valve morphology
- “Ping pong” movement
- Most often very well tolerated acutely except cusp avulsion or pre-existing LV dysfunction

Ventricular arrhythmias

- Wire induced
- Ischemic in critical AS
- Rapid ventricular pacing induced

- Very poorly tolerated
- Non pardoning ventricles
- DC cardioversion
- Most often reversible

Vascular complications

- Newborns and small infants (< 2.5 kg)
- Femoral > axilary or carotid
- Accessing the artery
- Pressing the artery
- Adequacy of heparinization
- Size of the sheath
- Duration of the procedure

Conclusions

- BAV is the procedure of choice for significant AS in children and adolescents
- Palliative – Additional procedure
- Very high success rate. Failure – EXCEPTION
- Needs a meticulous planning – Vascular access, crossing the valve, positioning the wire, choice of the balloon
- Finite complications – Most often minor

Conclusions

- NEVER, NEVER, NEVER …….
- Take BAV casually
- Hypertrophied, scarred and dysfunctional LV is non pardoning – DOES NOT TOLERATE SMALLEST OF THE INSULT