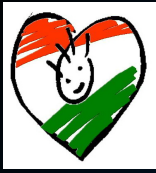


Pulmonary valve dilatation

András Szatmári

Budapest

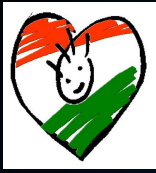
Hungary



Pulmonary valve dilatation

Ventricular Outflow Tract definition

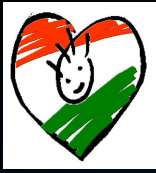
All structures from the ventricles to the resistance arteries (subvalvular membranes, semilunar valves, great and, smaller vessels), which situate along the blood stream during systole.



Pulmonary valve dilatation

- **Right Ventricular Outflow Tract Obstructions (RVOTO)**

VPS is mostly an isolated lesion, but frequently part of complex lesions, like Tetralogy of Fallot.



Pulmonary valve dilatation

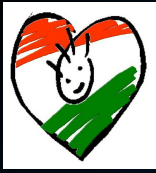
Developmental difference between RV and LV

–RV tri-partite

- inlet, trabecular, infundibular**

–LV bi-partite

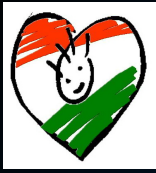
- inlet, trabecular**



Pulmonary valve dilatation

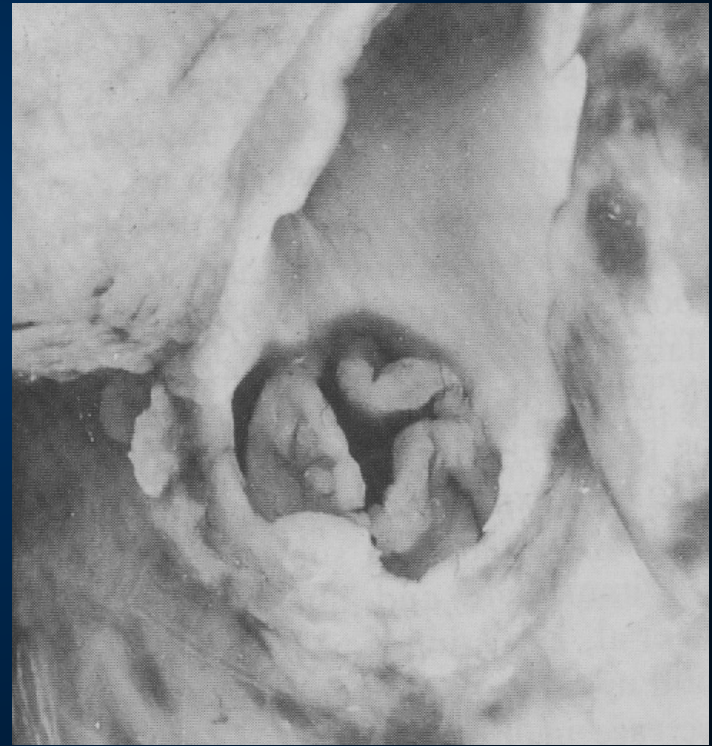
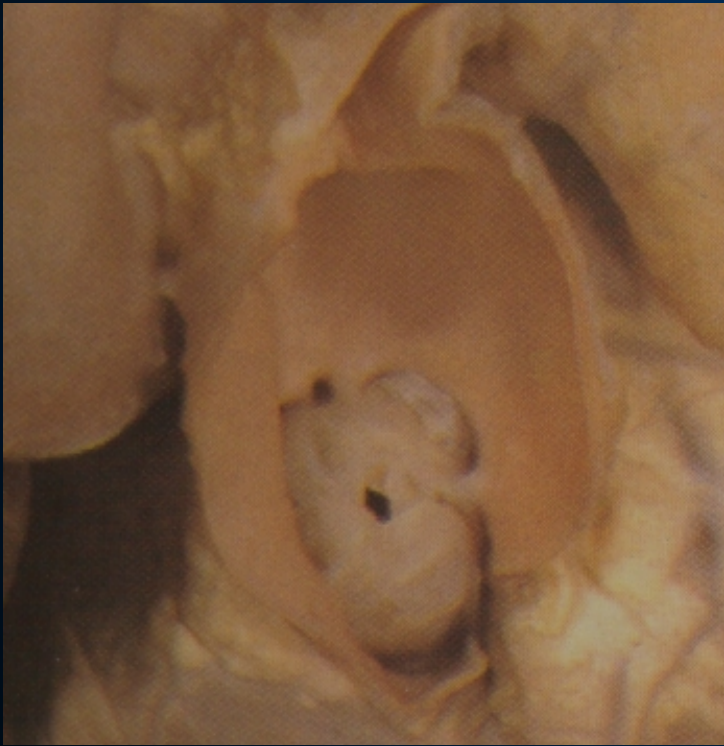
Pulmonary Valve

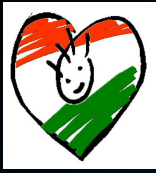
- *No fibrous anulus of the pulmonary valve*
- Noonan sy. = dysplastic pulmonary valve tissue



Pulmonary valve dilatation

Valvular pulmonary stenosis





Pulmonary valve dilatation

Valvular pulmonary stenosis

critical

severe

moderate

mild



Pulmonary valve dilatation

Valvular pulmonary stenosis - severity

- **Critical:**

duct dependent pulmonary circulation, RV failure

– (combined: OFO/ASD II, TI, RV&PA hypoplasia)

- **Severe:**

RV pressure suprasystemic, or $RVp = LVp$

– (combined: OFO/ASD II, TI, +/- RV&PA hypoplasia)

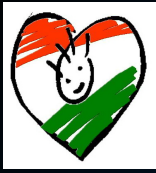
- **Moderate:**

TVDG > 50 mmHg, $RVp/LVp < 1$

– (combined: OFO/ASD II)

- **Mild:**

TVDG < 50 mmHg



Pulmonary valve dilatation

Valvular pulmonary stenosis – symptoms

- **Critical: emergency condition**

RV failure, (hepatomegaly, ascites, cyanosis = ASD R-L shunt, PDA closure = circulatory collapse, death

- **Severe: often asymptomatic (!)**

+/-cyanosis = ASD R-L shunt, fatigue, pallor

- **Moderate: regularly asymptomatic**

- **Mild: always asymptomatic**



Pulmonary valve dilatation

Valvular pulmonary stenosis – Dx (1)

– Physical examination

- *Thrill, proto-mesosystolic ejection murmur, P click, split S2*

– ECG

- *Signs of RVH, RV „strain” pattern*

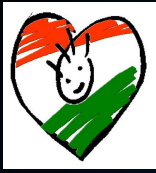
– X-ray

- *CTI mostly normal, apex can be elevated, pulmonary vascular markings normal*

– Echocardiography (M-mode, 2D, PD, CW, Color)

– Heart catheterisation

- *Mostly BVP at the same session*



Pulmonary valve dilatation

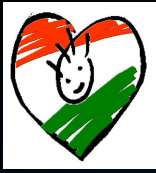
Valvular pulmonary stenosis – Dx (2)

– Echocardiography (M-mode, 2D, PD, CW, Color)

- RVH
- IVS bulging to the left
- Valve morphology, **annulus diam.**, motion, **dysplastic valve**
- Dimensions: MPA, RPA, LPA
- PDA ?

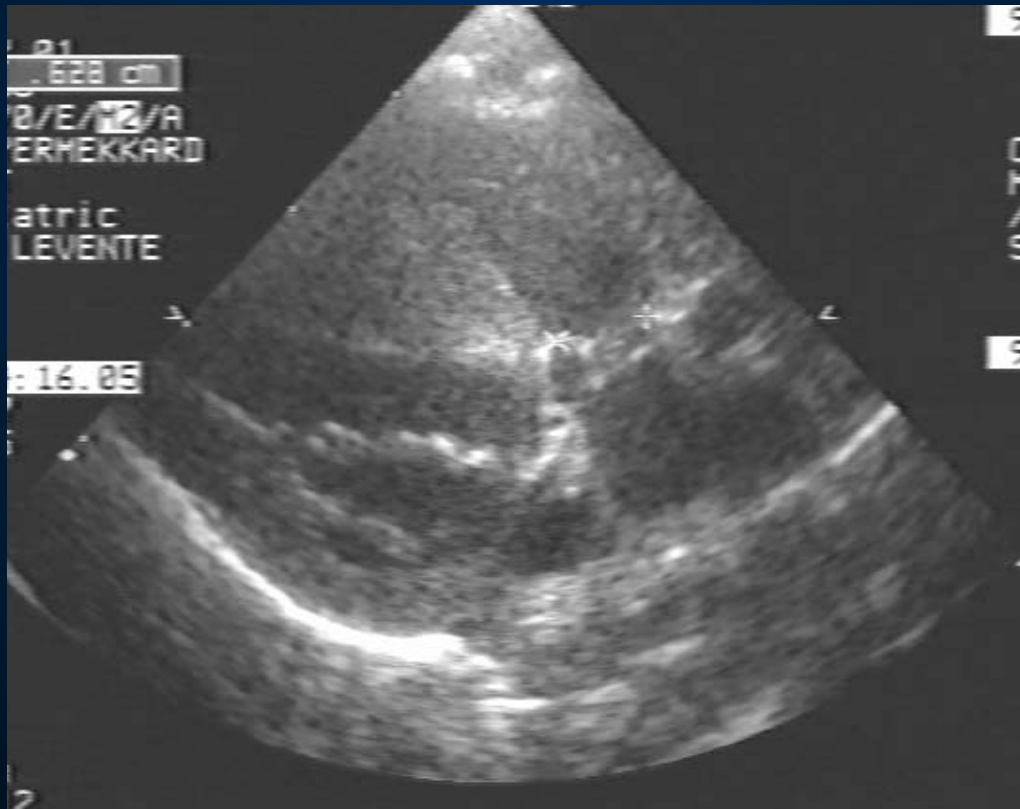
- TI Vmax (simplified Bernoulli: $4 \times V_{\max}^2 = \text{inst.gradient}$)
- MPA Vmax
- PI +/- (P_{pulm} , RVDp)

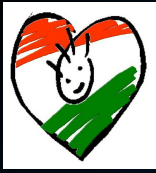
- Color Doppler jet diameter, length, direction



Pulmonary valve dilatation

Valvular pulmonary stenosis – Dx Echocardiography 2D





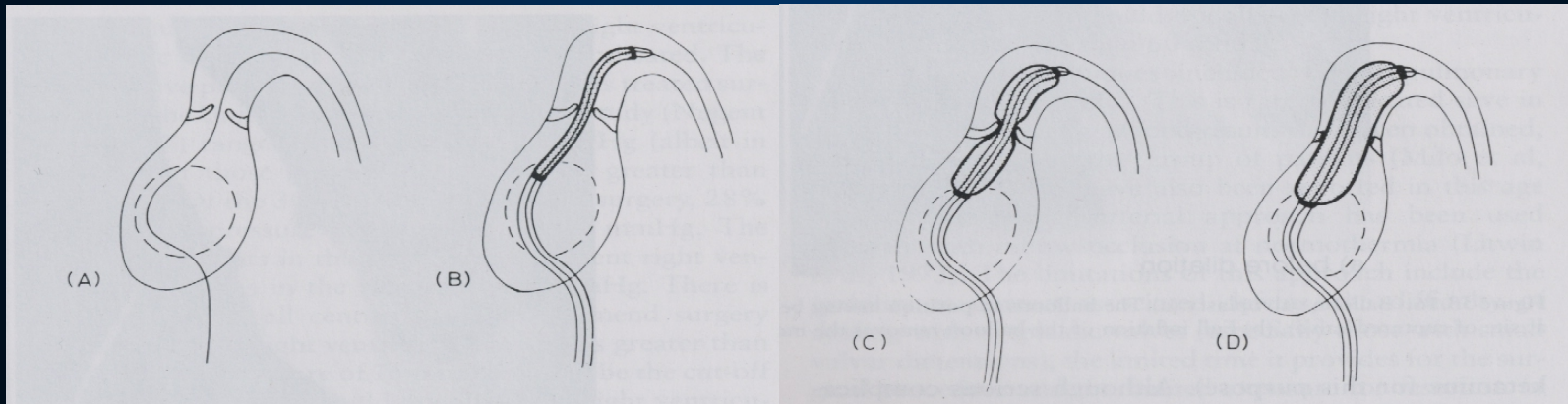
Pulmonary valve dilatation

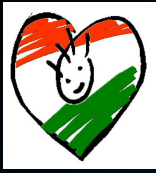
Cath. and intervention

- V. Fem. access
- RV pressure
- RVangio (Biplane)
 - Angio cath: NIH, Berman angio, rarely pigtail
- Measurements
 - Pulm.valve „anulus”
- Valve dilatation
- Controll RV pressure
- Controll RV angio



Pulmonary valve dilatation

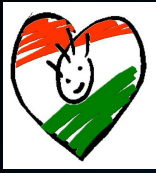




Pulmonary valve dilatation

Valve dilatation

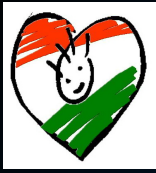
- **End-hole cath. for wire position**
 - Multipurpose, JR, wedge Berman
- **Exchange wire**
 - Ballon size dependent (Cook Roadrunner, Amplatz extra stiff 0,018” – 0,035”, etc.)
 - Stable position (LPA, RPA, desc.Ao)
 - Hydrophilic
- **Balloon**
 - Ballon/anulus = 1,2-1,3x
 - low profile, fast inflation-deflation, «Fr
 - Balloon length for age !! (avoid complication)
 - Tyshak II, Nucleus (adults)....
 - Indeflator!! – pressure control !



Pulmonary valve dilatation

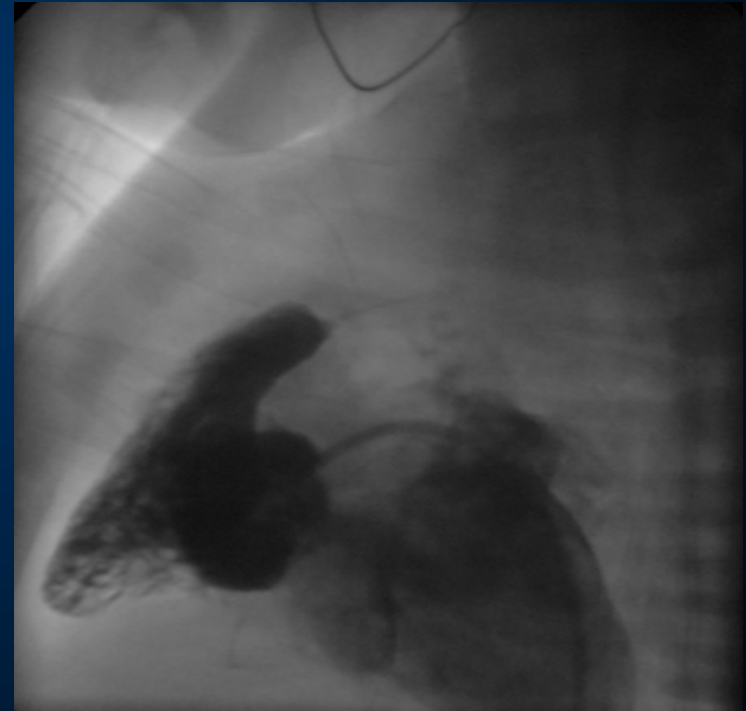
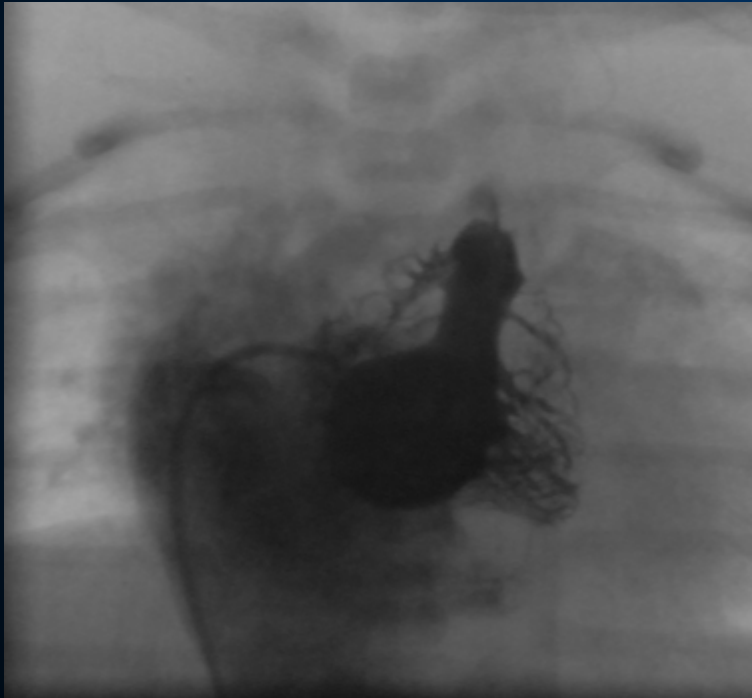
Tricks to avoid complication

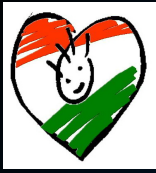
- Don't oversize RVOT rupture
- Don't use too long balloon – TV, bifurcation rupture
- De-airing
- Care while passing the TV with the exchange wire and balloon – cave route among TV chordae
- Place your exchange wire across the PDA – more stable position, better maneuverability (neonates)
- In case of dilated RA – rightward curve/loop in the RA to pass TV and reach the pulmonary valve
- In deflator for pressure control – balloon rupture - embolisation



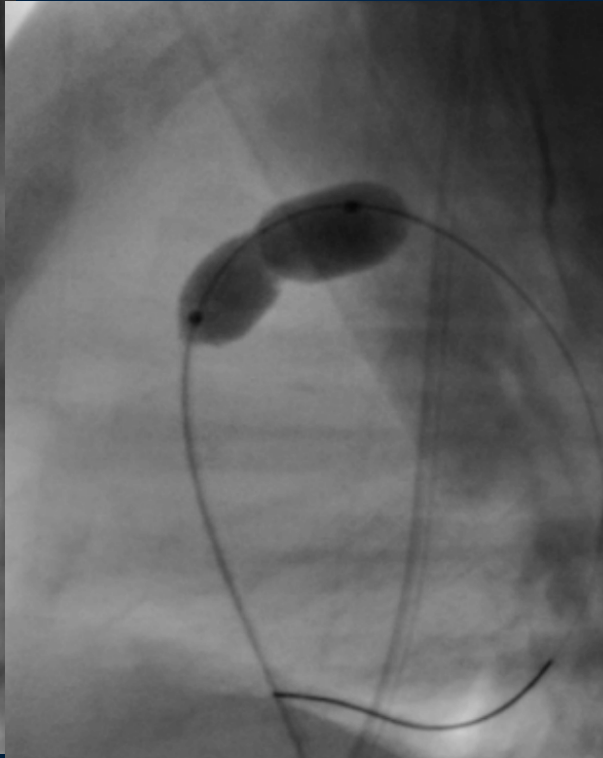
Pulmonary valve dilatation

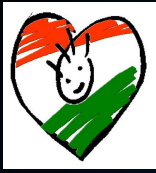
Valvular pulmonary stenosis





Pulmonary valve dilatation

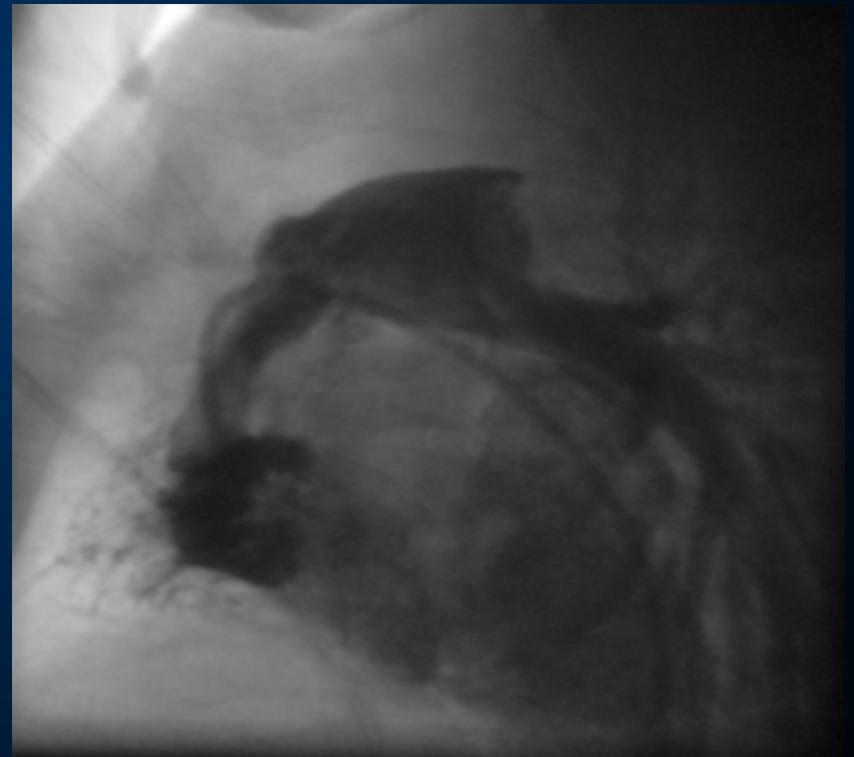
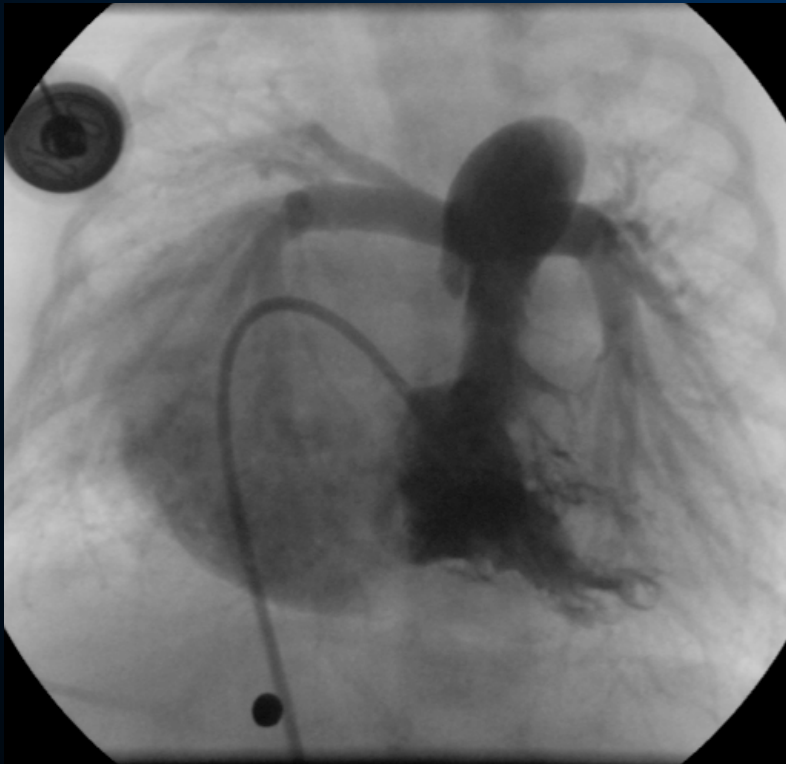


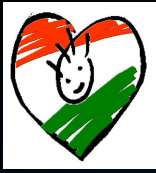


Pulmonary valve dilatation

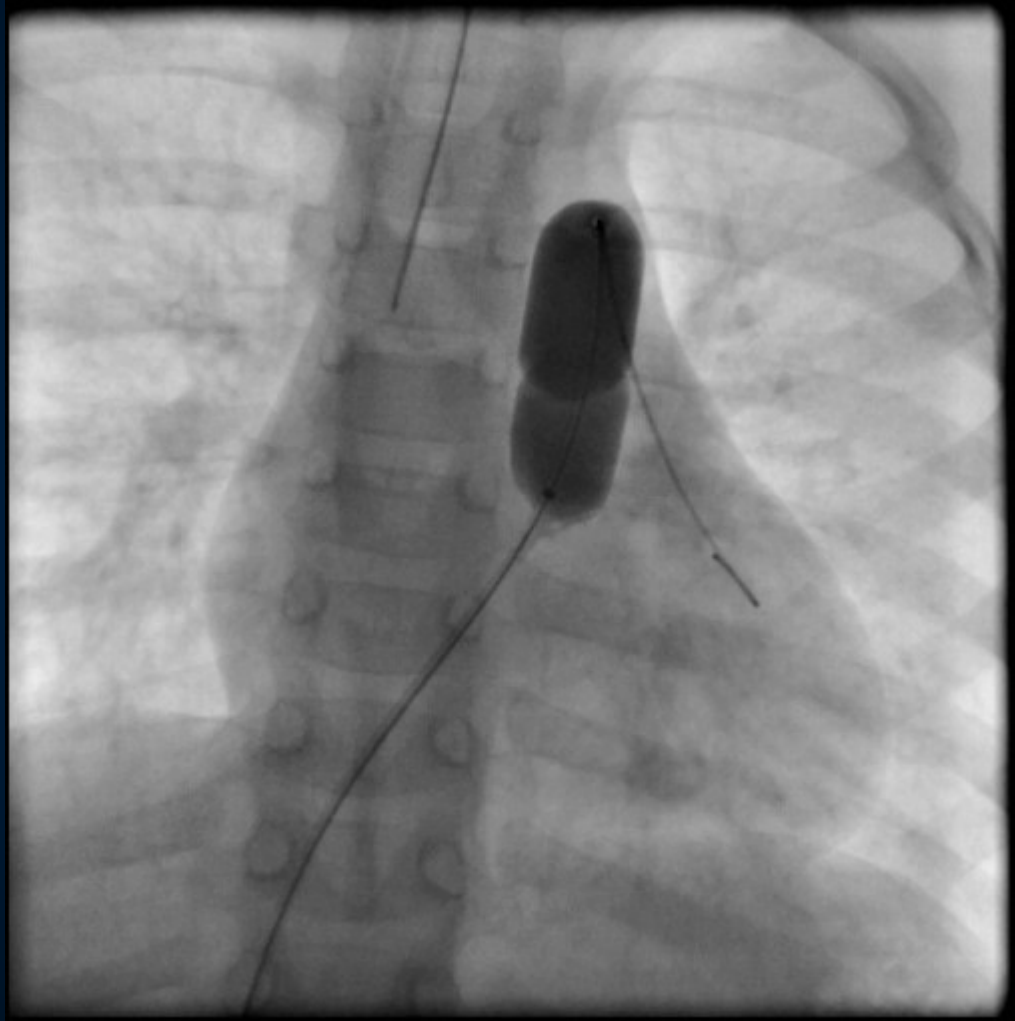
Valvular pulmonary stenosis – Dx + Tx

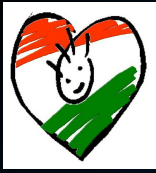
– Heart catheterisation = *BVP* at the same session



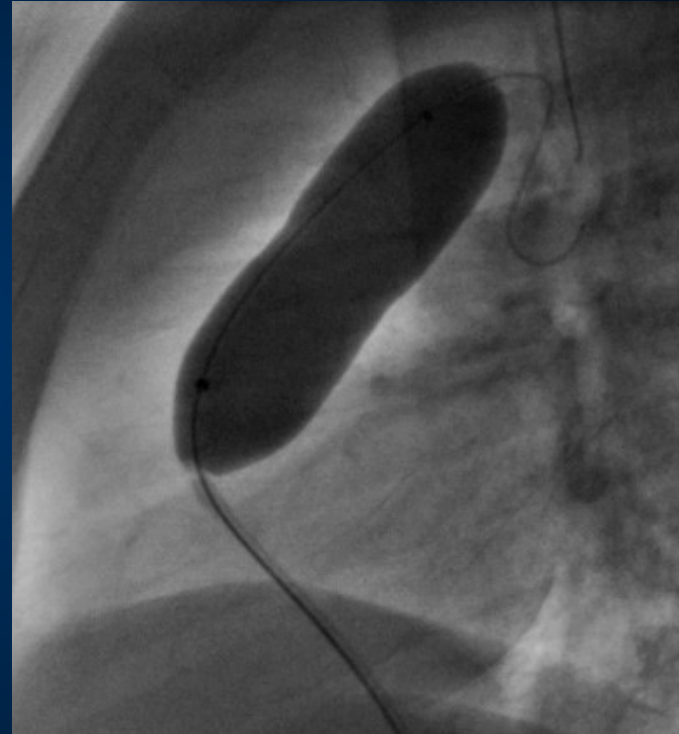
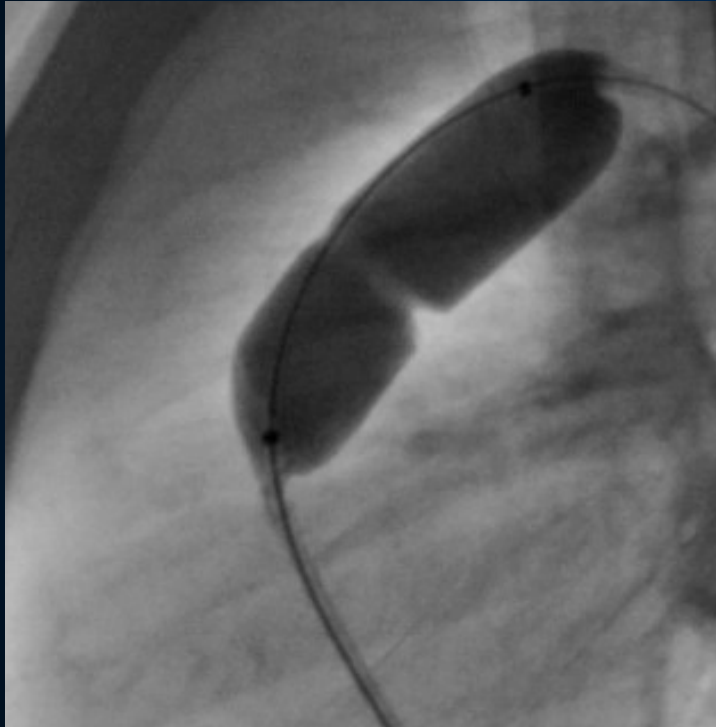


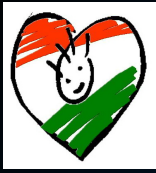
Pulmonary valve dilatation





Pulmonary valve dilatation

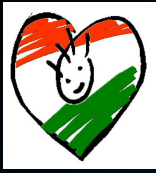




Pulmonary valve dilatation

Pulmonary Valve

- *No fibrous anulus of the pulmonary valve*
- Noonan sy. = dysplastic pulmonary valve tissue



Pulmonary valve dilatation





Pulmonary valve dilatation

