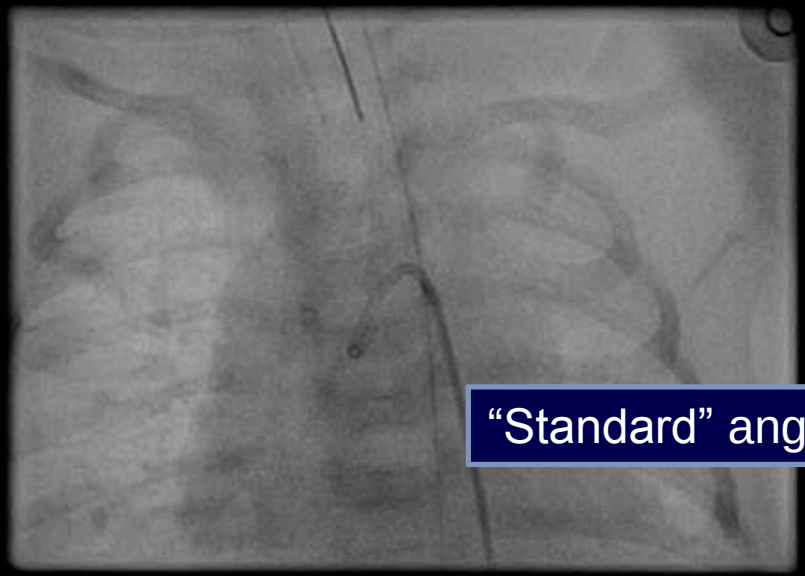
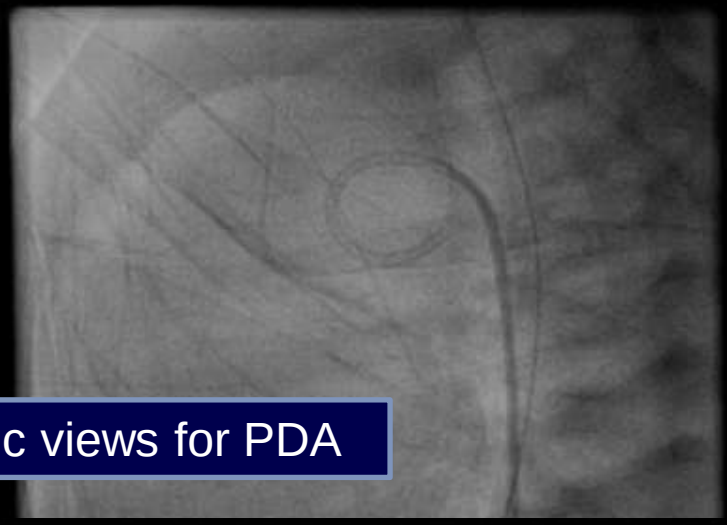
1. PDA morphology in infants with duct-dependent pulmonary circulation

2. PDA stenting – Tortuosity and branch PA stenosis

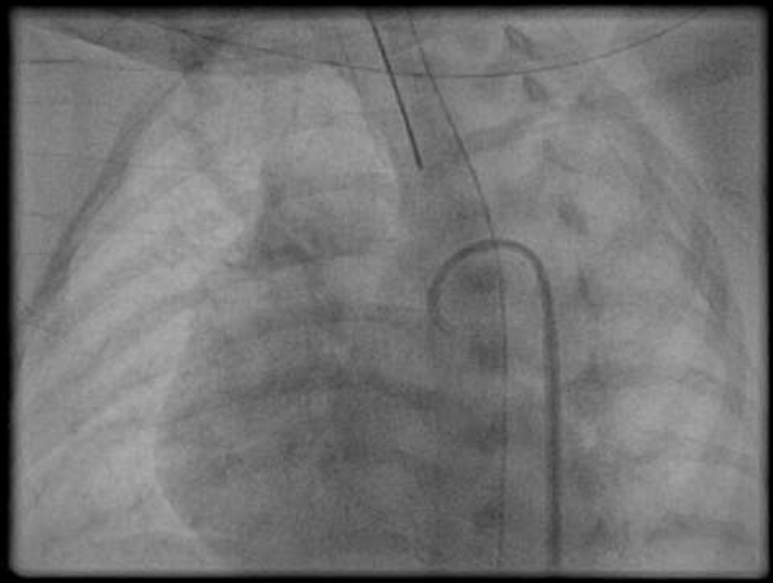
3. PDA stenting: Strategy & approach to consider.

Assessment of feasibility for PDA stenting : Cardiac cath





“Standard” angiographic views for PDA



Overlapping structures – multiple angiographic angulations to profile PDA, may obscure the presence of branch PA stenosis, underestimate length of PDA

PDA Morphology by CTA and impact on PDA stenting strategy

Single Centre; Prospective study: January 2013 – Dec 2014

All new infants less than 6 months with ductal dependent pulmonary artery circulation and had CTA done.

PDA morphology: Origin/type of PDA; site of insertion; tortuosity and presence of branch PA stenosis.

Stenting strategy: Route of stenting – transfemoral, transaxillary or transcarotid.

RESULTS - Demographic

- Total 84 patients were analyzed
- 83 had single PDA
- 1 –bilateral PDA
- Mean age: 0.9 month (range: 10 days to 6 months)
- Mean weight: 3.6kg (range 2kg- 6.8kg)
- Prostaglandin infusion: 58 patients (69%)

RESULTS - DIAGNOSIS

Total infants: 84

2 Ventricle: 38 (45.8%)

DIAGNOSIS	n(%)
PAVSD	20 (23.8)
TOF/PS	4 (4.7)
DORV/PS	6 (7.1)
TGA/VSD/PS	3 (3.5)
OTHERS	5 (5.9)

PAIVS – 20 PATIENTS (23.8%)

Single Ventricle: 26 (30.9%)

DIAGNOSIS	n(%)
TRICUSPID ATRESIA	9 (10.7)
UNBALANCED AVSD	5 (5.9)
DILV	2 (2.3)
DORV/single ventricle	2 (2.3)
OTHERS	8 (9.5)

RESULTS: The Origin of PDA

TYPE I:
PDA from decending Ao

n = 12
(14.46 %)

PAIVS	11
2-Ven	1

TYPE II :
PDA frm distal transverse arch

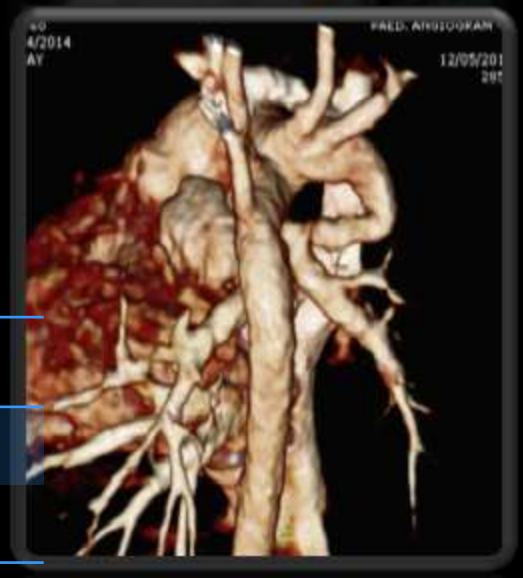
n= 56 (67.47%)

PAIVS	8
2-Ven	30
S-Ven	18

TYPE III:
PDA proximal transverse arch.

n= 9 (10.48%)

PAIVS	1
2-Ven	2
S-Ven	6



TYPE IV:
PDA from subclavian artery

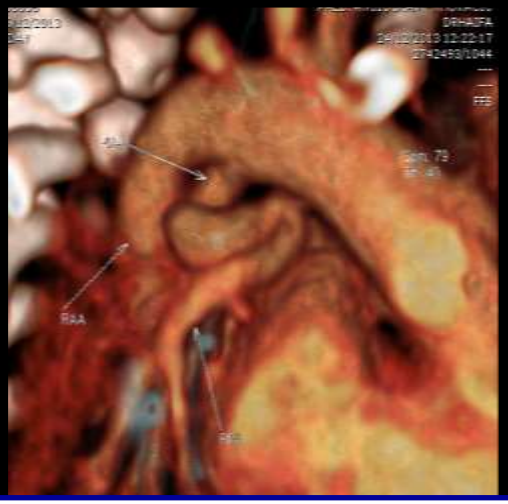
n = 6 (7.23%)

2-Ven	4
S-Ven	2

RESULTS: Insertion & Branch PA stenosis

Insertion to LPA: 38

BPA stenosis 30 (79%)

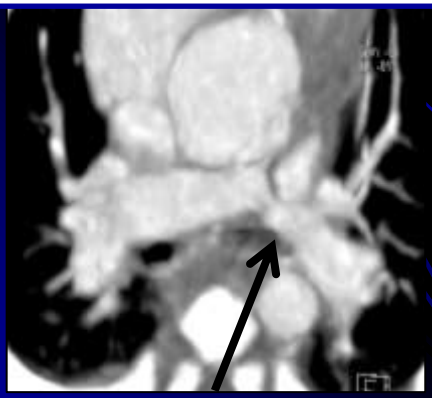


Insertion to RPA: 17

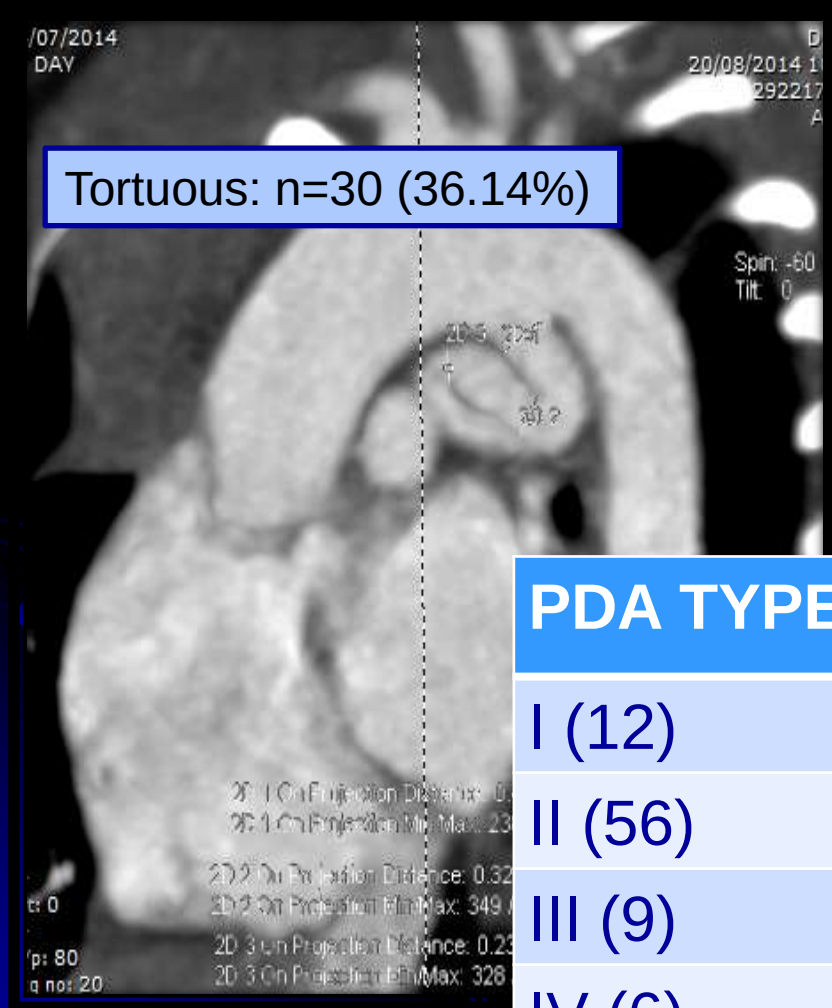
BPA stenosis 15 (88%)

Insertion to Central PA: 28

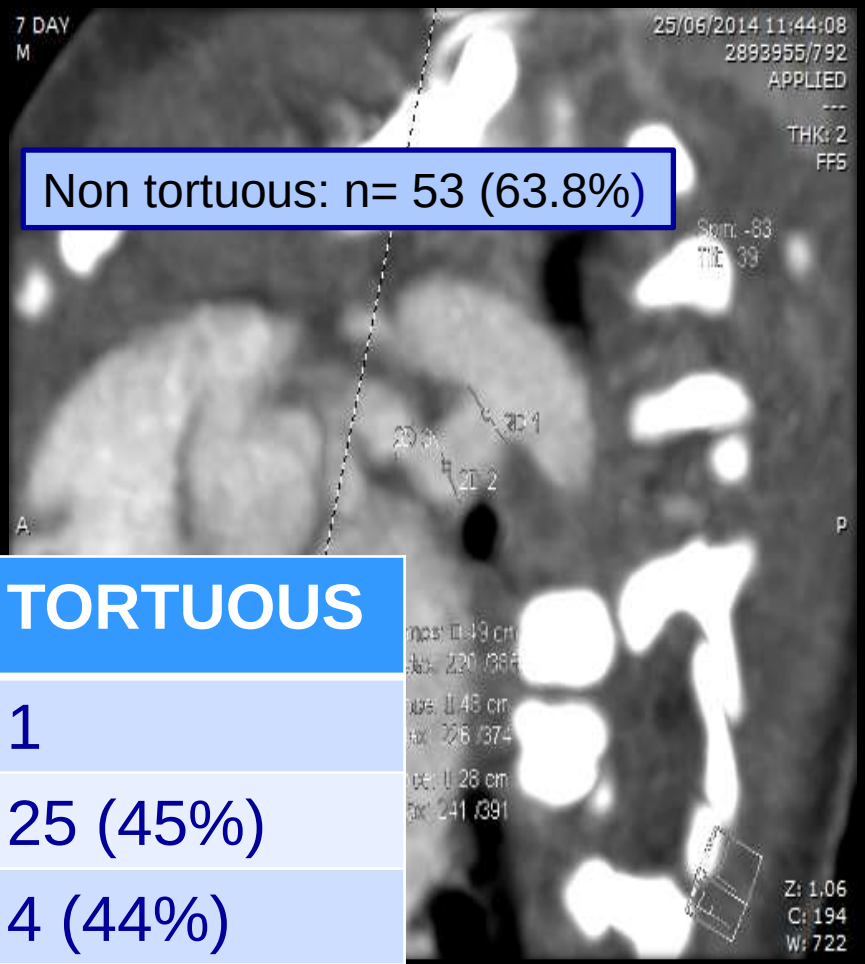
BPA stenosis 9 (33%)



RESULTS: Tortuosity



Tortuous: n=30 (36.14%)

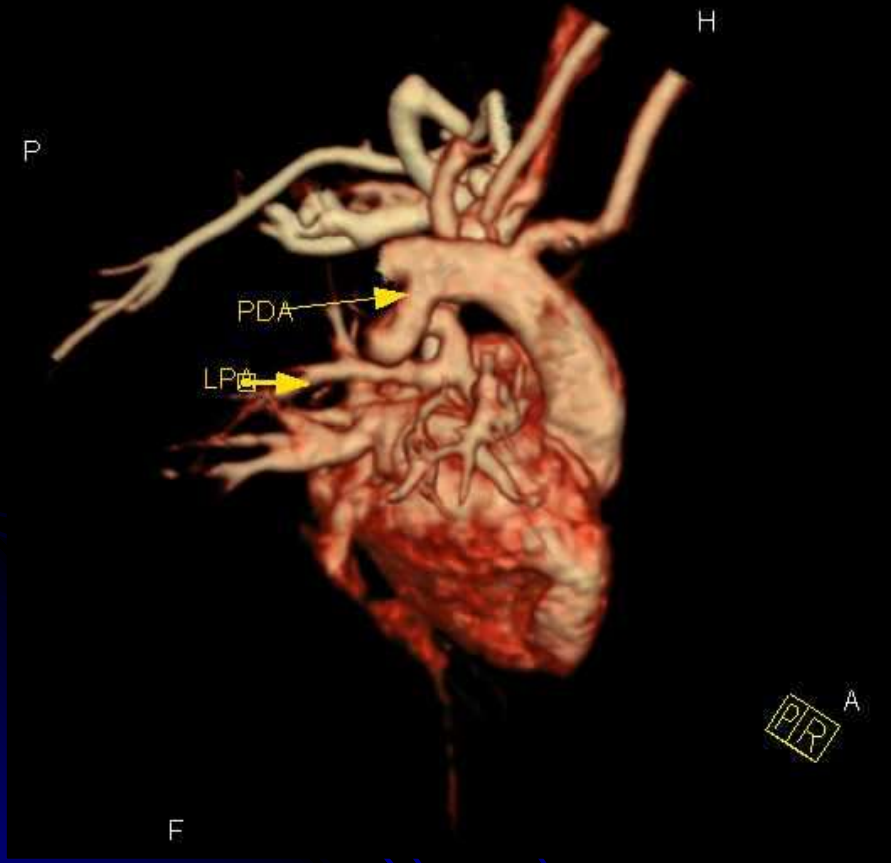


Non tortuous: n= 53 (63.8%)

PDA TYPE *	TORTUOUS
I (12)	1
II (56)	25 (45%)
III (9)	4 (44%)
IV (6)	0

BILATERAL PDA

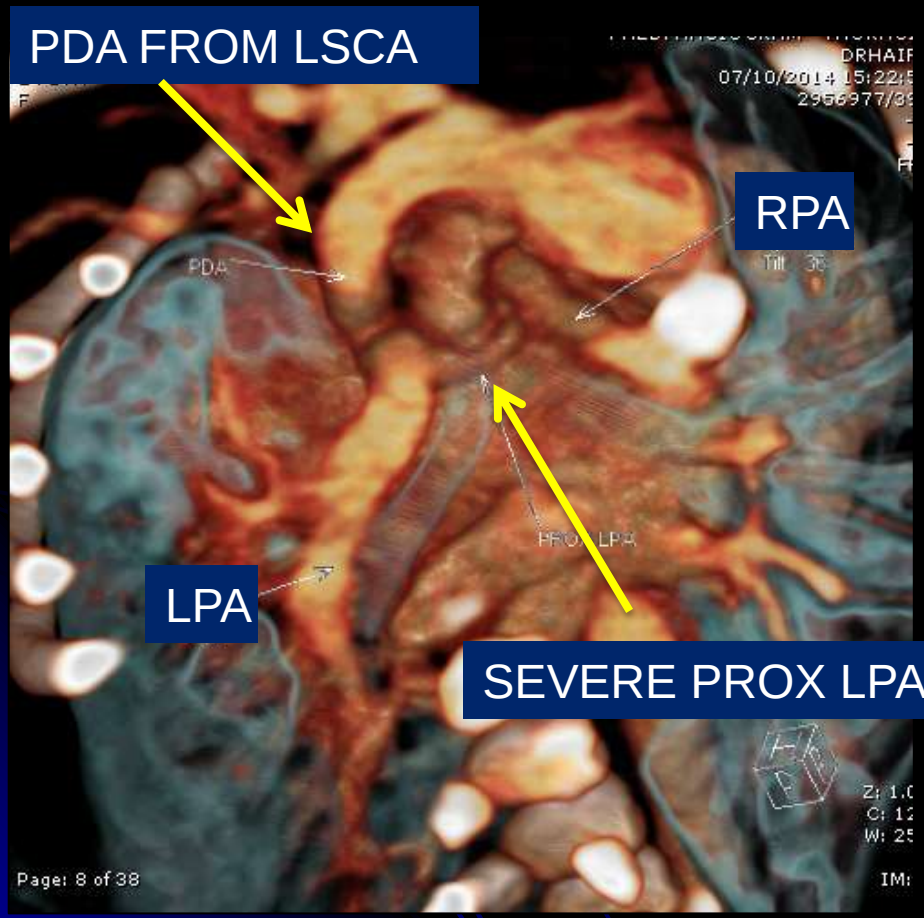
PDA morphology not suitable for stenting

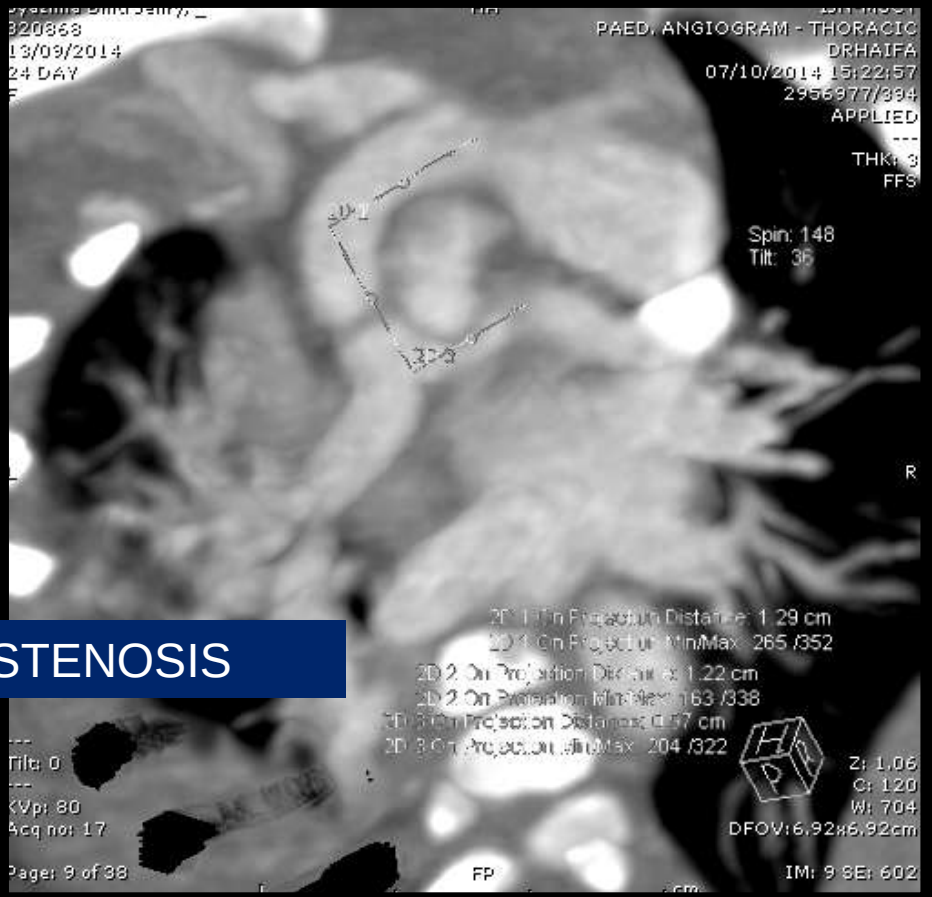


Long, acute bends

Very tortuous PDA (2 bends/ >)

Long PDA from LSCA to proximal LPA, severe prox. LPA stenosis





Treatment received

TORTOUSITY

	PDA Stent	BT Shunt
Tortuous	8(33.3%)	17(66.7)
Non-tortuous	28(58.3%)	20(41.7%)

$p \leq 0.05$

BRANCH PA STENOSIS

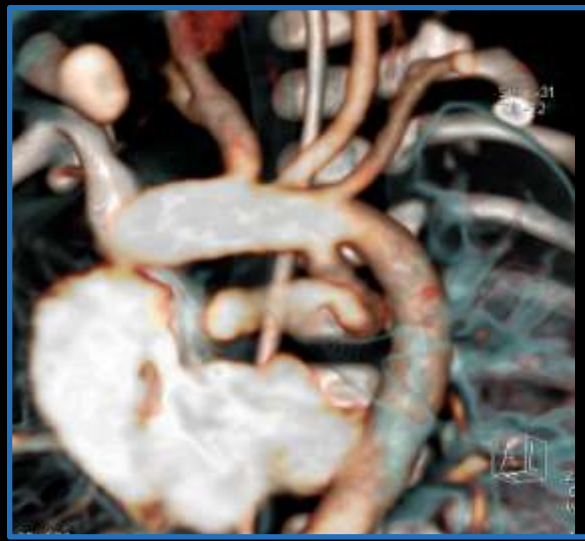
	PDA Stent	BT Shunt
Br PA stenosis	22(46.8%)	26(53.2%)
No stenosis	14(56.0%)	11(44.0%)

$P > 0.05$

Suggested approach

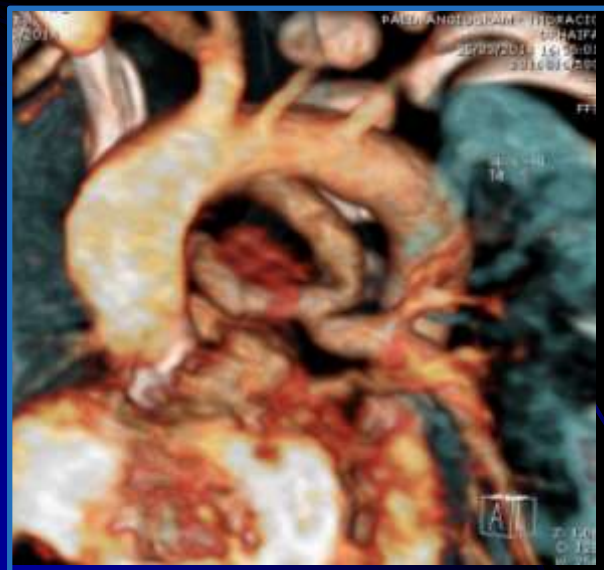
Type I
Origin Des Ao

Approach: Femoral artery



Type II
Origin distal Transverse arch

Approach: FA/FV and axillary



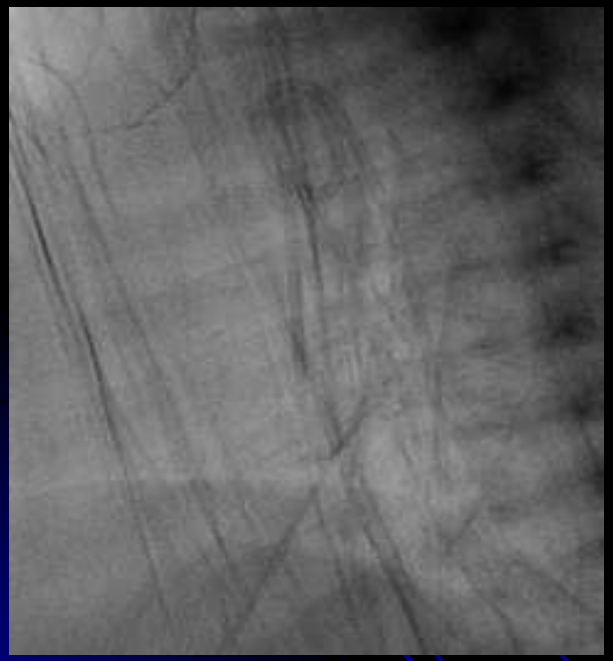
Type III
Origin prox transverse arch

Approach: Axillary artery

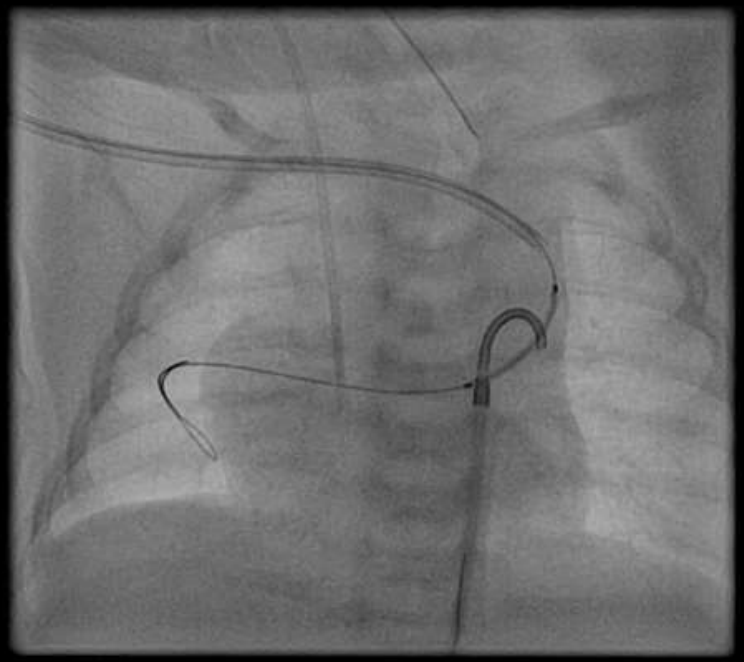
Type IV
Origin subclavian artery

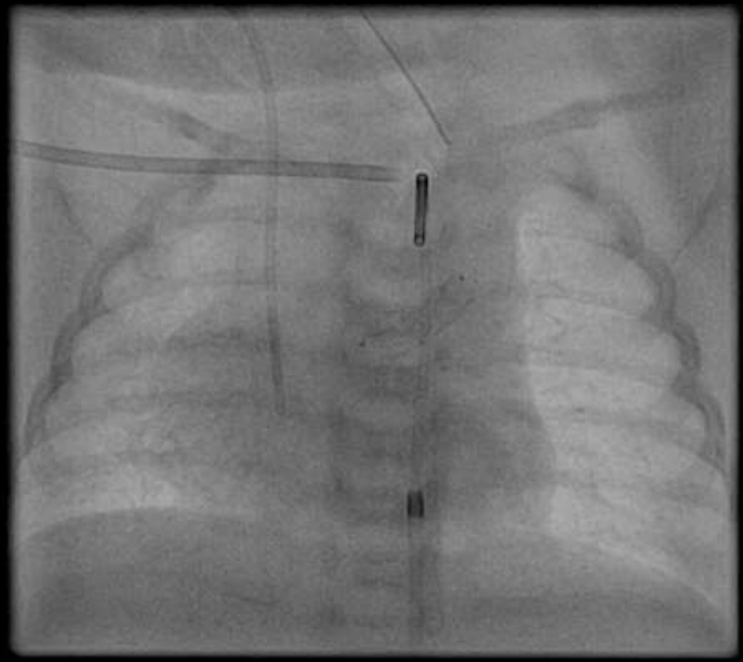
Approach: FA

Day 8; 3.2 Kg; PGE1
TOF/PA; Type II by by Echocardiography
Decided to proceed for PDA stenting without prior CTA

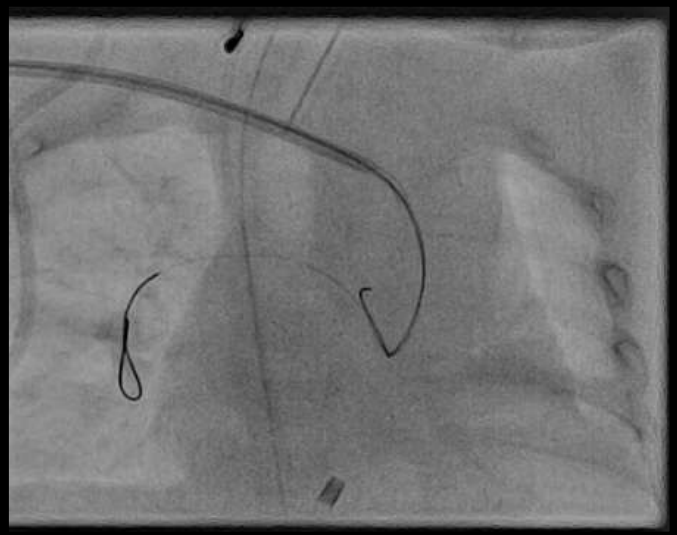


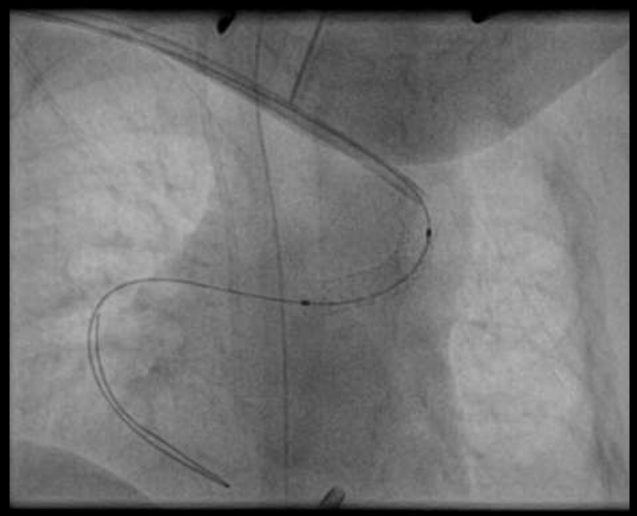
4F femoral artery
5F femoral vein





Neonate with single ventricle type II PDA to LPA, LPA stenosis





2014

Trans-axillary
As an option in
Type II And III

PDA stenting with branch PA stenosis Jan 2014 – Mac 2015: n = 29

Route PDA stenting	29 (100%)
-transfemoral	15 (51.7%)
-transaxillary	9 (31.0%)
-transvenous	4 (13.8%)
-transcarotid	1 (3.4%)
Mean fluoroscopy time (minute)	19 ± 11
Mean procedure time (minute)	81 ± 35
Median ICU stay (day)	3 (2-12)
Median length of hospital stay (day)	7 (4-17)

Summary: PDA morphology on CTA

PDA type	Insertion site PA branch	PAIVS	Bi- Vent	Single Vent	Branch PA stenosis
I (12)	0 (all to MPA)	11 (55%)	1 (3.0%)	0	2 (16.7%)
IV (6)	6 (All)	0	4 (11.0%)	2 (8%)	5 (83%)

- Recommended in difficult anatomy.
- Helpful in determining PDA stenting strategy

- Majority of patients with cyanotic CHD with single or biventricular morphology have type II PDA
- Patients with PAIVS usually has type I PDA, majority inserted onto MPA and rarely has branch PA stenosis
- Majority Type II and III PDA have insertion site to branch PA and associated with branch PA stenosis at the site of insertion