ROLE OF VALVED CONDUIT FOR VENTRICLE TO PULMONARY ARTERY RECONSTRUCTION IN CHILDREN

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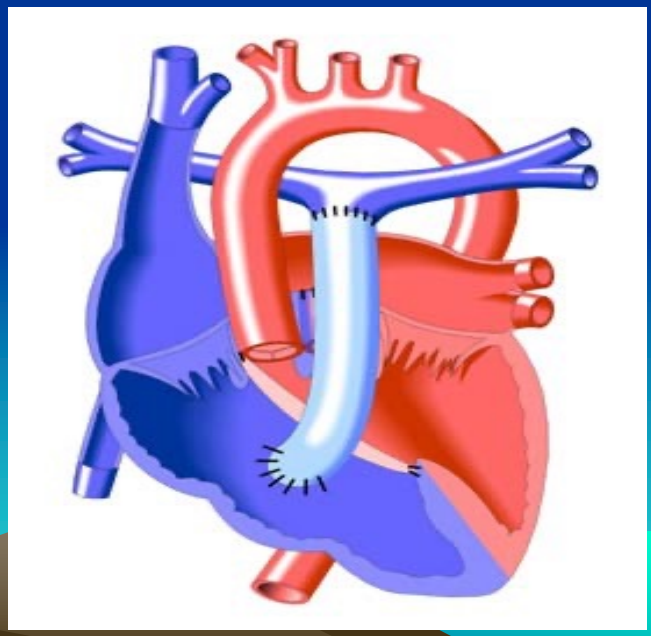
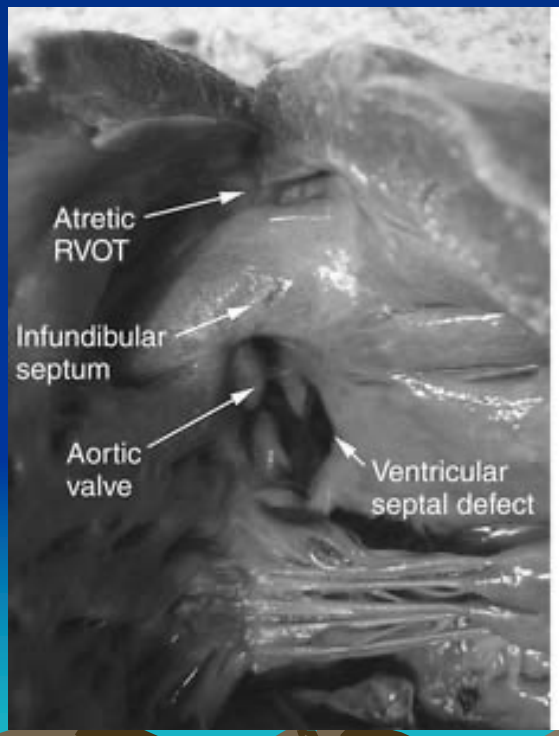
INTRODUCTION

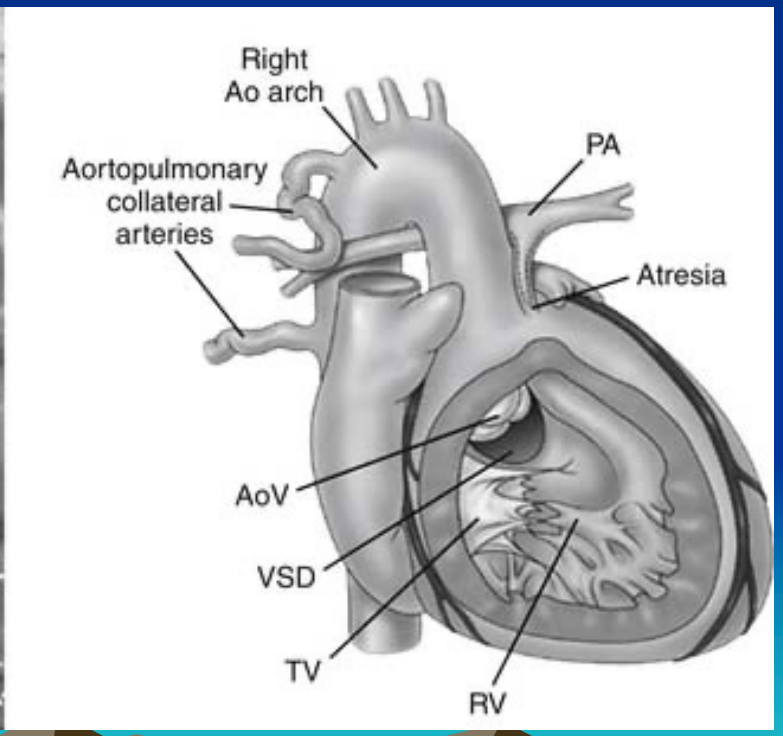
- 1966: Ross first successfully implanted valved conduit for repairing PA-VSD
- 1967: Gian Carlo Rastelli first performed surgical repair for TGA-VSD-PS by applying valved conduit
- Valved conduit has been applied for many decades to reconstruct the right ventricular outflow tract (RVOT) in children



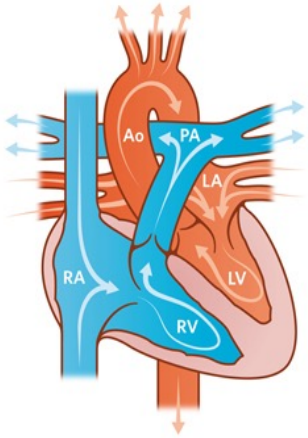
INDICATIONS

- Carrying the 2 important purposes
  - ➢Relieving RVOT obstruction
  - ➢Preventing pulmonary regurgitation
- Diseases: RVTO, PA-VSD,TGA, DORV, TOF, PR…

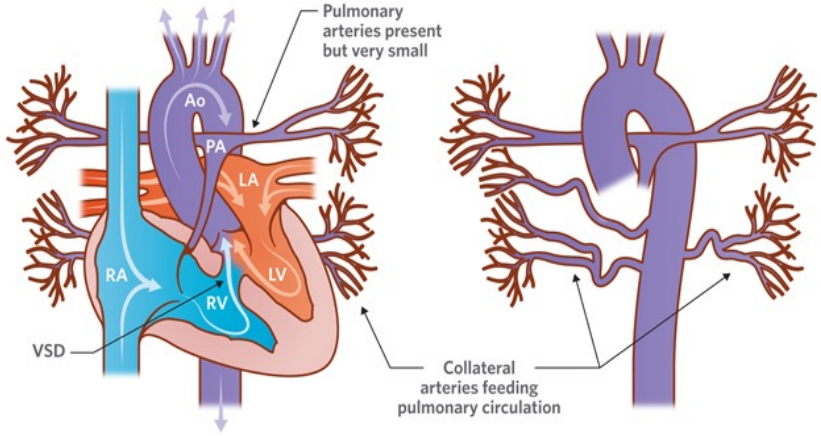




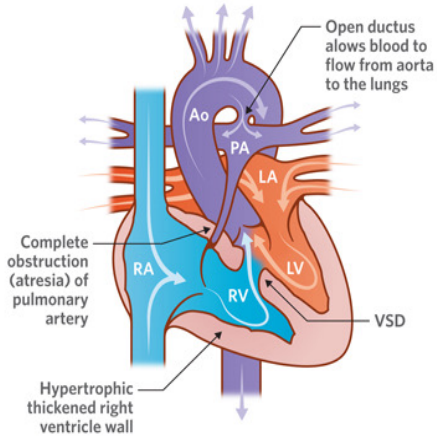
Pulmonary atresia with VSD and multiple aorto-pulmonary collaterals (MAPCAs)

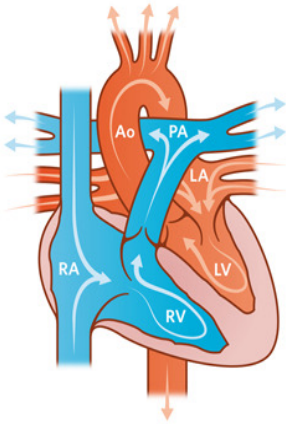


Normal heart and circulation



Pulmonary atresia with VSD





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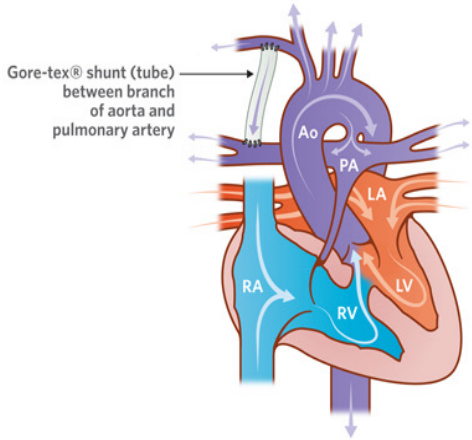
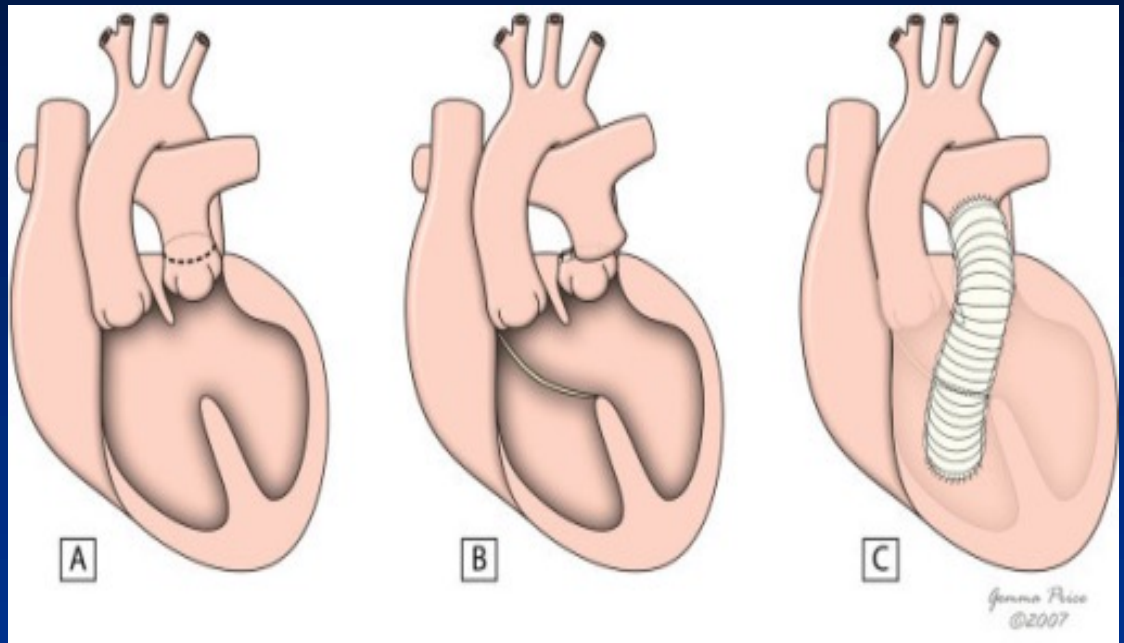
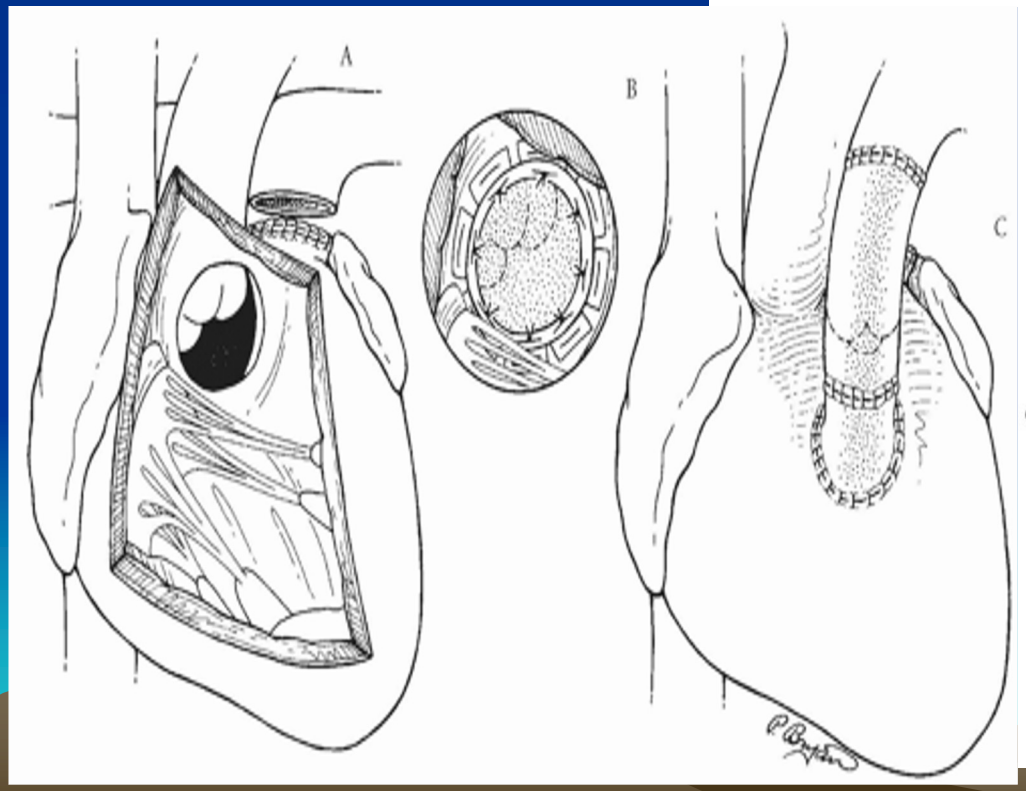
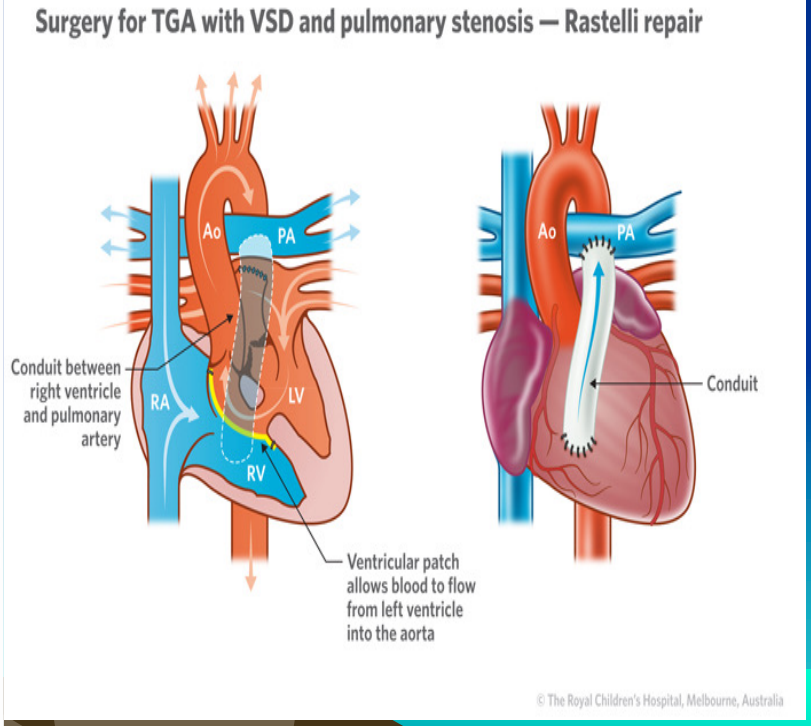


Shunt operation

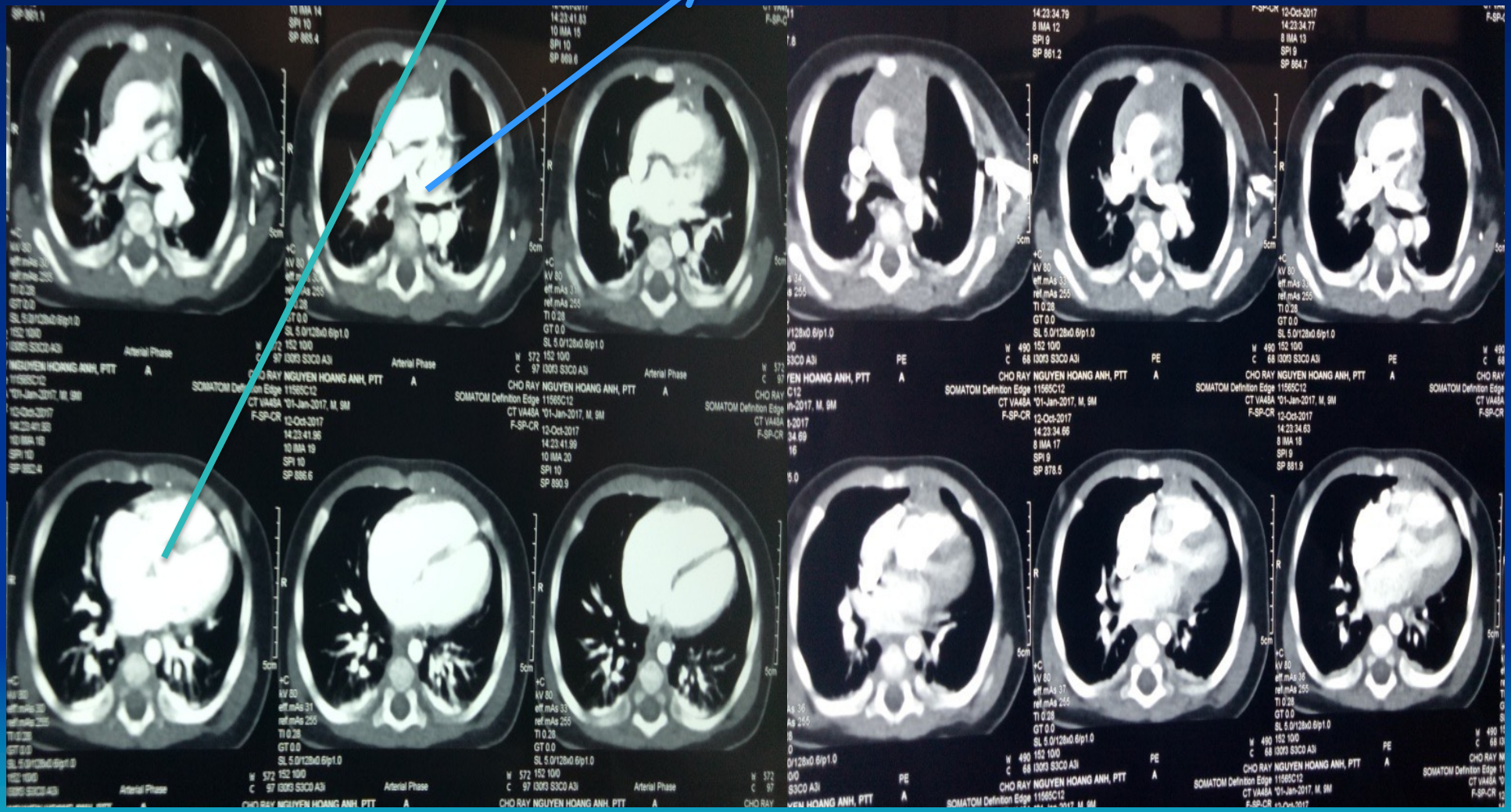
First conduit placement

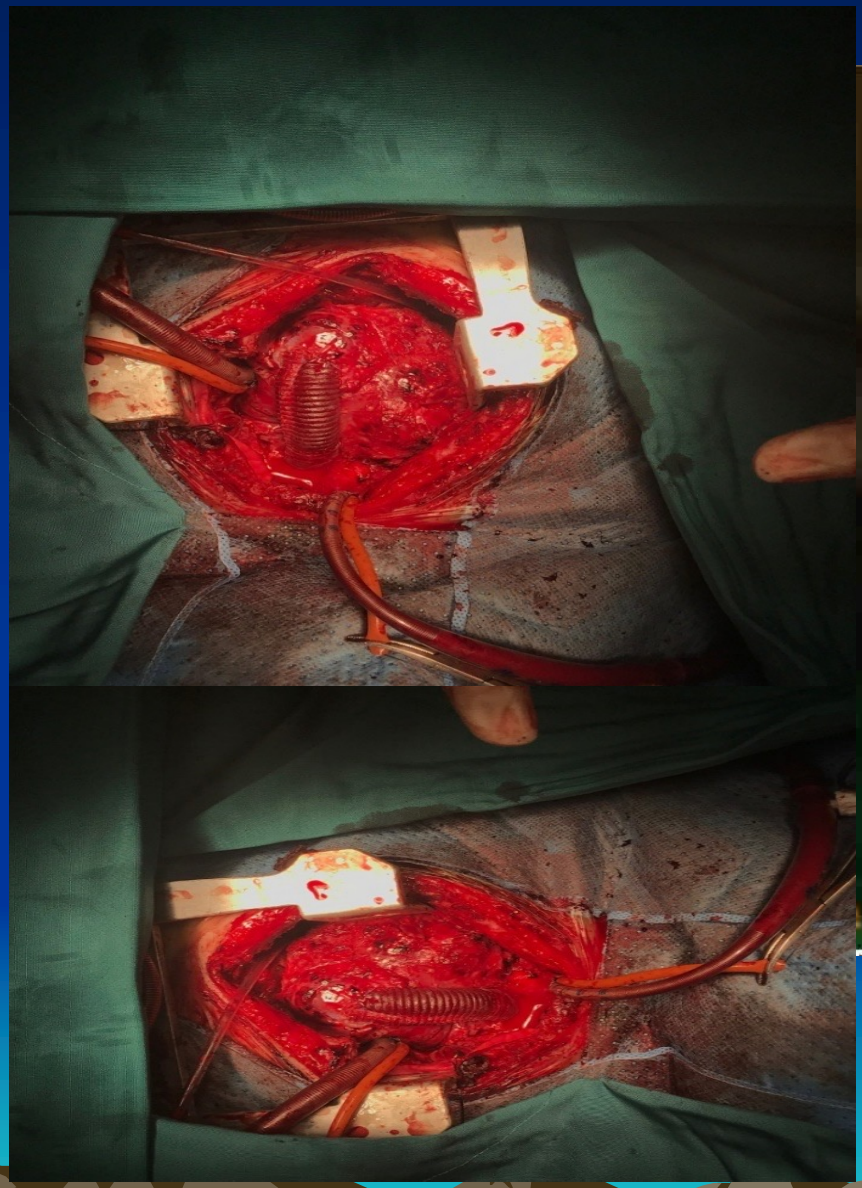


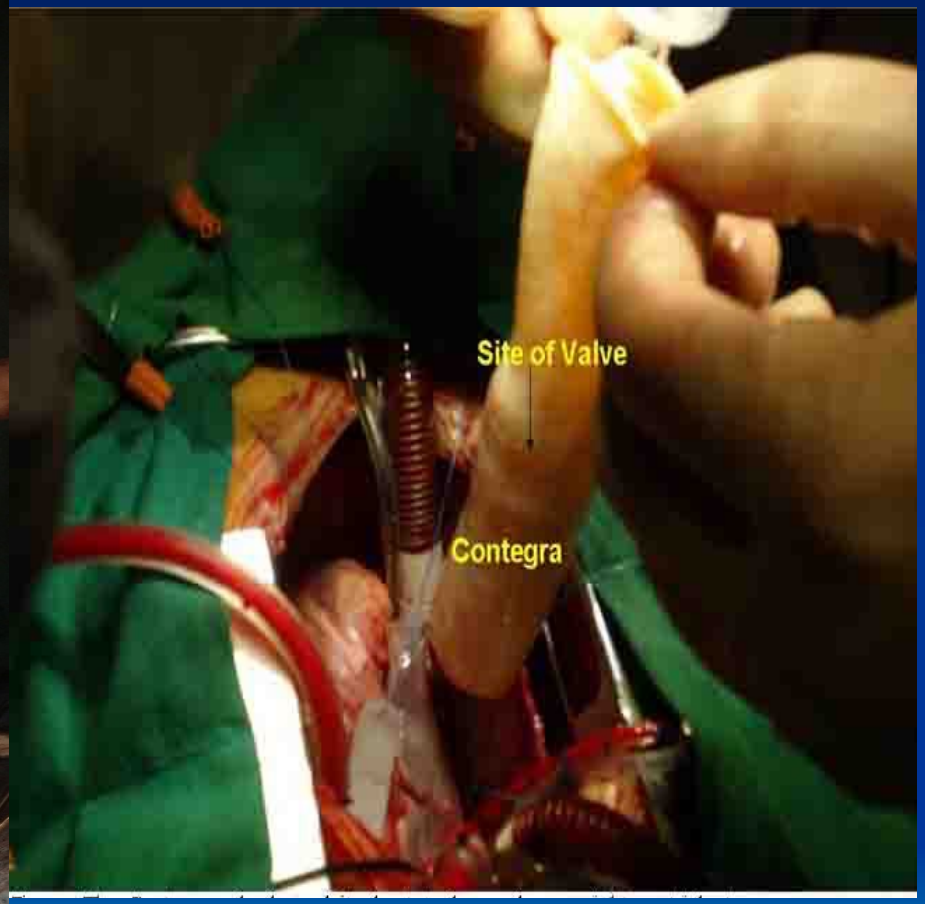




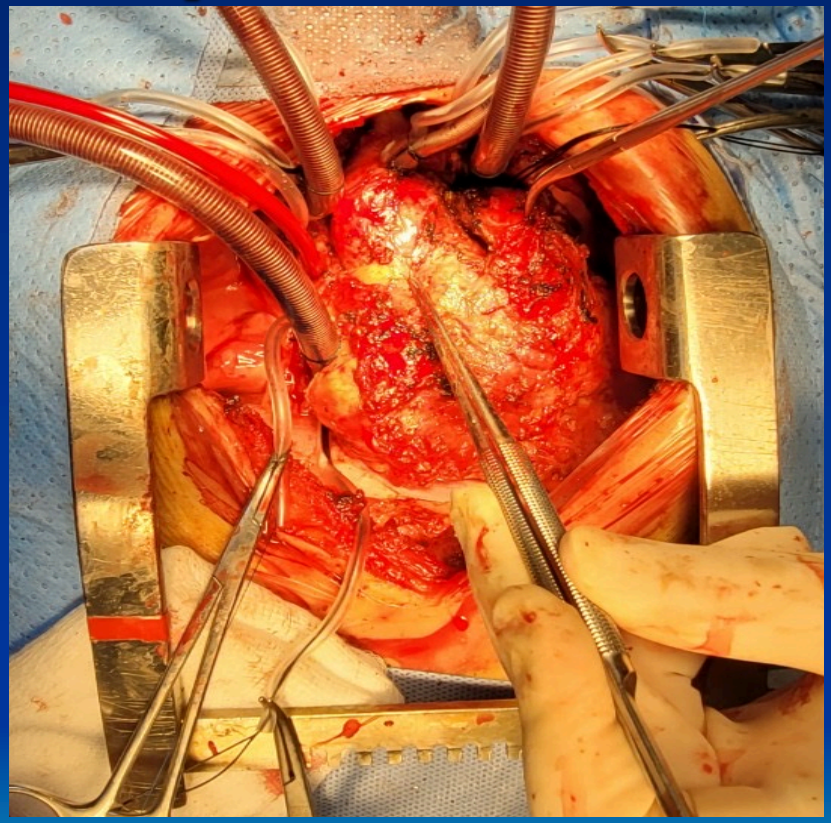
- **CTScan:**



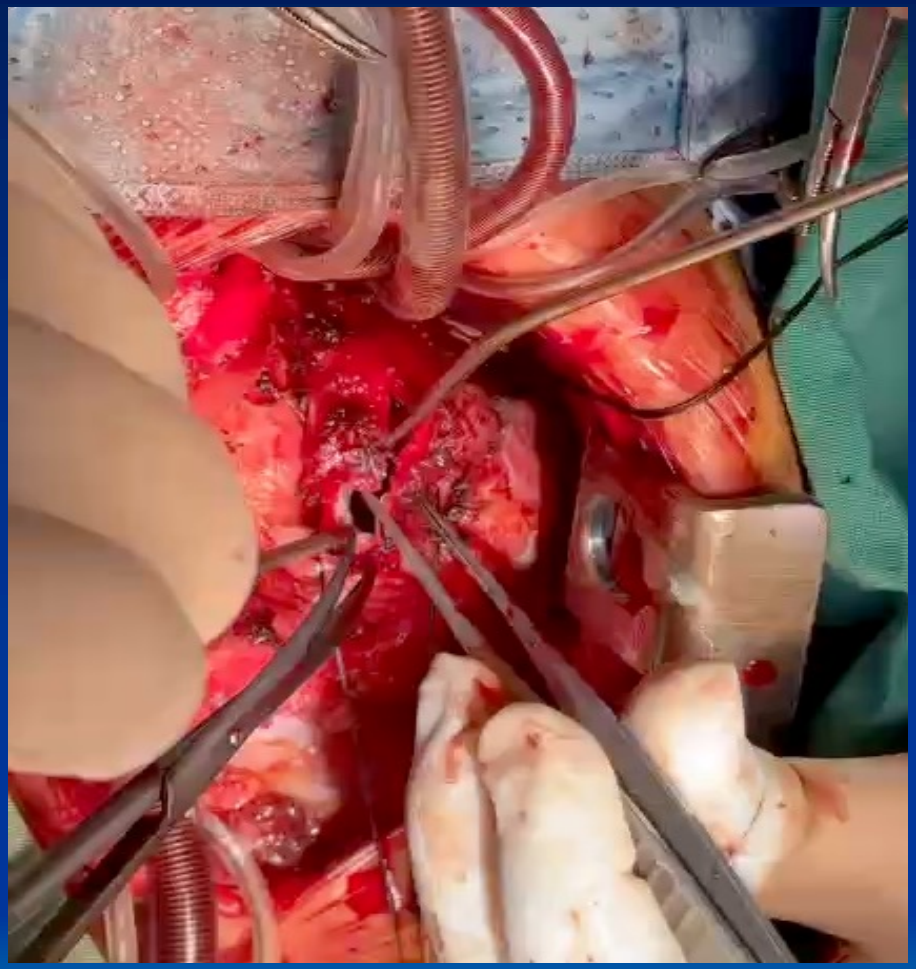



Site of Valve
Contegra

Conduit replacement

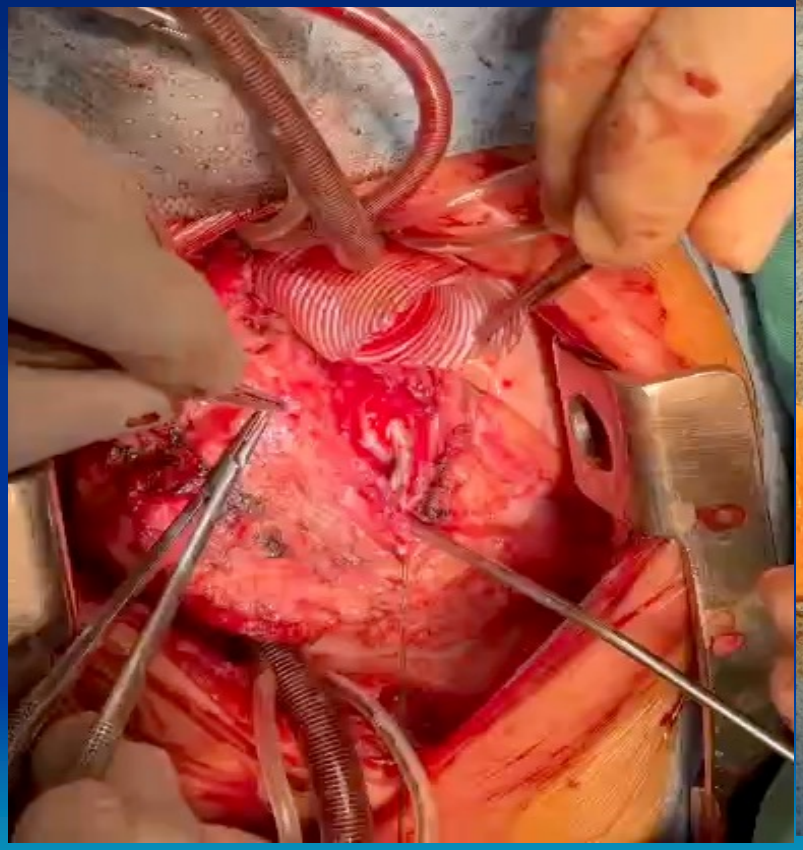


Dissecting and establishing CPB

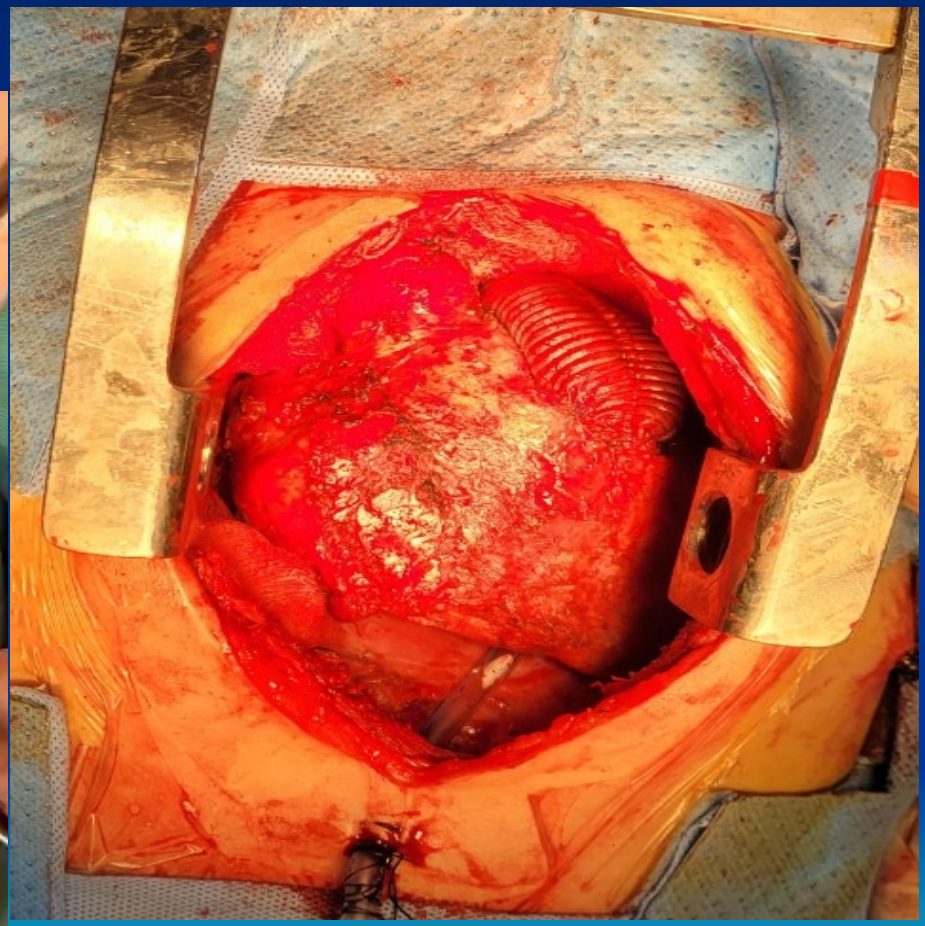


Removing failed conduit

Conduit replacement

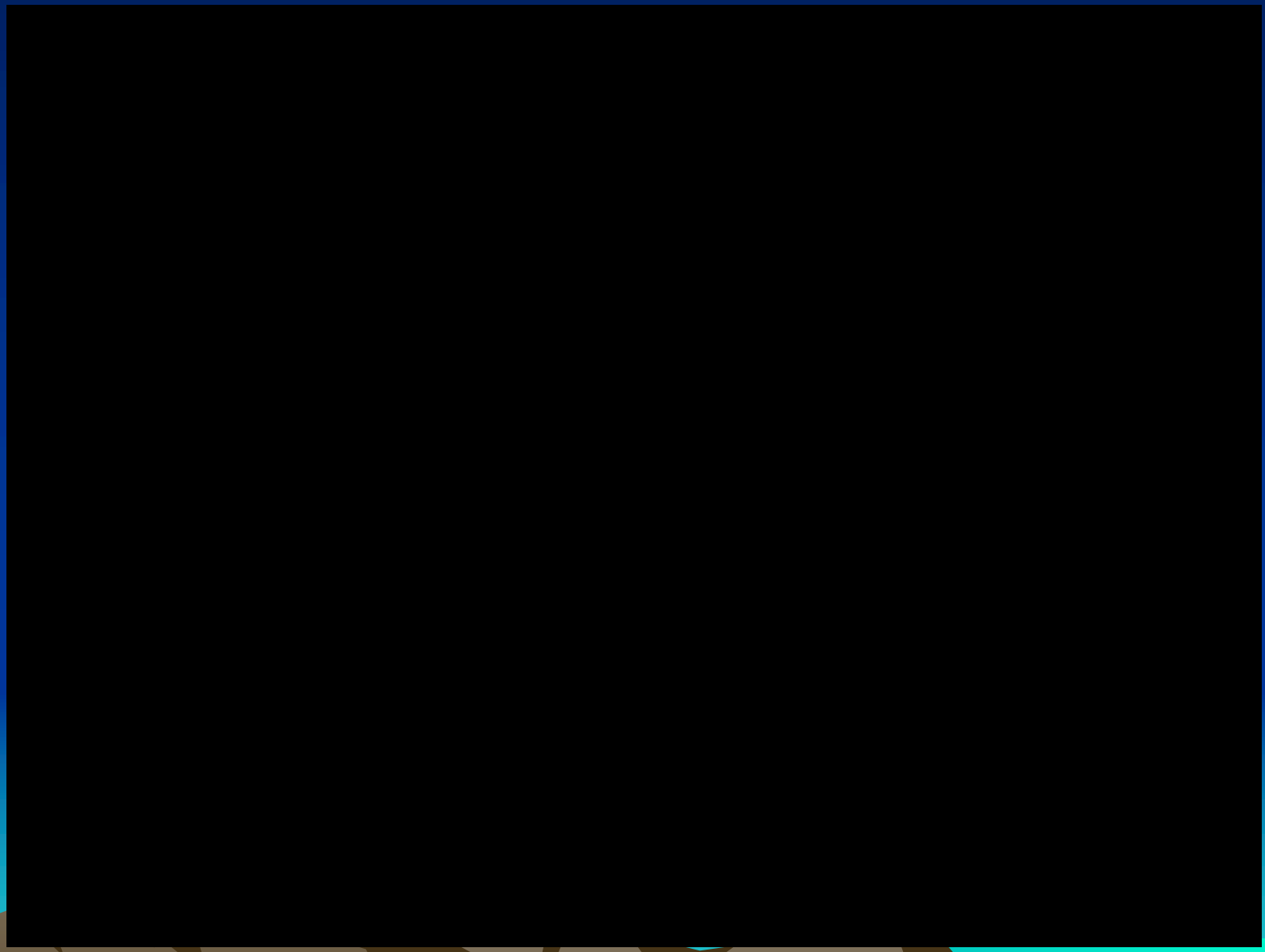


Replacing new conduit



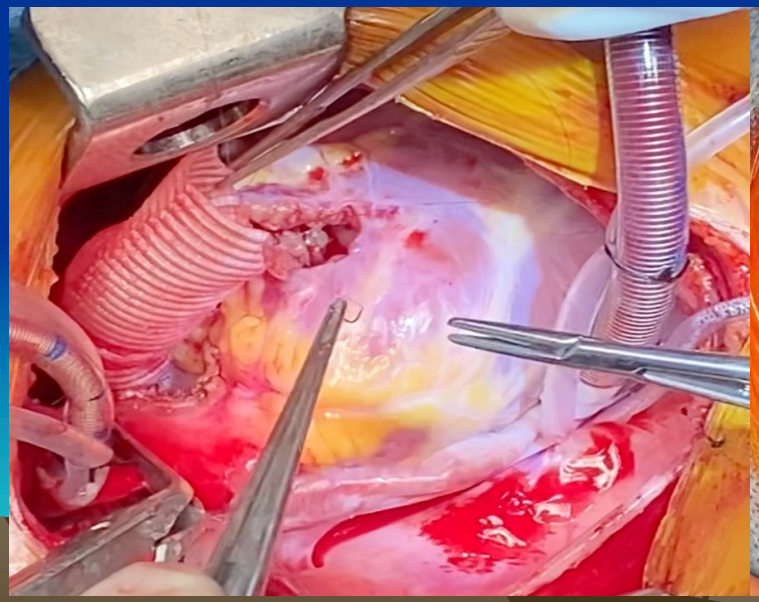
Done

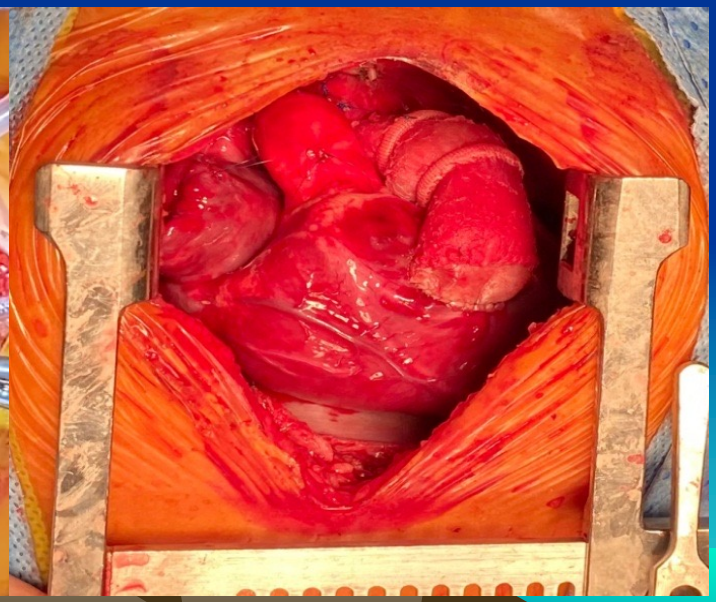
Conduit replacement



OPERATION

- Patients underwent surgeries from 3-2017→ 8-2023
- At the department of Pediatric cardiac surgery, Choray hospital, Vietnam
- CBP: Aorto-bicaval cannulation, In the group of 2nd conduit, with beating heart during operation
- Conduit size: basing on patient BSA

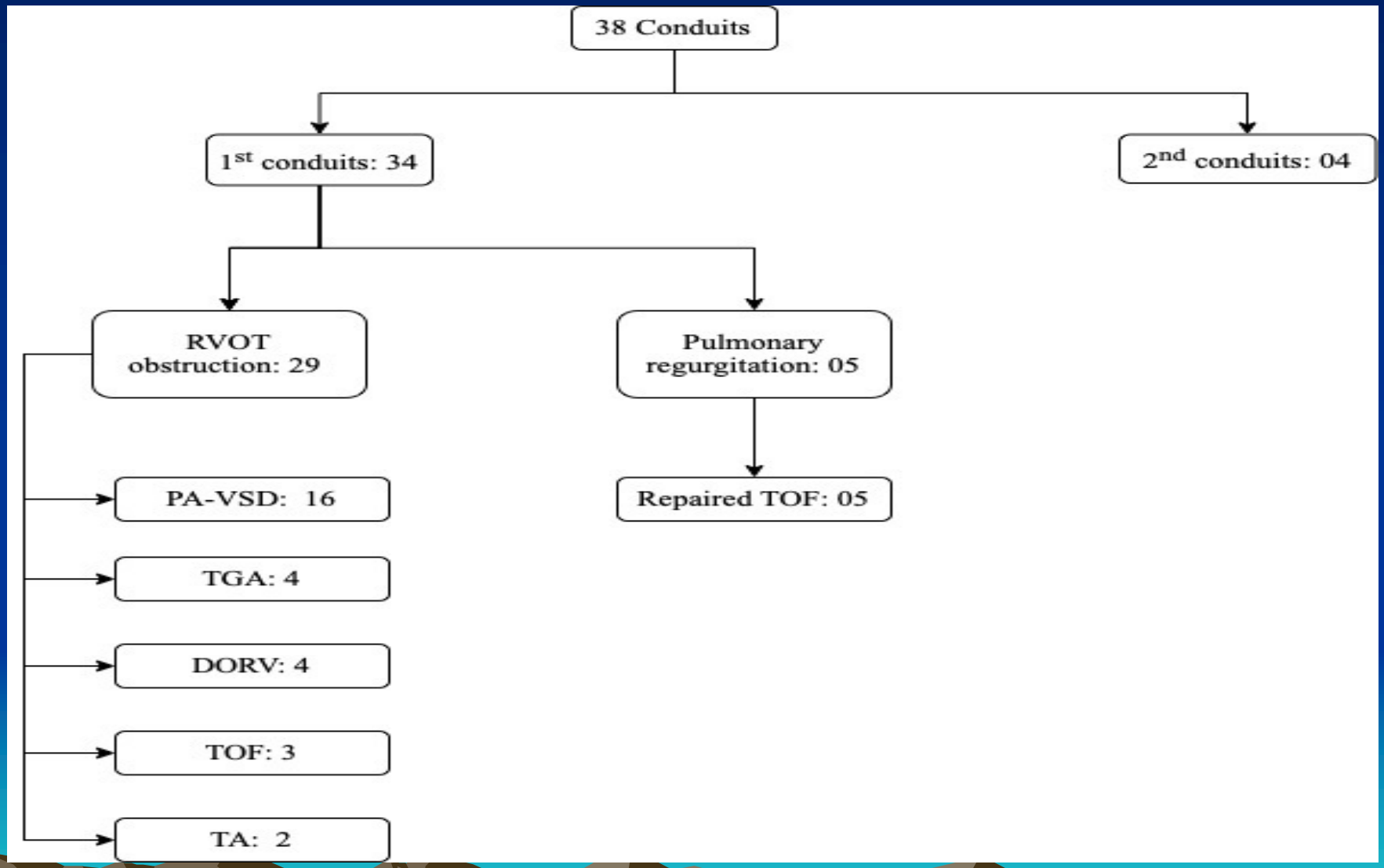




RESULTS

- 38 RV-PA valve conduits were implanted, 55.6% were male. Median age and weight at surgery were 4 yo (3 months to 14 years) and 12 kg (3 to 46 kg)
- There were 34 first conduits and 4 second conduits.
- Two types of conduits: 10.5% Contegra and 89.5% Labcor, which conduit sizes varied from 11 to 21

Classifying patients according to type of defects and number of prior conduit



RESULTS

	RVOT obstruction (n = 29)	PR and 2nd conduit (n= 9)
Age	3.7 ± 3.8 years (3 months to 13 years)	10 ± 3.9 years (4 to 14 years)
Weight (kg)	11.8 ± 7.2 (3 to 27)	28.5 ± 13.2 (14 to 46)
SpO2 (%)	73.8 ± 10.8 (53 to 96%)	>95%
History of catheter intervention (n,%)	10 (34.5)	2 (22.2)
History of cardiac operation (n,%)	8 (27.6)	9 (100%)
Z-score of LPA	0.88 ± 0.72 (-1.5 to +3.3)	0.5 ± 1.1 (-1.3 to + 2)
Z-score of RPA	1 ± 1.04 (-0.8 to +3.2)	0.9 ± 0.64 (+0.1 to +1.8)

Preoperative characteristics

RESULTS

Conduit characteristics

Type of conduit	Conduit size	Z-score	Peak pressure gradient before discharge (mmHg)
Labcor 89.5% Contegra: 10.5%	Median: 15 Min: 11 Max: 21	Median: +0.5 Min: -1.3 Max: +1.96	Median: 22 Min: 10 Max: 48

34 (89.5%) were Labcor valved conduit, 4 (10.5%) were Contegra
Size of conduits median was 15
Median Z-Score is of conduit was +0.5 (min-max: -1.3 to +1.96)

RESULTS

Surgical technique (other than conduit implantation) in group RVOT obstruction	N (%)
Palliative shunt takedown	6 (17.6)
VSD closure	34 (100)
ASD closure	4 (11.8)
PDA ligation/division	9 (26.5)
Band removal	2 (5.9%)

All patients in group of RVOT obstruction required VSD closure and repaired other associated defects

RESULTS

	N	ICU LOS (day)	Postoperative LOS (day)	3rd degree AV block (n,%)	ECMO support (n,%)	Death (n,%)
All	38	Median: 5.5 IQR: [3, 6.75] Min, max: 1, 54	Median: 15 IQR: [10.25, 18.75] Min, max: 1, 62	1 (2.6)	3 (7.9)	2 (5.3)
RVOT obstruction (1st conduit)	29	Median: 6 IQR: [5, 7] Min,max: 1, 54	Median: 16 IQR: [13, 20] Min, max: 1, 62	1 (3.4)	3 (10.3)	2 (6.9)
PR and 2nd conduit	9	2 ± 0.8 (1 to 3)	8.7 ± 3.1(5 to 13)	0	0	0

LOS: length of stay, IQR: interquartile range, ICU: intensive care unit

RESULTS

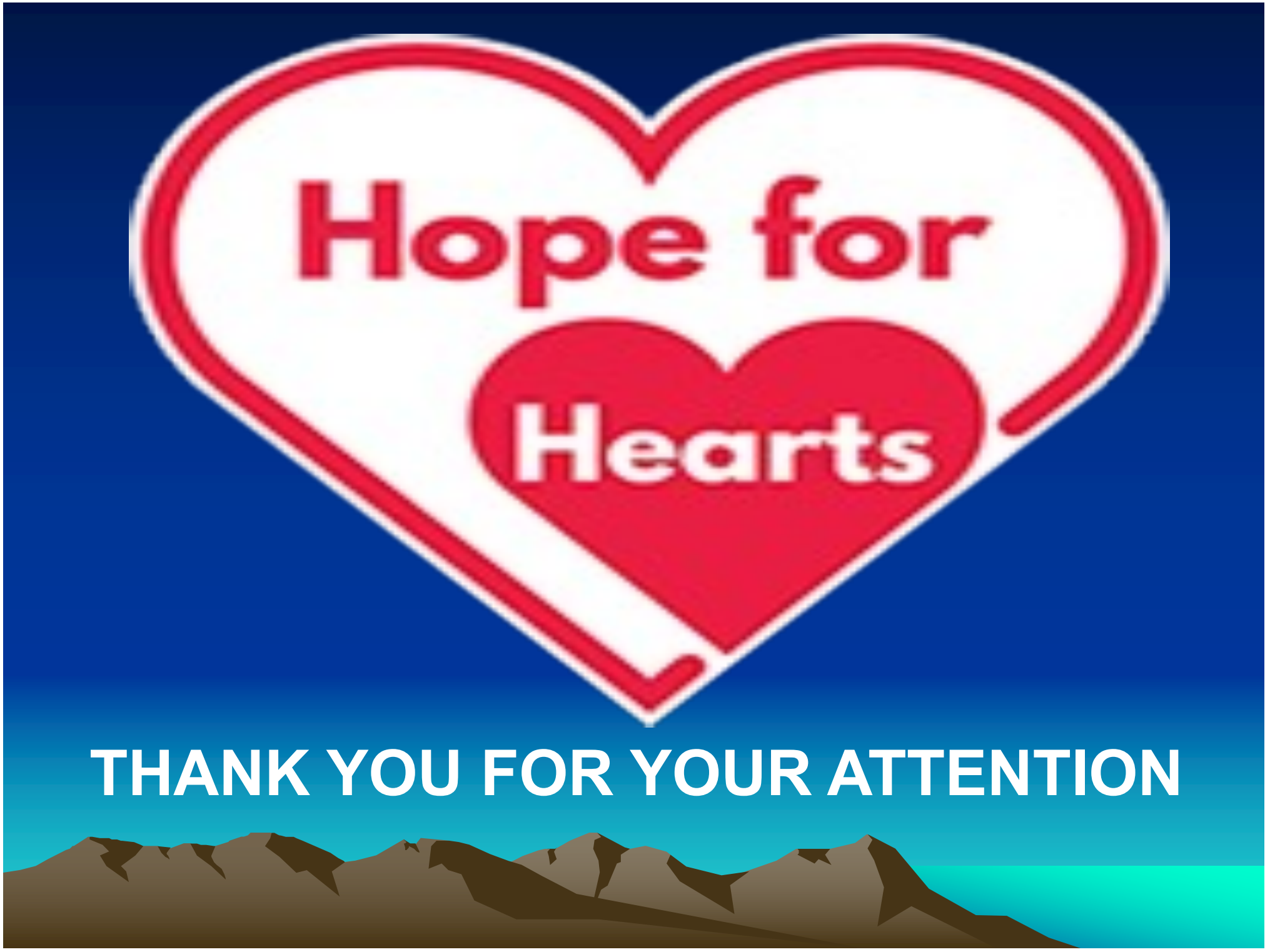
- 03 patients required ECMO supporting
- The median postoperative lenght of stay was 15 d
- Main complications: 3rd A-V block (permanent pacemaker required) was 2.6%
- Early mortality rate was 5.3%
- No patient required reoperation during hospital stay

RESULTS

- The median peak systolic pressure gradient across conduit was 22 mmHg
- Mild conduit stenosis was founded in 07 (19.4%) conduits, moderate stenosis: 02 (5.5%) conduits, no severe stenosis
- Following up time: 32.9 ± 6.5 (4 to 66) months. Peak systolic pressure gradient across conduit on was 30.3 ± 38 (4 to 80) mmHg. 4 conduits were failed because of severe calcification of biologic valve and all of them were replaced other larger conduit from 60 to 66 months since the first conduit
- No patient developed infective endocarditis

CONCLUSIONS

- Valved conduit is quite necessary in treatment of congenital RV-PA discontinuity and good choice in case of PR
- Our study showed that RV-PA valved conduits can be implanted or replaced with low mortality rate and rate of conduit failure is not significant in median-term of following up
- Good conduit survival in medium-term following up


Hope for
Hearts
THANK YOU FOR YOUR ATTENTION