

# Does the hypoplastic arch grow after resection of Coarctation and extended end-to-end anastomosis?

H. Dave<sup>1,4</sup>, Schweiger M<sup>1,4</sup>, Guglielmetti L<sup>1,4</sup>, Trippel A<sup>1,4</sup>, O. Romanchenko<sup>1,4</sup>, Döll C<sup>2,4</sup>, C. Balmer<sup>3,4</sup>, O. Kretschmar<sup>3,4</sup>, M. Huebler<sup>1,4</sup>

<sup>1</sup>Division of Congenital Cardiovascular Surgery, <sup>2</sup>Division of Neonatology and intensive care, <sup>3</sup>Division of Paediatric Cardiology, <sup>4</sup>Children's Research Centre, University Children's Hospital Zurich, Switzerland.

Correspondence: hitendu.dave@kispi.uzh.ch

## Background

- Arch hypoplasia coexists in about 40% of children presenting with Aortic Coarctation.
- When Coarctation and aortic arch hypoplasia coexist with an intra-cardiac heart defect such as AVSD, one of the strategies involves a single stage correction of both intra and extra-cardiac defects through a sternotomy with the use of CPB. The other strategy being a 2 stage correction: Coarctation repair through a thoracotomy without use of CPB in the neonatal period and an intra-cardiac repair at around 3 months of age.
- The optimum strategy would be the one that leads to a perfect reconstruction of the arch (Roman shaped arch) facilitating an age correlated growth, minimal surgical stress on the brain development and a long lasting intra-cardiac repair.
- With these goals in mind, we studied the growth of the hypoplastic arch after a Coarctation repair through a left thoracotomy.

## Conclusion

- The hypoplastic arch grows with age after resection and extended end-to-end anastomosis, but some arches remain small for age.
- Most of the arches tended to grow to a Z value < -3 at last follow up.
- It was gratifying that most of the patients were free of antihypertensive medications.
- Further studies are underway to identify the morphological subgroup with small proximal arch diameter that may be best corrected through a sternotomy and use of CPB.

## Clinical methods and surgical technique

- 25 patients with hypoplastic arch and Coarctation undergoing resection and extended end-to-end anastomosis, through a left posterior muscle sparing thoracotomy and without the use of CPB (out of a total of 139 consecutive Coarctation repairs performed between 2002-2010) were reviewed.
- Coarctation repair was performed using a muscle sparing left posterior thoracotomy and an extra-pleural approach.
- 6 patients successfully underwent intra-cardiac repair at the 2<sup>nd</sup> stage for sub-aortic membrane (2), AVSD (1), VSD(1), ASD(1), VSD and Mitral valve reconstruction (1).
- Median follow-up (Follow-up) was 82.3 (28.1-119.7) months.

## Demographic and clinical data

- Retrospective analysis
- N: 25
- Median age: 7 (0-442) days
- Median weight: 3.1 (0.98-10) kg
- There was no early or late death.
- No patient needed surgical re-enlargement of the arch.
- 2/25 patients required balloon dilatation for Recoarctations each at 2 months postoperatively (Fig 1).

## Results

- The below table and Fig 2 show the progression of Z value of the aortic arch
- All (barring 1) patients were free of antihypertensive medication.
- 3 patients had signs of LV hypertrophy, often due to association with bicuspid aortic valve, sub-aortic stenosis and AV septal defect.

Preoperative Z value of transverse arch	Postoperative Z value of transverse arch before discharge	Z value of transverse arch at a median follow-up of 69 (3.4-118) months	Z value of transverse arch at a median follow-up of 97 (47-138) months * ( Available in 16 patients)
-4.6 (-9.4 to -1.4)	-3.5 (-7.6 to -0.5)	-2.6 (-7.3 to -0.6)	-2.4 (-5 to 1)
Median Weight 3.1 (0.98-10) kg	Median Weight 3.1 (0.98-10) kg	Median Weight 19.5 (9-44) kg	Median Weight 25 (13-53) kg

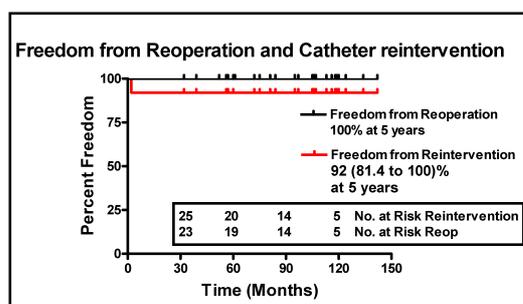


Fig 1. Freedom from reoperation and catheter reintervention

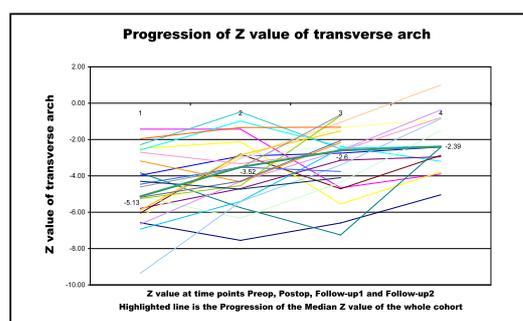


Fig 2. Progression of Z value of the transverse arch with age