

# Clinical significance of aortopulmonary collaterals after arterial switch operation in neonates with d-transposition of the great arteries

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## Background

- In patients with d-transposition of great arteries (d-TGA), enlarged bronchial arteries / major aortopulmonary collateral arteries (MAPCA) are common after surgical repair.
- Those MAPCA's are often clinically silent, but may cause congestive heart failure after surgical repair with systemic hypoxemia, pulmonary volume overload, left ventricular dysfunction and respiratory failure.
- The aim of our study was to evaluate our patient population for complicated early postoperative course due to MAPCA's.

## Conclusion

- After arterial switch operation, nearly half of our patients (43%) needed a cardiac catheterisation and half of them (20%) showed hemodynamic relevant MAPCA's.
- MAPCA's were a risk factor for prolonged ICU and hospital stay with a longer ventilation time, longer support with inotropic agents and delayed chest closure.
- We suggest an early work-up in the cath lab when facing an early postoperative complicated course due to coronary anomaly or MAPCA's.

## Methods

- 4-year retrospective study at Division of Pediatric Cardiology, University Children's Hospital, Zürich.
- Analysis of clinical data of neonates with simple d-TGA after arterial switch operation with known MAPCA's complicating the postoperative course.
- Statistical analysis was done with double-sided unpaired Student's t test. Data are given as mean ± standard deviation (range).

## Results

- Between January 2007 and December 2010, 40 patients (31 male) underwent arterial switch operation for d-TGA.
- Mean gestational week was 39 0/7 (28 5/7- 41 3/7), body weight was 3.4kg (1.2-4.2) and body length was 50cm (38-55).
- **Analysis of patients requiring heart catheterisation after arterial switch operation**
  - Seventeen (43%) patients required a postoperative cardiac catheterisation due to anomalies of the coronary arteries (n=9), pathologic signs for ischemia on ECG or prolonged postoperative course. Three of these patients had cardiac catheterisation after discharge.
  - The mean interval between repair and catheter was 18 days in patients with MAPCA's and 30 1/- 28 days in patients without MAPCA's.
  - Ten of these 17 patients (59%) had one or more MAPCA's, and 8 required transcatheter coil embolization (figure).
  - All catheterisations were without major complications. In all 8 patients, cardiac catheterisation resulted in complete MAPCA closure.
  - After closure of MAPCA's, patients recovered fast and none of the patients showed a prolonged course for cardiac reasons.
  - One patient required an additional operation for stenosis of the left coronary artery.

**Table 1. Comparison of 40 patients with d-TGA after arterial switch operation with or without MAPCA's (mean ± SD (range))**

	With MAPCA (n=8)	Without MAPCA (n=32)	p-value
Oxygen saturation before repair (%)	82	83	p = 0.09
Age at repair (days)	8	11	p = 0.86
Mechanical ventilatory support (days)	9.5 ± 15 (1-47)	3.3 ± 3 (1-17)	p < 0.038
Catecholamine use (days)	9 ± 8 (3-27)	5 ± 4 (1-18)	p = 0.056
Open chest (days)	6 ± 5 (2-16)	3 ± 1 (1-5)	p < 0.04
ICU stay (days)	15 ± 17 (3-56)	8 ± 5 (3-25)	p < 0.021
Overall hospital stay (days)	32 ± 22 (15-81)	21 ± 9 (11-54)	p < 0.03

## References

- 1 Enlarged Bronchial Arteries After Early Repair of Transposition of the Great Arteries, G. Wernofsky, N.D. Bridges, V.S. Mandell, A.R. Castaneda, S.B. Perry, Journal of American College of Cardiology, 1993 February, 465-70.
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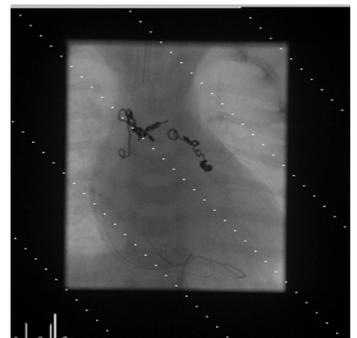


Figure: Angiography (aortic arch) showing MAPCA's originating from the descending aorta to both lungs, before and after closure using BALT Coils.