Contemporary results of resection and extended end-to-end anastomosis for repair of aortic Coarctation: Can we do better?

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Background

- Coarctation of Aorta is a simple congenital heart defect occurring in 4 - 5 pro 10,000 live births.
- It occurs as an isolated entity or in association with complex cardiac malformations such as VSD, AVSD, TGA, DILV, etc.
- Since the first correction with a cut and sew technique by Clarence Crawford in Stockholm (Year 1944), resection and extended end-to-end anastomosis has become established as the repair of choice.
- While the results have continued to improve in general, the best approach for Coarctation which coexists with aortic arch hypoplasia is debatable.

Clinical methods and surgical technique

- 100 consecutive primary Coarctation repairs performed through a left thoracotomy (2003 – 2010) were retrospectively reviewed.
- Coarctation co-existing with complex intra-cardiac defects such as d-TGA, Shone’s complex and others (10 during the similar time-frame) were excluded.
- In 7 patients, who presented with significant LV dysfunction, temporary stenting of the isthmus followed by early stent removal and resection was performed as soon as the LV function recovered.
- Muscle sparing left posterior thoracotomy and extra-pleural approach to the aorta was the preferred technique (Fig 1,2)

Demographic and clinical data

- N:100
- Co-existing simple cardiac defects
  - Aortic arch hypoplasia: 20
  - PFO/ASD: 32
  - VSD/AVSD: 26
- Time frame: 2003 – 2010
- Median age: 31 (1-1878) days
- Median weight: 5.1 (1.5-20) kg
- Median follow-up: 51.6 (0.2-121) months

Results

- Early mortality: 0%.
- Late mortality: 2% patients after well corrected isthmus and AVSD died after 20.5 and 4.5 months due to pulmonary hypertensive crisis (1) and unknown cause (1).
- Paraplegia / Paraparesis: 0%
- Median hospital stay was 11 (2-147) days – some were discharged to the referring centre.

Conclusion

- Repair of Aortic Coarctation (isolated and with simple intra-cardiac shunts) can be performed with incrementally low operative risk.
- The rate of reoperation and reintervention is low. Most recoarctations can be managed with catheter intervention.
- Patients with intra-cardiac shunt tolerate residual gradient poorly, hence the need to adapt technique and strategy in order to achieve this goal.
- Learning curve of the surgeon, technical & strategic issues such as residual ductal tissue, mobilization of aorta, etc. may play an inter-woven role in leading to reoperation and reintervention.
- An analysis of factors associated with reoperation and reintervention will help develop better selection strategies so as to further reduce the need for reoperation by subjecting them to a more aggressive repair using cardiopulmonary bypass.

Survival Percentage after Coarctation Repair

Freedom from Reoperation and Catheter reintervention on the arch and the isthmus

Kaplan Meier Survival was 98.9 (96.8-100)% (Fig 3).

Freedom from reoperation and catheter reintervention on the arch/isthmus was 92.5(86.7-98.3)% and 89.9 (83.3-96.5)% at 5 & 10 years respectively (Fig 4).

Seventeen patients have undergone subsequent intra-cardiac repairs for ASD, VSD, AVSD, subaortic membrane and mitral valve repair/replacement.

Two patients with borderline left-heart structures underwent early reoperation: Conversion to a DKS-shunt in one and a 2-ventricle repair in another. In hindsight, these should have primarily undergone a repair through a sternotomy with CPB support.