Complete Conversion of Type 1 to Type 0 Bicuspid Aortic Valve: A Novel Valve Repair Strategy

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Disclosures

- No relevant financial disclosures
Most common morphotype (71%): median raphe & false commissure (type 1 L/R)
Sclerotic & insufficient type 1 L/R
Need for repair?
Preop TEE: type 1 BAV with severe AR
Goal should be to restore normal geometry: form = function.


JTCVS 2005;130:601-3.
Form and function
Valve repair & reimplantation: MRA depicts tailored neosinuses

Tricuspid  Bicuspid (type 0)  Bicuspid (type 1)
Concept convert pathologic type 1 to unrestricted type 0...
Conversion of type 1 to type 0 ("True")
Morphology: 4 steps

1. Resection of median raphe with shortening of leading edge

2. Resection of false commissure with complete anterior annular detachment

3. Enlargement, reinforcement, and translocation of basilar attachment of anterior cusp

4. VSRR with annuloplasty (modified reimplantation technique)
Cusp detachment
Type 1 BAV with restriction and leading edge prolapse
Measurement of the posterior ("normal") cusp

\[ d = \frac{h}{0.7} \]

\[ d' = 2(0.73 \times d) \approx 2h + 2 \text{ (mm)} \]
Creating native pericardial leaflet symmetric with NC cusp
Resection of raphe & shortening leading edge
Fix leading edge length to equal NC cusp's
Tailor neocusp from native cusp and pericardial cusp
Translocate (reattach) neocusp to LVOT symmetric with noncoronary attachment depth
Annuloplasty (primary annular sutures) placed in subcusp coronet-shaped pattern
Result: two symmetric cusps
Graft envelops entire root structure
Pleats at 2/5 and 3/5 hemi circumference
2 symmetric cusps housed in 2 distinct sinuses
Clinical Presentation

• 51 year old man with type 1 BAV (R/N morphotype) and symptomatic moderately severe AR

• Ascending aorta – 4.8cm
Clinical Presentation

51 year old man with BAV, moderate-severe AR, and a type 1 R-N
2-yr postop TTE on type 1 to 0 conversion
2-yr postop TTE on type 1 to 0 conversion
7.5 years post another patient...
Results

- 48 BAVs with 3-4+ AR (aged 22-66) with AV repair and VSRR.
- No 30-d/hospital deaths, strokes or permanent pacemakers
- 1 late death (unrelated to valve repair)
- Complete follow-up (0.3-9 yrs, mean 3.8 yrs)
  - Postoperative transvalvular gradients remain normal
  - Freedom from >1+ AR and valve-related reoperation are 100%
  - All of complete conversion cases have <1+ AR
Conclusions

• Repair of the very common, raphe’d BAV (type 1) with severe AR is both feasible and desirable.

• Complete conversion to “True” morphology appears durable at the mid-term without evolving signs of deterioration or stenosis.

• This technique may be a superior option over bioprostheses in younger patients