Bicuspid aortic valve repair with an expansible ring

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Disclosure information

Consultant for Coroneo, Inc
Aortic valve
Tricuspid

Bicuspid valve
0 raphe
1 raphe

Unicuspid valve
2 raphes

Good candidates for repair

Good candidates for repair

Good candidates for repair
3 Phenotypes of Dystrophic AI

DILATED ROOT
(Sinuses of Valsalva ≥ 45mm)

DILATED ASCENDING AORTA
(Asc Aorta ≥ 40-45mm with normal root)

ISOLATED AORTIC INSUFFICIENCY
(All aorta ≥ 40-45mm)

Annulus ≥ 25mm  STJ ≥ 30mm
Standardised Approach to AV Repair

- **DILATED ROOT**
  - (Sinuses of Valsalva ≥ 45mm)

- **DILATED ASCENDING AORTA**
  - (Asc Aorta ≥ 40-45mm with normal root)

- **ISOLATED AORTIC INSUFFICIENCY**
  - (All aorta ≤ 40-45mm)

*Address the Annulus & STJ*

- Remodeling & Annuloplasty
- Asc Aorta Replacement & Annuloplasty
- Double Annuloplasty
BAV root phenotype
(Sinus Valsalva Ø ≥ 45 mm)
Remodeling + Subvalvular Annuloplasty

Subvalvular dissection & U sutures
Alignment of free margin length
Remodeling Commissure 180°
Effective height ≥ 9mm
External ring implantation
Standardization based on aortic annulus Ø

<table>
<thead>
<tr>
<th>Valsalva graft® Ø (mm)</th>
<th>25–27</th>
<th>28–30</th>
<th>31–35</th>
<th>≥36</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extra aortic ring® Ø (mm)</td>
<td>25</td>
<td>27</td>
<td>29</td>
<td>31</td>
</tr>
</tbody>
</table>

Annuloplasty ring = down size from one size

Lansac et al JTCVS 2009
Supra-coronary aneurysms
Bicuspid R-L (sinus $\Ø$ 40 – 45 mm)

Hemi-Root Repair + Subvalvular Annuloplasty

- Subvalvular dissection & U sutures
- Alignment of free margin length
- Hemi-Yacoub
- Effective height $\geq$ 9mm
- External ring implantation
Techniques for aortic annuloplasty in isolated AI to restore ratio STJ/Annulus 1.2

- **treat STJ Ø**
  - Double external ring annuloplasty (Lansac 2003)
  - Internal external ring annuloplasty (Fattouch 2011)

- **treat Annulus Ø**
  - Internal rigid ring (Rankin 2011)
  - Suture annuloplasty (Schäfers 2009)

**SCA Cabrol 1966**
### Double annuloplasty
For Isolated aortic valve repair
(all diameters ≤ 40 mm)

<table>
<thead>
<tr>
<th></th>
<th>Aortic annular base Ø (Hegar dilators, mm)</th>
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<tbody>
<tr>
<td></td>
<td>25-27</td>
</tr>
<tr>
<td>ExtraAortic STJ ring Ø (mm)</td>
<td>25</td>
</tr>
<tr>
<td>Extra aortic open ring® Ø (mm)</td>
<td>25</td>
</tr>
</tbody>
</table>

Aortic ring = down size from one size
Double annuloplasty for Isolated aortic valve repair
(all diameters ≤ 40 mm)

6 subvalvular « U » stitches

Alignment of cusp free edges

STJ ring

Tri 120°
Bi 180°

Cusp resuspension (effective height ≥9 mm)

open ring below the coronaries

Double annuloplasty
Excision of a calcified raphe
Unicuspid R-L R-NC minor form

Commissurotomy

Schäfers HJS, with permission
Unicuspid R-L R-NC complete form

Bicuspidization of unicuspid valve

Matrix recolonized by host cells for commissural reconstruction

Aicher D. ATS 2013
482 patients Aortic valve repair
Operative mortality: 1.2%

191 BAV Repairs

- Remodeling Root Repair + Subvalvular Annuloplasty
  \[ n = 100 \]

- Tubular Aorta Replacement / Hemi-Root Repair + Subvalvular Annuloplasty
  \[ n = 29 \]

- Isolated AV Repair with Double- and Supravalvular Annuloplasty
  \[ n = 31 \]
Long-Term Survival

Survival at 8 years:
- Isolated AI Repair + Single ring: 94%
- Isolated AI Repair + Double Ring: 100%
- Remodeling Root + Ring: 98%
- Asc. Aorta / Hemi-Yacounb + Ring: 100%

Similar to age match population
Indicence of reoperation is 1.5% remodeling+ring, 0% tube+ring, 0% double ring
Compare to 25% for single annuloplasty

cumulative risk of reop is 20 times higher than technique stabilizing STJ and annulus
p 0.0033
Indicence of recurrent AI is 35% in the single ring annuloplasty at 6 years while it is zero in all the other group. (p 0.00014)
Aortic Annuloplasty: a practical approach (EACTS)
Paris March 9-11th 2020
(live surgery-video session)
www.eacts.org