Tricuspid Valve Repair in the Setting of MV Disease

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I have no conflict of interest to disclose
Tricuspid annuloplasty during MV repair for degenerative diseases

**Figure 1** Freedom From Moderate or Greater TR

- **HR** = 0.26 (95% CI 0.07-0.94), P = 0.04

65% Tricuspid annuloplasty during MV repair


1985 – 2004
840 patients
Mean follow-up with echoes: 10.4 years

TV annuloplasty: 3.7%


2005 – 2010
343 patients
Mean follow-up with echoes: 4.1 years

TV annuloplasty: 7%

# Results

Factors Associated with Preoperative Moderate/Severe TR by Multivariable Analysis

<table>
<thead>
<tr>
<th>Factor</th>
<th>Reliability</th>
<th>Odds Ratio</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preop AF</td>
<td>99.0%</td>
<td>2.44</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Age/5 years</td>
<td>98.6%</td>
<td>1.20</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>NYHA 3&amp;4</td>
<td>94.0%</td>
<td>2.05</td>
<td>0.003</td>
</tr>
<tr>
<td>ASD/VSD</td>
<td>93.2%</td>
<td>5.11</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Preop LV EF/level</td>
<td>82.2%</td>
<td>1.58</td>
<td>0.006</td>
</tr>
<tr>
<td>Female gender</td>
<td>70.4%</td>
<td>1.59</td>
<td>0.03</td>
</tr>
</tbody>
</table>
Results

At 15 years:
- 66% Alive and free from adverse events
- 20% Deceased
- 14% Valve-related complications

Cumulative incidence over years since mitral valve surgery:
- 7% Isolated TR
- 4% Isolated MR
- 2% Combined MR/TR
- 1% Reoperation without MR/TR


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840 patients
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TV annuloplasty: 3.7%
TV annuloplasty: 7%
Tricuspid Annular Dilatation

Guidelines on the Management of Heart Valve Disease

American Guidelines...

European Guidelines...

Brazilian Guidelines...
What the Guidelines State about Functional TR

TRICUSPID ANNULOPLASTY SHOULD BE PERFORMED AT THE TIME OF LEFT SIDE HEART VALVE SURGERY IN PATIENTS WITH SEVERE FUNCTIONAL TRICUSPID REGURGITATION (Class I)
What the Guidelines State about Functional TR

AMERICAN GUIDELINE
“A diastolic diameter >40 mm (or >21 mm/m²) indicates significant annular dilation and an increased risk of persistent or progressive TR after isolated mitral valve surgery”. TV annuloplasty should be considered (CLASS IIa)

EUROPEAN GUIDELINE
Tricuspid annuloplasty should be considered in patients with mild or moderate functional TR with dilated annulus (≥40 mm or 21 mm/m²) (CLASS IIa)
Intraoperative Measurement of the Tricuspid Annulus
Tricuspid annulus diameter does not predict the development of tricuspid regurgitation after mitral valve repair for mitral regurgitation due to degenerative diseases - David TE et al. J Thorac Cardiovasc Surg – in press

**Incidence of ≥3+ TR (%)**

<table>
<thead>
<tr>
<th></th>
<th>All patients</th>
<th>TA &lt;40mm</th>
<th>TA ≥40mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 year</td>
<td>3.8 (2.6-5.6)</td>
<td>3.6 (2.2-5.7)</td>
<td>4.7 (2.3-9.3)</td>
</tr>
<tr>
<td>3 years</td>
<td>4.7 (3.4-6.1)</td>
<td>4.5 (3.1-6.3)</td>
<td>5.1 (3.0-8.8)</td>
</tr>
<tr>
<td>5 years</td>
<td>5.4 (4.1-7.2)</td>
<td>5.5 (3.9-7.6)</td>
<td>5.6 (3.2-9.7)</td>
</tr>
<tr>
<td>7 years</td>
<td>6.6 (4.6-9.4)</td>
<td>6.8 (4.6-10.4)</td>
<td>6.0 (2.9-12.2)</td>
</tr>
</tbody>
</table>
MANAGEMENT OF TRICUSPID VALVE REGURGITATION

Position statement of the ESC Working Groups of Cardiovascular Surgery and Valvular Heart Disease

MANAGEMENT OF TRICUSPID VALVE REGURGITATION


“Once considered non-important, treatment of secondary TR is currently viewed as an essential concomitant procedure at the time of mitral (and, less frequently, aortic valve) surgery”
MANAGEMENT OF TRICUSPID VALVE REGURGITATION


« Once considered non-important, treatment of secondary TR is currently viewed as an essential concomitant procedure at the time of mitral (and, less frequently, aortic valve) surgery »

« While the indications for surgical management of severe TR are now generally accepted (Class I), controversy persists concerning the role of intervention for moderate TR. However, there is a trend for intervention in this setting, especially at the time of surgery for left-sided heart valve disease and/or in patients with significant annular dilatation (Class IIa) »
Functional Tricuspid Regurgitation

What to do at the time of mitral valve surgery:

Severe TR  $\rightarrow$  Tricuspid annuloplasty
Moderate TR  $\rightarrow$  Tricuspid annuloplasty
Dilated RV*  $\rightarrow$  Tricuspid annuloplasty
Dilated annulus  $\rightarrow$  ?

* Mid-ventricular cavity $\geq$30 mm (needs further validation)
Prognostic Value of Preoperative Right Ventricular Geometry and Tricuspid Valve Tethering Area in Patients Undergoing Tricuspid Annuloplasty

Yiu KH et al. Circulation 2014;129:87-92

Background – Patients who undergo tricuspid annuloplasty during left-side heart valve surgery have a poor postoperative clinical outcome. However, preoperative RV echocardiography parameters that predict adverse events in these patients are poorly understood.
Conclusions - The present study demonstrates that RV geometry midcavity diameter and tricuspid valve tethering area are important measures associated with adverse events in patients undergoing tricuspid annuloplasty.
Tricuspid Annuloplasty for Functional TR

- **Rigid Rings**
  - Carpentier-Edwards Classic tricuspid annuloplasty ring
  - Edwards MC³ tricuspid annuloplasty ring
  - Medtronic Contour

- **Flexible Bands**
  - Sorin Flexible Band
  - Cosgrove-Edwards annuloplasty ring
  - Medtronic Simplici-T Band

- **Suture Annuloplasty**
  - DeVega Annuloplasty
  - Antunes modification
  - Bicuspidization of TV
Annuloplasty Rings and Bands...

“It is not the ring; it is the ringer, idiot”

Steven Bolling
Tricuspid Annuloplasty

Plication
Tricuspid Valve Leaflet Augmentation
Thank you