Is Mitral Regurgitation Reversible in Patients Undergoing TAVI?

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Background

- Significant MR is often present in patients with severe AS before TAVI
- MR can affect functional status and prognosis
Background (II)

Effect of TAVI on severity of MR

• 35 patients with Severe Aortic Stenosis and Mitral Regurgitation underwent TAVI
• After 24 hours 12 pts had improvement of MR
• The only predictor of improvement was absence of MAC

R Durst et al *Heart Valve Dis* 20:272-281; 2011
Background (III)
Changes in Mitral Regurgitation after TAVI

- 79 consecutive patients
- MR was mild in 57%, moderate in 18%, severe in 1%

AFTER TAVI: Overall no change in degree of MR
MR remained unchanged in 61%, improved in 17% and worsened in 22%.

MR improvement was more common in pts with lower EF

Apost Zakas, Patrick Serruys, Peter de Jaegere, et al
Catheterization and Cardiovascular Interventions 75:43-49(2010)
451 patients underwent TAVI
• 132(29%) had significant MR
• Significant MR in patients undergoing TAVI is associated with a higher early mortality rate.
• At 1-year follow-up, MR was improved in 55% of patients with moderate or severe MR at baseline.

Stefan Toggweiler, Robert H. Boone, Josep Rodés-Cabau et al

*J. Am. Coll. Cardiol.* 2012;59;2068-2074
AIM

Define the short term effect of TAVI on MR severity
101 pts underwent TAVI between 09.2008-05.2012

Echo was performed before TAVI, before discharge, (3[1.5-5]* days) and at follow up (60[34-310] days).

MR severity was classified according to vena contracta (VC) and visual assessment as:

- Absent
- Mild
- Moderate
- Severe

*median [interquartile range]
Results

TAVI procedures
110

Successful TAVI
101 (92%)

Failed TAVI
9

- Death
  3
- Urgent surgery
  3
- Other
  3
• 101 patients with severe AS
• 49% male
• Mean age 81.5±8.2 years
<table>
<thead>
<tr>
<th>Clinical characteristics</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>68</td>
<td>67</td>
</tr>
<tr>
<td>Diabetes</td>
<td>33</td>
<td>33</td>
</tr>
<tr>
<td>Hyperlipidemia</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>Smokers</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Coronary artery disease</td>
<td>68</td>
<td>67</td>
</tr>
<tr>
<td>Pulmonary Hypertension</td>
<td>38</td>
<td>38</td>
</tr>
<tr>
<td>Atrial Fibrillation</td>
<td>18</td>
<td>18</td>
</tr>
<tr>
<td>Organic MV disease</td>
<td>86</td>
<td>85</td>
</tr>
</tbody>
</table>
Approach

- Retrograde Transfemoral: 92 (91%)
- Anterograde Transapical: 7 (7%)
- Subclavian: 2 (2%)
Device

- Edwards SAPIEN: 85 (85%)
- Medtronic CoreValve: 15 (15%)
Severity of MR before TAVI

- No MR: 14 (14%)
- Mild MR: 24 (24%)
- Moderate MR: 37 (37%)
- Severe MR: 26 (25%)
# Results

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>Post TAVI</th>
<th>FUP</th>
<th>p-value (\circ)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Aortic Gradient (mmHg)($)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak</td>
<td>84.0</td>
<td>22.0</td>
<td>20.5</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>[66.0-100.0]</td>
<td>[17.0-27.0]</td>
<td>[16.0-27.0]</td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>46.0</td>
<td>12.0</td>
<td>11.0</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td></td>
<td>[37.5-58.0]</td>
<td>[9.0-15.0]</td>
<td>[8.5-15.0]</td>
<td></td>
</tr>
<tr>
<td><strong>TI gradient (mmHg)($)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>41.0</td>
<td>37.5</td>
<td>35.0</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>[33.0-48.0]</td>
<td>[29.2-45.7]</td>
<td>[29.0-42.2]</td>
<td></td>
</tr>
</tbody>
</table>

\(\circ\) p-value based Wilcoxon Signed Ranks Test, significant both for baseline vs post TAVI and baseline vs FUP

\(\$\) values are median [interquartile range]
Results – Visual assessment of MR

- **p<0.0001**

<table>
<thead>
<tr>
<th></th>
<th>pre TAVI</th>
<th>post-predischarge</th>
<th>fup</th>
</tr>
</thead>
<tbody>
<tr>
<td>absent</td>
<td>14%</td>
<td>14%</td>
<td>14%</td>
</tr>
<tr>
<td>mild</td>
<td>24%</td>
<td>33%</td>
<td>33%</td>
</tr>
<tr>
<td>moderate</td>
<td>37%</td>
<td>38%</td>
<td>39%</td>
</tr>
<tr>
<td>severe</td>
<td>26%</td>
<td>14%</td>
<td>15%</td>
</tr>
</tbody>
</table>

*P-value base on chi-square test, significant both for baseline vs post TAVI and baseline vs FUP*
Results – Assessment of MR by Vena Contracta
All patients

* p-value based on Wilcoxon Signed Ranks Test, significant both for baseline vs post TAVI and baseline vs FUP
Results – Assessment of MR by Vena Contracta according to etiology of MR

- p-value based on Wilcoxon Signed Ranks Test, significant both for baseline vs post TAVI and baseline vs FUP
- p-value based on Mann-Whitney Test, significant at echo before TAVI, post TAVI and FUP
MR before and after treatment according to MR severity before TAVI

Severity of MR before TAVI
MR before treatment and at FUP according to MR severity before TAVI

Severity of MR before TAVI

- **Absent**
  - n=11
  - 6 (55%) 2 degrees
  - 5 (45%) 1 degree
  - 0% no change
  - 0% worsening

- **Mild**
  - n=19
  - 8 (42%) 2 degrees
  - 6 (32%) 1 degree
  - 1 (3%) no change
  - 6 (32%) worsening

- **Moderate**
  - n=31
  - 16 (52%) 2 degrees
  - 11 (35%) 1 degree
  - 3 (10%) no change
  - 1 (3%) worsening

- **Severe**
  - n=19
  - 7 (37%) 2 degrees
  - 5 (26%) 1 degree
  - 0% no change
  - 7 (37%) worsening
Improvement of MR post TAVI in patients with significant MR at baseline

<table>
<thead>
<tr>
<th></th>
<th>Improved MR n=28</th>
<th>Unchanged or worsened MR n=32</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>82.6±7</td>
<td>81.6±7</td>
<td>0.595*</td>
</tr>
<tr>
<td>Female</td>
<td>17(61%)</td>
<td>18(56%)</td>
<td>0.726°</td>
</tr>
<tr>
<td>Coronary artery disease</td>
<td>18(64%)</td>
<td>21(66%)</td>
<td>0.914°</td>
</tr>
<tr>
<td>Hypertension</td>
<td>19(68%)</td>
<td>17(53%)</td>
<td>0.245°</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>7(25%)</td>
<td>7(22%)</td>
<td>0.775°</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>6(21%)</td>
<td>5(15%)</td>
<td>0.562°</td>
</tr>
<tr>
<td>Pulmonary hypertension</td>
<td>8(29%)</td>
<td>20(62%)</td>
<td>0.009°</td>
</tr>
<tr>
<td>Organic MV disease</td>
<td>25(89%)</td>
<td>31(97%)</td>
<td>0.240°</td>
</tr>
<tr>
<td>Mean aortic gradient mmHg</td>
<td>49.4±15</td>
<td>48.3±18</td>
<td>0.622$</td>
</tr>
</tbody>
</table>

p-values based on *student T-test, °chi-square test and §Mann-Whitney Test
Results - Improvement in MR post TAVI

- Of 60 Moderate and severe MR patients
- 28 (47%) pts improved MR:
  - 1 degree – 23 pts
  - 2 degrees – 4 pts
  - 3 degrees – 1 pts
Results - Improvement in MR at follow up

- Of 50 Moderate and severe MR patients
- 24 (48%) pts improved MR:
  - 1 degree – 18 pts
  - 2 degrees – 6 pts
Aortic incompetence post TAVI

- Mild: 35 (36%) pts
- Moderate: 19 (20%) pts
- Severe: No patient
Conclusions

• Degree of MR improves post TAVI, regardless of etiology of MR and pathology of the mitral valve.

• Long term assessment of MR should be performed in order to confirm persistence of MR improvement.