How to Deal with
Asymptomatic Severe Aortic Stenosis?

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AORTIC VALVE STENOSIS (AS)

General considerations

• Most prevalent heart valvular disease
• When symptomatic is usually fatal within 3 years
• AVR in symptomatic AS associated with excellent long-term results
• Surgical risk is low (~1-4%, also in elderly)
AS

Natural History: Average survival from onset of symptoms

• Angina: 5 years
• Syncope: 3 years
• Heart failure: 2 years
Conclusion: “It seems reasonable to recommend that the asymptomatic AS can be followed medically until symptoms development”

Kelly TA, Am J Cardiol 1988
ASYMPTOMATIC AS

• AVR will not improve the quality of life (the patient is asymptomatic)
• Most pts have a good short-term prognosis (risk of sudden death <1% per year vs. 2% per month in symptomatic pts)
### SEVERE AS

**Definition Criteria**

<table>
<thead>
<tr>
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<th>Aortic stenosis</th>
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<tbody>
<tr>
<td>Valve area (cm²)</td>
<td>&lt;1.0</td>
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<tr>
<td>Indexed valve area (cm²/m² BSA)</td>
<td>&lt;0.6</td>
</tr>
<tr>
<td>Mean gradient (mmHg)</td>
<td>&gt;40</td>
</tr>
<tr>
<td>Maximum jet velocity (m/s)</td>
<td>&gt;4.0</td>
</tr>
<tr>
<td>Velocity ratio (VTI)</td>
<td>&lt;0.25</td>
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</table>
ASYMPTOMATIC SEVERE AS

662 pts (mean age 72±11 yrs) initially not having AVR

Cardiac death: 117/622 (19%)
Sudden death: 11/270 (4%) unop. pts

Pellikka PA et al, Circulation 2005
By three years, 52% of the patients had developed symptoms, undergone AVR or died.
ASYMPTOMATIC SEVERE AS

- Risk of sudden death is not zero
- Risk of sudden death vs. operative risk of early AVR must be taken into consideration
- Pts may not recognize their symptoms, thus putting themselves at risk of death
ASYMPTOMATIC SEVERE AS

The Risk of Waiting

• Sudden death rate of 2% per month once symptoms occur, requires a strict interval of follow-up visit (<3 months)
ASYMPTOMATIC SEVERE AS

Who are the high risk pts with severe AS:

1) Positive Exercise Test
2) Heavy Valve Calcification
3) Rapid progression of AS
4) Left Ventricular Hypertrophy
5) Rising of Biomarkers (BNP)
ASYMPTOMATIC SEVERE AS

Positive Exercise Testing

- Failure to achieve a rise in blood pressure
- Occurrence of symptoms
- Haemodynamic instability
- Reduction in exercise tolerance
ASYMPTOMATIC SEVERE AS

Positive Exercise Testing and Event-free Survival %

Amato MC et al, Heart 2001
**ASYMPTOMATIC SEVERE AS**

**Progression**

- More rapid in severely calcified valves and more severely stenosed valves
- AS with a peak velocity >4 m/s requires AVR within 2-3 yrs
- As with a peak velocity >5 m/s requires AVR within 1 yrs
ASYMPTOMATIC SEVERE AS

Progression in the elderly: case report
(P.A., 86-year female pt)

AVA 0.9 cm²
AV peak vel. 4.1 m/s
AV peak gradient 67 mmHg
AV mean gradient 43 mm Hg

at 2 yrs

AVA 0.2 cm²
AV peak vel. >5.5 m/s
AV peak gradient 175 mmHg
AV mean gradient 106 mm Hg

(NYHA II)
Left Ventricular Hypertrophy and Diastolic Dysfunction

(4,264 isolated AVR)

- Severe Left Ventricular Hypertrophy (>180 g/m²) and diastolic dysfunction (LA > 50 mm) are consequence of long-standing AS and are powerful predictors of poor long-term survival after AVR

Beach J et al, JTCVS 2013
# Aortic Valve Replacement (AVR)

## Operative Mortality

<table>
<thead>
<tr>
<th>Authors</th>
<th>Procedures</th>
<th>N. pts</th>
<th>Mortality (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jamieson WR, STS DB, 1999</td>
<td>AVR</td>
<td>26,317</td>
<td>4.3</td>
</tr>
<tr>
<td>Jamieson WR, STS DB, 1999</td>
<td>AVR + CABG</td>
<td>22,713</td>
<td>8.0</td>
</tr>
<tr>
<td>Desai ND, STS DB, 2009</td>
<td>AVR +/- CABG</td>
<td>216,245</td>
<td>5.7</td>
</tr>
<tr>
<td></td>
<td><em>Isol. AVR</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>AVR + CABG</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>McClure RS, 2010</td>
<td>AVR +/- CABG</td>
<td>1,000</td>
<td>7.2</td>
</tr>
<tr>
<td>ISTHMUS, 2011</td>
<td>AVR +/- CABG</td>
<td>1,591</td>
<td>6.5</td>
</tr>
<tr>
<td>Tor. Vergata Univ. 2013</td>
<td>AVR</td>
<td>1,517</td>
<td>2.4</td>
</tr>
<tr>
<td></td>
<td>AVR + CABG</td>
<td>569</td>
<td>6.3</td>
</tr>
</tbody>
</table>
STS Score predicted operative mortality and M + M (%) shown by age in healthy asymptomatic pts with severe AS

M + M: Mortality & Morbidity
Malignant natural history of Asymptomatic Severe AS

- 338 asymptomatic pts (71 +/- 15 yrs) with severe AS:
  239 Medical Treat. (Group MED), 99 AVR (Group AVR)

1, 2 and 5 years Survival:

Group MED: 67%, 56% and 38%
Group AVR: 94%, 93% and 90%*

*P < .0001
• 15-year survival after AVR in asymptomatic is similar to matched population for age and gender

• 10-year survival after AVR was better in asymptomatic vs symptomatic (70% vs 62%)

• 10-year survival in asymptomatic AS without AVR was 33% only
### CURRENT INDICATIONS FOR AVR IN ASYMPTOMATIC AS

<table>
<thead>
<tr>
<th>Class of Recommendation</th>
<th>Severe AS and systolic LV dysfunction (LVEF &lt;50%) not due to another cause</th>
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<tbody>
<tr>
<td>I</td>
<td>Severe AS and abnormal exercise test showing symptoms on exercise clearly related to AS</td>
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<tr>
<td>II a</td>
<td>Severe AS and abnormal exercise test showing fall in blood pressure</td>
</tr>
</tbody>
</table>
| II a                    | If surgical risk is low when:  
|                         | 1) Very severe AS (peak transvalvular velocity >5.5 m/s)  
|                         | 2) Severe valve calcification and rate of peak transvalvular velocity progression > 0.3 m/s per year |
| II b                    | If surgical risk is low in when:  
|                         | 1) Elevated BNP  
|                         | 2) Increase of mean pressure gradient with exercise >20 mmHg  
|                         | 3) Excessive LV hypertrophy |

ESC/EACTS Guidelines, Eur J Cardiothorac Surg 2014
ASYMPTOMATIC SEVERE AS

Our Experience 2010-2012
(53 pts, M/F: 30/23, mean age 63 ± 13 yrs, range 40-86)

- Symptoms (n=163) 76%
- No Symptoms (n=53) 24%

Tot. 216 isolated AVR
Conclusions

• Moderate Asymptomatic AS: waiting
  (sudden death <<1% /year, rapid progression of AS seems to be negligible)
ASYMPTOMATIC SEVERE AS

• Without surgery freedom from events (death/AVR) is estimated 40-30% at short-term follow-up
• Early surgery offers better survival and cardiac events-free survival as compared with late surgery: 
  risk of waiting is higher
