ESC /EACTS Guidelines for the Management of Asymptomatic Severe Aortic Stenosis

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Aortic stenosis

- Most frequent valvular heart disease requiring intervention in Europe

- 5% of the population > 75 years
Distribution of Valvular Heart Diseases in the Euro Heart Survey

5001 patients

Native Valve Disease 72%

AS 34%
AR 10%
MS 10%
MR 25%
Multiple 20%
Right 1%

Previous Valvular Intervention 28%

Valve Repair 18%
Valve Replacement 82%

Iung et al. Eur Heart J 2003;24:1244-53
Aetiology of Single Valvular Heart Diseases in the Euro Heart Survey

- Other
- Ischemic
- Congenital
- Inflammatory
- Endocarditis
- Rheumatic
- Degenerative

Iung et al. Eur Heart J 2003;24:1244-53
### Patient Characteristics in the Euro Heart Survey

<table>
<thead>
<tr>
<th></th>
<th>Age (years)</th>
<th>≥ 70 years (%)</th>
<th>≥ 1 comorbidity (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AS</td>
<td>69±12</td>
<td>56</td>
<td>36</td>
</tr>
<tr>
<td>AR</td>
<td>58±16</td>
<td>25</td>
<td>26</td>
</tr>
<tr>
<td>MS</td>
<td>58±13</td>
<td>18</td>
<td>22</td>
</tr>
<tr>
<td>MR</td>
<td>65±14</td>
<td>44</td>
<td>42</td>
</tr>
</tbody>
</table>

Iung et al. Eur Heart J 2003;24:1244-53
Patient Evaluation

● Clinical assessment
  – Symptoms, comorbidities, patient education.
  – Auscultation.

● Echocardiography
  – Key examination to confirm diagnosis and assess severity and prognosis.
  – Need to check consistency between the different echocardiographic findings (severity, mechanism, anatomy of valvular disease) and with clinical assessment.
Echocardiographic criteria for the definition of severe aortic valve stenosis: *an integrative approach*

<table>
<thead>
<tr>
<th></th>
<th>Aortic stenosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valve area (cm²)</td>
<td>&lt; 1.0</td>
</tr>
<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</td>
<td>&lt; 0.25</td>
</tr>
</tbody>
</table>

### Indications for aortic valve replacement in asymptomatic aortic stenosis

<table>
<thead>
<tr>
<th>Class</th>
<th>Level</th>
<th>Indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>C</td>
<td>AVR is indicated in asymptomatic patients with severe AS and systolic LV dysfunction (LVEF &lt; 50%) not due to another cause.</td>
</tr>
<tr>
<td>I</td>
<td>C</td>
<td>AVR is indicated in asymptomatic patients with severe AS and abnormal exercise test showing symptoms on exercise clearly related to AS.</td>
</tr>
</tbody>
</table>
| IIa   | C     | AVR should be considered in asymptomatic patients, with normal EF and none of the above mentioned exercise test abnormalities, if the surgical risk is low, and one or more of the following findings is present:  
  - very severe AS defined by a peak transvalvular velocity > 5.5 m/s,  
  - severe valve calcification and a rate of peak of transvalvular velocity progression ≥ 0.3 m/s per year. |
| IIb   | C     | AVR may be considered in asymptomatic patients with severe AS, normal EF and none of the above mentioned exercise test abnormalities, if surgical risk is low, and one or more of the following findings is present:  
  - markedly elevated natriuretic peptide levels confirmed by repeated measurements without other explanations,  
  - increase of mean pressure gradient with exercise by > 20 mmHg,  
  - excessive LV hypertrophy in the absence of hypertension. |
Risk stratification by exercise testing

Limiting symptoms during test: 46 of 125 pts (37%)
No events in pts with AVA > 1 cm²
Risk stratification by exercise testing

+ PV 79% if age < 70 y
+ PV 57 % whole population
Best predictor: Dizziness
Very severe asymptomatic AS

Rosenhek et al Circ 2010:121;151-6
Prospective study of asymptomatic severe AS

Table 2
Area under curve, sensitivity, specificity, and optimal cutoff values of significant variables for predicting outcome

<table>
<thead>
<tr>
<th>Data at Inclusion</th>
<th>Cutoff Value</th>
<th>Area Under Curve</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left atrial area index (cm²/m²)</td>
<td>≥12.4</td>
<td>0.90</td>
<td>83.9%</td>
<td>90.6%</td>
</tr>
<tr>
<td>Peak systolic velocity (cm/s)</td>
<td>≤4.5</td>
<td>0.87</td>
<td>88.7%</td>
<td>82.8%</td>
</tr>
<tr>
<td>Peak Aa velocity (cm/s)</td>
<td>≤9</td>
<td>0.81</td>
<td>80.6%</td>
<td>75%</td>
</tr>
<tr>
<td>Early diastolic filling/annular velocity</td>
<td>&gt;13.8</td>
<td>0.67</td>
<td>42%</td>
<td>88%</td>
</tr>
<tr>
<td>B-type natriuretic peptide (pg/ml)</td>
<td>≥61</td>
<td>0.89</td>
<td>82%</td>
<td>93.7%</td>
</tr>
</tbody>
</table>
Event-free survival curves according to BNP


Nessmith et al. Am J Cardiol 2005;96:1445-1448

Lancellotti, Pierard Am J Cardiol 2010;105:385-388
Risk Score for Predicting Outcome in Patients With Asymptomatic Aortic Stenosis

Jean-Luc Monin, MD, PhD; Patrizio Lancellotti, MD, PhD; Mehran Monchi, MD; Pascal Lim, MD; Emmanuel Weiss, MD; Luc Piérard, MD, PhD; Pascal Guéret, MD

107 pts followed in Créteil
Risk score according to independent variables
Validation in Liège (107 pts)

Score = (Peak velocity x 2) + (nat log BNP x 1.5) + 1.5 (if female)

Monin, Lancellotti, Pierard et al. Circulation, 2009
Exercise Doppler echo

During exercise
Exercise echo in asymptomatic AS

Lancellotti, Piérard Circulation 2005
Event-free survival

Rest mean gradient  $\uparrow$ in gradient with Ex  Combination

$\Delta$ mean gradient $> 20$ mmHg

Maréchaux S et al. Eur Heart J 2010

www.escardio.org/guidelines
Severe or pseudosevere AS?
Asymptomatic paradoxical LF/LG severe AS

Adjusted incidence of cardiac events, %

Follow-up, months

p=0.009

LF/LG group

LF/HG group

NF/HG group

NF/LG group

Lancellotti & Pierard JACC 2012;59:224-32
Indications for antithrombotic therapy after valvular surgery

<table>
<thead>
<tr>
<th>Indication</th>
<th>Class</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral anticoagulation is recommended lifelong for all patients with a mechanical prosthesis.</td>
<td>I</td>
<td>B</td>
</tr>
<tr>
<td>Oral anticoagulation is recommended lifelong for patients with bioprostheses who have other indications for anticoagulation.</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>The addition of low-dose aspirin should be considered in patients with a mechanical prosthesis and concomitant atherosclerotic disease.</td>
<td>Ila</td>
<td>C</td>
</tr>
<tr>
<td>The addition of low-dose aspirin should be considered in patients with a mechanical prosthesis after thromboembolism despite adequate INR.</td>
<td>Ila</td>
<td>C</td>
</tr>
<tr>
<td>Oral anticoagulation should be considered for the first 3 months after implantation of a mitral or tricuspid bioprosthesis.</td>
<td>Ila</td>
<td>C</td>
</tr>
<tr>
<td>Oral anticoagulation should be considered for the first 3 months after mitral valve repair.</td>
<td>Ila</td>
<td>C</td>
</tr>
<tr>
<td>Low-dose aspirin should be considered for the first 3 months after implantation of an aortic bioprosthesis.</td>
<td>Ila</td>
<td>C</td>
</tr>
<tr>
<td>Oral anticoagulation may be considered for the first 3 months after implantation of an aortic bioprosthesis.</td>
<td>IIb</td>
<td>C</td>
</tr>
</tbody>
</table>
Diagnosis of coronary artery disease

Coronary angiography is recommended before valve surgery in patients with severe valvular heart disease and any of the following:

- history of coronary artery disease,
- suspected myocardial ischaemia,
- left ventricular systolic dysfunction,
- men aged over 40 years and postmenopausal women,
- ≥ 1 cardiovascular risk factor.

Class | Level
--- | ---
I | C

### Management of CAD

<table>
<thead>
<tr>
<th>Indications for myocardial revascularisation</th>
<th>Class</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>CABG is recommended in patients with a primary indication for aortic/mitral valve surgery and coronary artery diameter stenosis ≥ 70%.</td>
<td>I</td>
<td>C</td>
</tr>
<tr>
<td>CABG should be considered in patients with a primary indication for aortic/mitral valve surgery and coronary artery diameter stenosis ≥ 50-70%.</td>
<td>IIa</td>
<td>C</td>
</tr>
</tbody>
</table>
Management of severe aortic stenosis and elective non-cardiac surgery according to patient characteristics and the type of surgery

**Severe AS and need for elective non-cardiac surgery**

**Symptoms**

- **No**
  - Risk of non-cardiac surgery
    - Low-moderate
      - Non-cardiac surgery
    - High
      - Patient risk for AVR
        - High
          - AVR before non-cardiac surgery
        - Low
          - Non-cardiac surgery under strict monitoring
  - Non-cardiac surgery

- **Yes**
  - Patient risk for AVR
    - Low
      - Non-cardiac surgery under strict monitoring
      - Consider BAV/TAVI
    - High
      - AVR before non-cardiac surgery
  - Non-cardiac surgery under strict monitoring
  


www.escardio.org/guidelines
Read The
Take Home Messages & Gaps in Evidence on the ESC Web Site
## Indications for transcatheter aortic valve implantation

<table>
<thead>
<tr>
<th>Indication</th>
<th>Class</th>
<th>Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>TAVI should only be undertaken with a multidisciplinary “heart team” including cardiologists and cardiac surgeons and other specialists if necessary.</td>
<td>Ⅰ</td>
<td>C</td>
</tr>
<tr>
<td>TAVI should only be performed in hospitals with cardiac surgery on-site.</td>
<td>Ⅰ</td>
<td>C</td>
</tr>
<tr>
<td>TAVI is indicated in patients with severe symptomatic AS who are not suitable for AVR as assessed by a “heart team” and who are likely to gain improvement in their quality of life and to have a life expectancy of more than 1 year after consideration of their comorbidities.</td>
<td>Ⅰ</td>
<td>B</td>
</tr>
<tr>
<td>TAVI should be considered in high risk patients with severe symptomatic AS who may still be suitable for surgery, but in whom TAVI is favoured by a “heart team” based on the individual risk profile and anatomic suitability.</td>
<td>Ⅱa</td>
<td>B</td>
</tr>
</tbody>
</table>
## Contraindications for transcatheter aortic valve implantation

### Absolute contraindications
Absence of a "heart team" and no cardiac surgery on the site. Appropriateness of TAVI, as an alternative to AVR, not confirmed by a "heart team".

### Clinical
- Estimated life expectancy < 1 year.
- Improvement of quality of life by TAVI unlikely because of comorbidities.
- Severe primary associated disease of other valves with major contribution to the patient’s symptoms that can be treated only by surgery.

### Anatomical
- Inadequate annulus size (< 18 mm, > 29 mm).
- Thrombus in the left ventricle.
- Active endocarditis.
- Elevated risk of coronary ostium obstruction (asymmetric valve calcification, short distance between annulus and coronary ostia, small aortic sinuses).
- Plaques with mobile thrombi in the ascending aorta, or arch.
- For transfemoral/subclavian approach: inadequate vascular access (vessel size, calcification, tortuosity).

### Relative contraindications
- Bicuspid or non-calcified valves.
- Untreated coronary artery disease requiring revascularization.
- Haemodynamic instability.
- LVEF < 20%.
- For transapical approach: severe pulmonary disease, LV apex not accessible.