Asymptomatic Severe AS: Should We Refer For Valve Replacement?

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Are asymptomatic patients with severe AS really asymptomatic?

No Relationships to Disclose
Management challenges:

- The asymptomatic patient with severe AS
- Low-flow, low gradient severe AS

Are asymptomatic patients with severe AS *really* asymptomatic?
Aortic stenosis

Indications for valve replacement

Exercise test results:

• Symptoms
• Hypotension

How are symptoms determined?
• Everyone has symptoms on stress test
• Are the symptoms cardiac in origin?
• What level of exercise?

How is hypotension defined?
• Less than 20 mmHg increase (?)
Aortic stenosis

Indications for valve replacement

Exercise test results:
• Symptoms
• Hypotension

Should *asymptomatic* patients with severe AS undergo AVR? …when they are *really* asymptomatic?
Vmax: 4.6 m/s
Mean Δ: 52 mmHg
AVA: 0.7 sq cm

Severe AS:
- Vmax: >4.0 m/s
- Δ: >40 mmHg
- AVA: <1.0 sq cm
Aortic Stenosis

84 year old man with severe AS

• Watchful waiting? *
• More data (more testing)?
• Aortic valve replacement?

* Wait until he develops symptoms in 5-6 years and then recommend TAVR?
Natural History of Severe Asymptomatic AS

Natural History of Severe Asymptomatic AS


Average hospital mortality: 8.8%
- Low volume centers: 13.0%
- High volume centers: 6.0%

Event-Free Survival (%)

Time (years)

Otto

Rosenhek

$V_{max} > 4.0 \text{ m/s}$
Natural History of Severe Asymptomatic AS

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  - High volume centers: 6.0%

Event-Free Survival (%)

- Time (years)
- Event-Free Survival (%)

- Vmax > 4.0 m/s

Pellikka et al. *Circulation* 2005;111:3290-2395
Average hospital mortality: 8.8%

- Low volume centers: 13.0%
- High volume centers: 6.0%

Medicare data

Natural History of Severe Asymptomatic AS

Pellikka et al. Circulation 2005;111:3290-2395
Stewart et al. Eur Heart J 2010;31:2216-2222
Natural History of Severe Asymptomatic AS

- Average hospital mortality: 8.8%
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Medicare data


**Vmax > 4.0 m/s**

Event-Free Survival (%)

Time (years)

Rosenhek

n=128
Natural History of Severe Asymptomatic AS

Rosenhek et al. Circulation 2010;121:151-156
<table>
<thead>
<tr>
<th>Date</th>
<th>Vmax</th>
<th>Mean</th>
<th>ΔAVA</th>
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<tr>
<td>Aug 2006</td>
<td>3.7</td>
<td>31</td>
<td>1.3</td>
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<tr>
<td>Jan 2009</td>
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<td>36</td>
<td>1.2</td>
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<tr>
<td>Dec 2009</td>
<td>4.1</td>
<td>39</td>
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<td>Nov 2010</td>
<td>4.4</td>
<td>45</td>
<td>1.0</td>
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<tr>
<td>Sept 2011</td>
<td>5.2</td>
<td>68</td>
<td>0.8</td>
</tr>
</tbody>
</table>
Management challenges:

- The asymptomatic patient with severe AS
- Low-flow, low gradient severe AS

Indications for TAVR

What is the risk of death while waiting for symptoms to trigger AVR?
Natural History of Severe Asymptomatic AS

Survival (%) vs. Time (years)

Average hospital mortality: 8.8%
- Low volume centers: 13.0%
- High volume centers: 6.0%

Natural History of Severe Asymptomatic AS

Kang et al. Circulation 2010;121:1502-1509
Natural History of Severe Asymptomatic AS

- Average hospital mortality: 8.8%
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  - High volume centers: 6.0%

Survival (%)

Time (years)

Kang et al. Circulation 2010;121:1502-1509
Nistri et al. Am J Cardiol 2012;109:718-723
Average hospital mortality: 8.8%
- Low volume centers: 13.0%
- High volume centers: 6.0%

Medicare data

Natural History of Severe Asymptomatic AS

Kang et al. Circulation 2010;121:1502-1509
Nistri et al. Am J Cardiol 2012;109;718-723
Taniguchi et al. J Am Coll Cardiol 2105;66:2827-2838
Natural History of Severe Asymptomatic AS

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Medicare data

Survival (%) vs. Time (years)

Taniguchi et al. J Am Coll Cardiol 2105;66:2827-2838
Natural History of Severe Asymptomatic AS

- Average hospital mortality: 8.8%
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Survival (%) vs Time (years)

- AVR (n=291)
- Conservative (n=291)


31% of patients who developed symptoms did not have AVR

→ 17 deaths
Asymptomatic Aortic Stenosis

Indications for valve replacement:

- Very severe AS: $\text{Vmax} \geq 5 \text{ m/s}$

class Ila
Asymptomatic Aortic Stenosis

Indications for valve replacement:

- Very severe AS: $V_{\text{max}} \geq 5 \text{ m/s}$
- Rapid progression and low surgical risk

Class IIa

Class IIb
Asymptomatic Aortic Stenosis

Indications for valve replacement:

- Very severe AS: $V_{\text{max}} \geq 5 \text{ m/s}$  
  class IIa

- Rapid progression and low surgical risk  
  class IIb

- Very severe AS: $V_{\text{max}} > 5.5 \text{ m/s}$  
  class IIa
Asymptomatic Aortic Stenosis

Indications for valve replacement:

- **Very severe AS:** $V_{\text{max}} \geq 5\, \text{m/s}$
  - class IIa

- **Rapid progression and low surgical risk**
  - class IIb

- **Very severe AS:** $V_{\text{max}} > 5.5\, \text{m/s}$
  - class IIa

- **Severe valve calcification and rate of progression $\geq 0.3\, \text{m/s / year}$**
  - class IIa
Asymptomatic Aortic Stenosis

Indications for valve replacement:

- Very severe AS: Vmax ≥5 m/s
  - class IIa
- Rapid progression and low surgical risk
  - class IIb
- Very severe AS: Vmax >5.5 m/s
  - class IIa
- Severe valve calcification and rate of progression ≥0.3 m/s / year
  - class IIa
- Markedly elevated BNP
- Increase in gradient with exercise >20 mmHg
- Excessive LVH
  - class IIb
Asymptomatic Aortic Stenosis

Indications for valve replacement:

The ACC/AHA and ESC/EACTS guidelines have lowered the threshold for surgery in asymptomatic patients with AS

- Severity of AS
- Severity of calcification
- Left ventricular function
- Exercise response
Asymptomatic Aortic Stenosis

Indications for valve replacement:

The ACC/AHA and ESC/EACTS guidelines have lowered the threshold for surgery in asymptomatic patients with AS

- Severity of AS
- Severity of calcification
- Left ventricular function
- Exercise response
- BNP?
B-Type Natriuretic Peptide
Clinical Activation in Aortic Stenosis
Impact on Long-Term Survival

Marie-Annick Clavel, DVM, PrTD, Joseph Malouf, MD, Hector I. Michalena, MD, Rakesh M. Suri, MD, PhD, Ali N. Lerman, MD, Paul I. Sievers, MD, and Maurice Enriquez-Sarano, MD

Rochester, Minnesota

J Am Coll Cardiol 2014;63:2016–2025

Asymptomatic AS with Normal EF

Survival (percent)

Time (years)

n=562

p<0.001

BNP ratio

<1.0

1.0-1.9

2.0-2.9

≥3.0

Clavel et al, J Am Coll Cardiol 2014;63:2016-2025
Aortic stenosis is a simple mechanical fault, which, if severe enough, imposes a heavy burden on the left ventricle and sooner or later overcomes it. An obstructive lesion of this sort presents a challenge to the surgeon. The patient's story is a living parable. The syndrome of aortic stenosis is perhaps one of the most intriguing and challenging in cardiac medicine.

The definition of severe stenosis is one with sufficient hypertrophy of the left ventricle to cause inversion of the T wave of the electrocardiogram in left ventricular surface leads or their precordial derivatives.

...it’s not simple any more
Valvular heart disease: Have the guidelines filled the gap?