Improving Quality of Care for Patients with Heart Valve Disease

The Heart Team
The Heart Valve Clinic

Raphael Rosenhek
Department of Cardiology
Medical University of Vienna

Eurovalve 2016
Brussels, March 10th, 2016
Heart Valve Clinic
Functioning of the Advanced Valve Clinic

Valvular Heart Disease

Prevalence

Population based studies

Nkomo V et al.
Lancet 2006;368:1005-1011

Projection

Proportion of the population aged 0-14 and ≥65 years EU-27 (% of total population)

Eurostat 2010
Aortic stenosis ≥75 yrs
n = 408

- No severe AS (n = 124)
- Severe AS (n = 284)
  - No severe symptoms n = 68
  - Severe symptoms n = 216
    - NYHA III: 105
    - NYHA IV: 35
    - Angina: 147

No intervention n = 72 (33%)

Intervention n = 144 (67%)

Iung, B et al. Eur Heart J 2005;26:2714-20
Timing of Intervention in Mitral Regurgitation

Denial of Surgery in Symptomatic Pts

Isolated MR (n=877)

- No severe MR (n=331)
  - Symptoms missing (n=6)
  - No symptoms (n=144)
    - No intervention n=193 (49%)
    - Intervention n=203 (51%)

- Severe MR (n=546)
  - Symptoms (n=396)
    - No intervention n=193 (49%)
    - Intervention n=203 (51%)

Aortic Valve Disease - Undertreatment
Why are patients denied Surgery? Age

Iung, B. et al. Eur Heart J 2005 26:2714-2720
Life Expectancy in Years
Europe and US

<table>
<thead>
<tr>
<th>Age</th>
<th>EU Overall</th>
<th>EU Men</th>
<th>EU Women</th>
<th>US Overall</th>
<th>US Men</th>
<th>US Women</th>
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<tbody>
<tr>
<td>65</td>
<td>18.9</td>
<td>17.0</td>
<td>20.5</td>
<td>18.5</td>
<td>17.0</td>
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<td>70</td>
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<td>10.5</td>
<td>12.7</td>
<td>11.6</td>
<td>10.5</td>
<td>12.3</td>
</tr>
<tr>
<td>80</td>
<td>8.8</td>
<td>7.9</td>
<td>9.4</td>
<td>8.7</td>
<td>7.8</td>
<td>9.3</td>
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<tr>
<td>85</td>
<td>6.5</td>
<td>5.9</td>
<td>6.8</td>
<td>6.4</td>
<td>5.7</td>
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<td>3.2</td>
<td>2.9</td>
<td>3.3</td>
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<tr>
<td>100</td>
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<td></td>
<td></td>
<td>2.3</td>
<td>2.0</td>
<td>2.3</td>
</tr>
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</table>

ESC Working Group on Valvular Heart Disease Position Paper. Assessing the Risk of Interventions in Patients with Valvular Heart Disease
Rosenhek R et al. Eur Heart J 2012;33:822-828
Aortic Valve Disease - Euroheart Survey

Why are patients denied Surgery?

Iung, B. et al. Eur Heart J 2005 26:2714-2720
Estimation of Undertreated Pts (>65yrs)  
Aortic Stenosis

- EU population > 65: 84,600,000 (Eurostat, 2008)
- AS Prevalence rate: ~ 4% (Cardiovascular Health Study)
- AS Prevalence: ~ 1,200,000
- Operable AS (%): 20% (L.E.K. Consulting estimate)
- Addressable patients: ~ 240,000 (Calculation, Millenium)
- Annual AVR patients: ~ 80,000

Eurostat 2008
Millenium Research Group, 2007
Severe Aortic Stenosis

Inappropriate Delay in Referral and Symptom Reporting

- 422 patients for aortic valve surgery
- 48% in NYHA class III and IV
- Mean time from referral to AVR 112 days

Waiting Times for Aortic Stenosis Surgery
Assessing Practice

All residents of British Columbia on a Waiting List Between 1991 and 2000

<table>
<thead>
<tr>
<th>Interval</th>
<th>Status</th>
<th>n</th>
<th>Median 25th percentile</th>
<th>75th percentile</th>
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</thead>
<tbody>
<tr>
<td>Booking to surgery</td>
<td>Total</td>
<td>2187</td>
<td>75</td>
<td>42</td>
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<tr>
<td></td>
<td>Urgent</td>
<td>1709</td>
<td>67</td>
<td>37</td>
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<tr>
<td></td>
<td>Elective</td>
<td>478</td>
<td>107</td>
<td>63</td>
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<tr>
<td>Procedure to booking</td>
<td>Total</td>
<td>2087</td>
<td>62</td>
<td>20</td>
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<tr>
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<td>Urgent</td>
<td>1632</td>
<td>62</td>
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<tr>
<td></td>
<td>Elective</td>
<td>455</td>
<td>63</td>
<td>21</td>
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<tr>
<td>Internist to testing</td>
<td>Total</td>
<td>1736</td>
<td>24</td>
<td>8</td>
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<tr>
<td></td>
<td>Urgent</td>
<td>1349</td>
<td>23</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Elective</td>
<td>387</td>
<td>26</td>
<td>8</td>
</tr>
<tr>
<td>Primary care physician to internist</td>
<td>Total</td>
<td>1619</td>
<td>22</td>
<td>0</td>
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<tr>
<td></td>
<td>Urgent</td>
<td>1259</td>
<td>22</td>
<td>10</td>
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<tr>
<td></td>
<td>Elective</td>
<td>360</td>
<td>23</td>
<td>10</td>
</tr>
<tr>
<td>Primary care physician to surgery</td>
<td>Total</td>
<td>1581</td>
<td>243</td>
<td>148</td>
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<tr>
<td></td>
<td>Urgent</td>
<td>1229</td>
<td>228</td>
<td>139</td>
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<tr>
<td></td>
<td>Elective</td>
<td>352</td>
<td>278</td>
<td>189</td>
</tr>
</tbody>
</table>

Heart Valve Clinic - Evidence
Aortic Stenosis: Delayed Symptom Reporting

Zilberszac R... Rosenhek R. ESC 2011 (abstract)
Symptom Reporting in Aortic Stenosis
Severity of Symptom Onset

Zilberszac R et al. ESC 2011 (abstract)
### Multivalvular Disease Combinations

<table>
<thead>
<tr>
<th></th>
<th>Aortic</th>
<th>Mitral</th>
<th>Tricuspid</th>
<th>Pulmonic</th>
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</thead>
<tbody>
<tr>
<td><strong>Stenosis</strong></td>
<td>AS</td>
<td>MS</td>
<td>TS</td>
<td>PS</td>
</tr>
<tr>
<td><strong>Regurgitation</strong></td>
<td>AR</td>
<td>MR</td>
<td>TR</td>
<td>PR</td>
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**Degenerative**
- Rheumatic
- Congenital
## Multivalvular Disease

### Combinations

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### Causes

- Degenerative
- Rheumatic
- Congenital
## Multivalvular Disease

### Combinations

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### Degenerative

- Rheumatic
- Congenital
# Multivalvular Disease Combinations

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<td>MR</td>
<td>TR</td>
<td>PR</td>
</tr>
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</table>

- AS: Aortic Stenosis
- MS: Mitral Stenosis
- TS: Tricuspid Stenosis
- PS: Pulmonic Stenosis
- AR: Aortic Regurgitation
- MR: Mitral Regurgitation
- TR: Tricuspid Regurgitation
- PR: Pulmonic Regurgitation

**Types of Disease:**
- Degenerative
- Rheumatic
- Congenital
Timing of Intervention in Mitral Regurgitation

Influence of Hospital Procedural Volume

Adverse Outcomes (%)

Procedural Volume
- 1 to 35
- 35 to 70
- 71 to 140
- 140+

Variations in rates of mitral valve repair for degenerative disease among 46 heart centres in the UK

Center-Related Variability of Outcome „The Lottery of Mitral Valve Surgery“

- National repair rate of 51%
- Variability of 20% to 90% among different hospitals

Variations in rates of mitral valve repair for degenerative disease among 46 heart centres in the UK

Mitral Valve Repair in Mitral Regurgitation

Surgeon Volume and Repair Rate

Median number of surgeries: 5 !!
Minimally Invasive Mitral Valve Repair
Individual Learning Curves

Normal Learning Curve

Outperforming Surgeon

Underperforming Surgeon

Asymptomatic Severe Mitral Regurgitation
Valve Clinic - Watchful Waiting Strategy

Timing of Intervention in Mitral Regurgitation

Watchful Waiting Approach

Table 2. Basic Principles of a Watchful Waiting Approach

- Regular clinical follow-up (including ECG)*
- Regular echocardiographic follow-up*
- Instruction of the patient to promptly report the onset of symptoms
- Referral to surgery without delay once criteria for surgery are reached

*Six-month follow-up intervals are recommended for asymptomatic patients with severe valvular mitral regurgitation.

Asymptomatic Severe Aortic Stenosis

Overall Outcome: Wait for Symptoms Strategy

- 126 Patients
- Severe AS (AV-Vel $\geq 4$ m/s)
- Asymptomatic
- Compared to Age-, Gender-Matched General Population

Regular Control exams

Rosenhek, R. et al.
Patients with moderate or severe aortic valve calcification and aortic jet velocity increase > 0.3 m/s within 12 months

2 year event-rate: 80%

The Spectrum of Aortic Stenosis

Natural History

<table>
<thead>
<tr>
<th>AV-Vel</th>
<th>Event-free Survival (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>≥ 5.5 m/s</td>
<td>P &lt; 0.0001</td>
</tr>
<tr>
<td>5.0 to 5.5 m/s</td>
<td></td>
</tr>
<tr>
<td>4.0 to 5.0 m/s</td>
<td></td>
</tr>
<tr>
<td>3.0 to 4.0 m/s</td>
<td></td>
</tr>
<tr>
<td>2.5 to 3.0 m/s</td>
<td></td>
</tr>
</tbody>
</table>

Rosenhek R et al. Circulation 2010;121:151-156
Quality in Valvular Heart Disease
Achieving Excellence

1. Evaluate Quality
2. Identify Gaps
3. Improve Practice
Heart Valve Clinic Concept

Patient → General Cardiologist → Primary Care Provider

New / Known Case

Standard HVC
Cardiologist/Imaging
Expert in VHD
+ Nurse ('Hub')

Advanced HVC
Experts in VHD + Interventional Cardiology + Cardiac Surgery

Multidisciplinary Decision-Making
Heart Team

Inform the patient
Schedule exams
Take appointments
Deliver appropriate care

Information/Collaboration

Specialist valve clinics: recommendations from the British Heart Valve Society working group on improving quality in the delivery of care for patients with heart valve disease

John B Chambers, 1 Simon Ray, 2 Bernard Prendergast, 3 David Taggart, 4 Stephen Westaby, 5 Lucy Grothier, 6 Chris Arden, 7 Jo Wilson, 8 Brian Campbell, 9 Jonathan Sandoe, 10 Christa Gohlke-Bärwolf, 11 Carlos-A Mestres, 12 Raphael Rosenhek, 13 Catherine Otto 14

Chambers J et al. Heart 2013 (online first)
Heart Valve Clinic

**Tasks**

<table>
<thead>
<tr>
<th>Tasks</th>
<th>Expert in VHD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nurse</td>
</tr>
<tr>
<td>Patient background</td>
<td>+</td>
</tr>
<tr>
<td>Blood pressure</td>
<td>+</td>
</tr>
<tr>
<td>Blood sample</td>
<td>+</td>
</tr>
<tr>
<td>12-lead ECG</td>
<td>+</td>
</tr>
<tr>
<td>Supervise exercise test</td>
<td>+</td>
</tr>
<tr>
<td>Echocardiography</td>
<td>+</td>
</tr>
<tr>
<td>Stress echocardiography</td>
<td>(+)</td>
</tr>
<tr>
<td>Referral to a surgeon/interventional cardiologist</td>
<td></td>
</tr>
<tr>
<td>Database entry</td>
<td>+</td>
</tr>
<tr>
<td>Letter to family physician</td>
<td>(+)</td>
</tr>
<tr>
<td>Fix appointments</td>
<td>+</td>
</tr>
<tr>
<td>Organize dental surveillance</td>
<td>+</td>
</tr>
<tr>
<td>Adapt oral anticoagulation therapy</td>
<td>+</td>
</tr>
<tr>
<td>Adapt medical treatment</td>
<td>+</td>
</tr>
<tr>
<td>Follow-up of complex cases</td>
<td>+</td>
</tr>
</tbody>
</table>

Heart Valve Clinic

Advantages

- Closing the Gap Between Guidelines and Practice
- Assessment of Symptoms
- Availability and Quality of Imaging Techniques
- Understanding Implications of Measured Variables
- Link with the Heart Team

Valvular Heart Disease
Individualized Interdisciplinary Decision Making

Timing and Choice of Procedure

- Patient Preferences
- Individualized Risk Assessment
- Natural Disease History
- Risk of Intervention(s)
- Life Expectancy
- Long-term postprocedural outcome
- Need for Reintervention
- Team Approach

Adapted from Rosenhek R et al. Eur Heart J 2012;33:822-828
Optimized Patient Management
• Patient work-up and referral for intervention
• Patient education and information
• Setting for a watchful waiting approach

Education and Formation
• Increased experience (large patient numbers / complex cases)
• Translation of knowledge
• Training of physicians in valve disease

Research
• Local databases
• Research collaboration

Quality Assessment
Quality Assessment in Valvular Heart Disease

Summary

Essential to Provide Excellent Care

Recognition of Gaps

• On a national / supranational (ESC) level
• At the institutional level

Prerequisites

• Systematic documentation
• Periodic Outcome Assessment

Ideal Setting

• Structured Programs in Heart Valve Disease
  • Cardiology
  • Cardiac Surgery
• Heart Team
• Heart Valve Clinic
Heart Valve Disease

Quality Management

**Direct effect**
- Standardized quality of care
- Improved outcomes

**Regional Effects**
- Regional recognition as an expert-center in valve disease
- Increased patient referral
- Positive synergy also for interventional and surgical programmes

**Impact on Health System**
- Potential important role at the level of a national health care environment
- Adequate and cost-effective use of resources
Quality in Valve Disease – Heart Team
A Multidisciplinary Approach: Center of Excellence