Single-center experience with mechanical valve replacement in children and adolescents: a lifelong challenge


DEPARTMENTS OF PAEDIATRIC CARDIAC SURGERY AND CONGENITAL CARDIOLOGY

BACKGROUND

- Valve repair is the preferred treatment in paediatric patients with valvular heart disease. However, replacement is sometimes unavoidable.
- In young patients, the use of a mechanical prosthesis is favoured to avoid reoperations for premature structural degeneration of the valve.
- However, mechanical valve replacement in a paediatric population is limited by small cardiac dimensions and the need for lifelong oral anticoagulation.
- Limited long-term data is available, especially regarding INR management and valve-related events.

METHODOLOGY

Ghent experience: January 1984 - December 2015

40 patients received a mechanical prosthesis before age 20
- 5 were lost to follow-up
- 28 received INR follow-up by their GP
- 7 used a self-monitoring INR device

Study endpoints:
- Survival
- Valve-related events
- INR variability

PREOPERATIVE DATA

DEMOGRAPHICS

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>60%</td>
</tr>
<tr>
<td>Female</td>
<td>40%</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>NYHA class</th>
<th>Number (%)</th>
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</thead>
<tbody>
<tr>
<td>I</td>
<td>15%</td>
</tr>
<tr>
<td>II</td>
<td>52%</td>
</tr>
<tr>
<td>III</td>
<td>23%</td>
</tr>
<tr>
<td>IV</td>
<td>10%</td>
</tr>
</tbody>
</table>

VALVULAR PATHOLOGY

Main diseased valve (to be replaced):
- Mitral: 55%
- Aortic: 25%
- Tricuspid: 10%
- Pulmonic: 5%
- Multiple: 5%

Associated disease(s):
- Marfan
- Other structural cardiac defects (ASD, VSD)
- Aortic coarctation
- Ascending AD aneurysm
- None

ETIOLOGY OF VALVULAR DYSFUNCTION

<table>
<thead>
<tr>
<th>Type of dysfunceny</th>
<th>Number (%)</th>
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</thead>
<tbody>
<tr>
<td>Rheumatic</td>
<td>60%</td>
</tr>
<tr>
<td>Congenital</td>
<td>20%</td>
</tr>
<tr>
<td>Infectious</td>
<td>20%</td>
</tr>
<tr>
<td>Valvular</td>
<td>5%</td>
</tr>
</tbody>
</table>

RESULTS

Follow-up (FU)
- Median FU-time: 12.9 ± 9.2 y - 88% completeness (incl. INR: 79%)
- Cumulative FU-time: 540 patient-years

Survival at 20 y: 76 ± 10 %

Valve- and anticoagulation (AC)-related events and INR variability
- 60% of patients remained free of any major valve-related event
- INR-variability: 29 ± 21% (self-mon.) vs 43 ± 21% (GP mon.) (p=0.05)
- High INR variability was associated with more AC-related events
- No AC-related events were seen in patients using INR self-monitoring

CONCLUSION

- 40% of the patients receiving a mechanical heart valve prosthesis during childhood experience at least one major adverse event during later life.
- Half of these events are related to the need for anticoagulation, through showing a high INR variability in this young population.
- Self-monitoring of INR might decrease this specific complication rate.