External aortic annuloplasty with a dedicated expansible ring improves outcomes in remodeling root repair compared to homemade Dacron ring

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Patients and Methods

• 375 patients operated: Root remodeling with homemade Dacron ring or Extra-Aortic ring annuloplasty, and compared
• Repair rate: 77.1%
• 2003-2020
• Age: 52.3 y
• Analysis with propensity score matching
Survival and Reoperation incidence

Competing risks model

Survival after VSRR repair, compared to general population

- Strata
  - Extra-Aortic
  - Dacron
  - General population

89.9% vs 80.0%, p=0.018
matched: 93.3% vs 79.8%, p=0.067

Reoperation incidence according to type of annuloplasty

- Ring
  - Dacron
  - Extra-Aortic

2.0% vs 9.7%, p=0.0098
matched: 0.0% vs 9.8%, p=0.036

Number at risk

<table>
<thead>
<tr>
<th>Time (years)</th>
<th>Dacron</th>
<th>Extra-Aortic</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>86</td>
<td>289</td>
</tr>
<tr>
<td>2</td>
<td>72</td>
<td>214</td>
</tr>
<tr>
<td>4</td>
<td>63</td>
<td>178</td>
</tr>
<tr>
<td>6</td>
<td>54</td>
<td>142</td>
</tr>
<tr>
<td>8</td>
<td>40</td>
<td>117</td>
</tr>
<tr>
<td>10</td>
<td>33</td>
<td>74</td>
</tr>
</tbody>
</table>
AI recurrence

*Competing risks model*

**AI grade > 2 incidence according to type of annuloplasty**

- **Ring**
  - Dacron
  - Extra-Aortic

1.9% vs 11.2%, p=0.0046

matched: 0.0% vs 10.1%, p=0.043

**AI grade > 1 incidence according to type of annuloplasty**

- **Ring**
  - Dacron
  - Extra-Aortic

25.0% vs 26.2%, p=0.25

matched: 25.3% vs 17.0%, p=0.14
Evolution of root expansibility

Evolution of aortic annulus expansibility according to type of annuloplasty

Evolution of sinuses of Valsalva expansibility according to type of annuloplasty

Before surgery | Discharge Time | Midterm

Ring | Dacron | Extra-Aortic

Expansibility (%)

p=0.84 | p=0.022 | p=0.012 (matched: p=0.06)

p=0.86 | p=0.004 (matched: p=0.002)
Evolution of mean transvalvular gradient

Evolution of mean transvalvular gradient according to type of annuloplasty

p = 0.68  |  p = 0.009  |  matched: p = 0.002

Gradient (mmHg)

Before surgery  |  Discharge Time  |  Midterm

Ring  |  Dacron  |  Extra-Aortic
Evolution of Systolic root diameter

Mixed-effects logistic regression

Evolution of aortic annulus SYSTOLIC diameter according to annuloplasty type after propensity score matching

Evolution of sinuses of Valsalva SYSTOLIC diameter according to annuloplasty type after propensity score matching
Evolution of Diastolic root diameter

*Mixed-effects logistic regression*

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**Evolution of aortic annulus DIASTOLIC diameter**
according to annuloplasty type
after propensity score matching

- **Aortic annulus (mm)**
  - Time after operation (years)
  - p=0.023

**Evolution of sinuses of Valsalva DIASTOLIC diameter**
according to annuloplasty type
after propensity score matching

- **Sinuses of Valsalva diameter (mm)**
  - Time after operation (years)
  - p=0.033
According to valve morphotype after Extra-Aortic ring annuloplasty
Conclusions

Aortic root remodeling with calibrated expansible Extra-Aortic ring annuloplasty:

• improves outcomes of reoperation, recurrent AI and gradient
• maintains physiological root dynamics for durable valve repair
• prevents dilation over time