Comparison of Hemodynamic Performance of the Trifecta and Mitroflow Aortic Valve Prostheses

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BACKGROUND
The St. Jude Medical Trifecta aortic heart valve is a new-generation mounted bovine pericardial prosthesis designed for supra-annular placement. The Mitroflow prosthesis (Sorin Group, Saluggia, Italy) is a well-known bioprosthesis, also manufactured with bovine pericardial tissue.

OBJECTIVE
The objective of this retrospective, single-center study was to compare the early hemodynamic performance measured with Doppler echocardiography of the Trifecta and Mitroflow valves.

METHODS
- 434 patients who underwent aortic valve replacement with the Trifecta or Mitroflow valves between June 2007 and June 2009 were reviewed.
- A total of 79 (18%) patients received the Trifecta valve, and 355 (82%) received the Mitroflow valve.
- Early Doppler echocardiographic results were analyzed and used to compare the hemodynamic performance of both valves.

RESULTS
- The mean age of patients in the Trifecta group was 75.9±7 years; 53 (67%) were male. The mean age of patients in the Mitroflow group was 74.2±10 years; 220 (62%) were male.
- Baseline characteristics and preoperative echocardiographic findings were similar between the two groups (Table 1).
- Median valve size: 23 mm for both groups
- Early mortality (≤ 30 days): 0 (0%) in Trifecta valve replacement patients; 10 (3%) in the Mitroflow group
- Stroke during the early postoperative period: 1 in each group
- Hemodynamic parameters: Mean gradients were slightly lower and prosthetic valve areas were greater in patients with the Trifecta valve compared with those with the Mitroflow valve (Table 1).

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<thead>
<tr>
<th></th>
<th>Trifecta valve</th>
<th>Mitroflow valve</th>
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<tbody>
<tr>
<td>Ejection fraction (%)</td>
<td>63.3±9.2</td>
<td>57.6±14.8</td>
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<tr>
<td>Preoperative annulus size (cm)</td>
<td>2.2±0.2</td>
<td>2.2±0.2</td>
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<tr>
<td>Postoperative aortic valve area (cm²)</td>
<td>2.03±0.6*</td>
<td>1.78±0.5</td>
</tr>
<tr>
<td>Postoperative mean gradient (mmHg)</td>
<td>12.2±4.6*</td>
<td>17.7±7.4</td>
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<tr>
<td>Postoperative mean gradient by valve size (mmHg)</td>
<td></td>
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<tr>
<td>19 mm</td>
<td>15.4±4.8*</td>
<td>25.9±9</td>
</tr>
<tr>
<td>21 mm</td>
<td>11.8±4.4*</td>
<td>19.1±6.8</td>
</tr>
<tr>
<td>23 mm</td>
<td>12.1±3.9*</td>
<td>16.9±6.1</td>
</tr>
<tr>
<td>25 mm</td>
<td>9.6±4.2*</td>
<td>16.4±9.3</td>
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* = p< 0.05 vs. Mitroflow
SUMMARY OF KEY FINDINGS

- The postoperative mean gradient of the Trifecta valve (12.2±4.6 mmHg) was significantly lower than that for the Mitroflow valve (17.7±7.4 mmHg).
- The statistically significant advantage in postoperative mean gradient for the Trifecta valve was consistent across all valve sizes.
- The Trifecta valve also demonstrated a statistically significant benefit in the postoperative aortic valve area.

CONCLUSIONS

- Early hemodynamic performance of the Trifecta bioprosthesis is favorable, showing statistically significant greater postoperative aortic valve area and lower transvalvular gradients across all valve sizes at early postoperative follow-up.
- Additional follow-up is necessary to understand whether these early differences in hemodynamic performance translate into meaningful clinical benefit.

REFERENCE