Microaxial Support After Orthotopic Heart Transplantation

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Introduction and Objective

- Impella is a temporary ventricular support device intended for short term use (<4 days for the Impella 2.5 and Impella CP, and ≤ 6 days for Impella 5.0 and LD).
- There has yet to be a study investigating the outcomes of microaxial support for patients who previously underwent heart transplantation.
- We aimed to assess utilization patterns of microaxial mechanical circulatory support after heart transplantation in adults and adolescents.

Methods

- A total of 214 articles resulted from searching the nine databases during the initial search (15 June 2021). Data were extracted from article texts, tables, and figures (Figure 1).
- Continuous data were represented with medians and IQRs (analyzed via Kruskal-Wallis Rank Sum tests), while categorical data were represented as percentages (analyzed via chi-squared tests). Survival data were compared via log-rank tests.
- R statistical software, version 4.1.0 (R Foundation for Statistical Computing, Vienna, Austria) was used for data analyses. P-values of <0.05 were considered statistically significant.

Results

- This study involved 21 patients, which included 15 adults and 6 adolescents.
- In adults, primary RV graft dysfunction was seen in 40% (6/15) and acute graft rejection was present in 46.7% (7/15).
- In all adolescents the indication for Impella was graft rejection (acute 50.0% (5/6), chronic 33.3% (2/6), and unspecified 16.7% (1/6)).
- Biventricular support was required in 6.7% (1/15) of adults and in 83.3% (5/6) of adolescents (p < 0.01) (Table 2).

Table 2: Baseline Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Adults (n=15)</th>
<th>Adolescents (n=6)</th>
<th>Total (n=21)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years), median [IQR]</td>
<td>40.00 (29.0, 58.0)</td>
<td>14.50 (11.0, 19.0)</td>
<td>38.36 (29.0, 58.0)</td>
<td>0.01</td>
</tr>
<tr>
<td>Male, % (n/N)</td>
<td>93.3% (14/15)</td>
<td>90.0% (2/2)</td>
<td>89.5% (16/18)</td>
<td>1.00</td>
</tr>
<tr>
<td>Weight (kg), median [IQR]</td>
<td>86.8 [70.0, 97.0]</td>
<td>66.7 [59.0, 70.0]</td>
<td>76.7 [66.0, 92.0]</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Echocardiogram Findings, % (n/N)</td>
<td>83.3% (5/6)</td>
<td>16.7% (1/6)</td>
<td>50.0% (5/10)</td>
<td>0.37</td>
</tr>
<tr>
<td>Heart Transplant Indication, % (n/N)</td>
<td>50.0% (7/14)</td>
<td>9.5% (2/21)</td>
<td>31.1% (9/28)</td>
<td>0.01</td>
</tr>
</tbody>
</table>

- Overall improvement was observed both in median LV ejection fraction (23.5% [11.2-28] to 42% [37.8-47.2], p = 0.01) and cardiac index (1.9 [1.4-2.6] to 3.0 [2.5-3.1], p = 0.02) after Impella therapy.
- Subgroup analyses lost statistical significance except for LVEF in adults (12.5% [10-21] to 40.5% [32.5-44], p = 0.03).

Conclusions

- Indications for microaxial support appear to vary between adult and adolescent patients.
- Overall improvement in LVEF and cardiac index was observed, however, with suboptimal survival to discharge.

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