Early and Mid-Term Outcomes of Transcatheter Management in Pulmonary Atresia with Intact Ventricular Septum

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Introduction:

Pulmonary atresia with intact ventricular septum (PAIVS) is revealed with a broad spectrum of heterogeneous morphology. Percutaneous techniques such as perforation of the atretic valve, balloon dilatation, and stenting of the patent ductus arteriosus are used more frequently in our clinic than surgery. These techniques have advantages including short hospital stay, short ICU stay, etc. The goal of the primary interventional approach is to avoid surgery. However, a group of patients with PAIVS still need to undergo surgery because of poor right ventricular growth. Therefore, the final achievement of the initial percutaneous treatment strategies is still debatable. In this paper, we present the early and midterm results of the percutaneous approach in our clinic in order to investigate the final effect of interventional therapy according to initial morphology.

Methods:

Between May 2010 and November 2011, seventeen neonates underwent transcatheter intervention. Detailed echocardiographic examination based on right ventricular size, tricuspid valve morphology, and coronary sinusoids was applied to all patients before the intervention. Nine patients were boys and 8 were girls. The mean age was 12.7 ± 12.1 days and weight was 3.2 ± 0.9 kg. Table 1 summarizes the patients' characteristics and preinterventional echocardiographic findings.

Results:

Two procedure-related mortalities occurred. The mean follow-up period was 6.9 ± 5.2 months (2-19 months). The mean duration of intensive care was 2 ± 1, 8 days. One of the patients with PAIVS achieved biventricular physiology after pulmonary valve perforation. Three patients have been followed without any reintervention or surgery.

Fourteen out of 17 patients achieved stent patency during 6 months of follow-up, while re-stenosis developed in one patient (1/13; %7.7) who had undergone Glenn operation at 5 months of age. Seven patients are still waiting for Glenn anastomosis without complication and reintervention (Table 2).

Conclusion:

As a primary treatment, transcatheter management for PAIVS is a feasible, safe, and effective palliation in newborns. Right ventricular size determines the type of the intervention. The early outcomes can be comparable with surgical palliation. However, a group of PAIVS particularly with severe right ventricular hypoplasia cannot achieve a surgery-free life even after successful primary percutaneous intervention.

Table-1

<table>
<thead>
<tr>
<th>Patient Data</th>
<th>Median (range)</th>
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</thead>
<tbody>
<tr>
<td>Age (day)</td>
<td>12.7 ± 12.1</td>
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<tr>
<td>Gender (M/F)</td>
<td>9/8</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>3.2 ± 0.9 (2.2-4.7)</td>
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</tbody>
</table>

Table-2

<table>
<thead>
<tr>
<th>Patient Data</th>
<th>Median (range)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Days of Intensive care stay</td>
<td>2.54 ± 3.3 (1-11)</td>
</tr>
<tr>
<td>Days of hospital stay</td>
<td>7.2 ± 4.2 (3-23)</td>
</tr>
<tr>
<td>Balloon dilatation + PDA stenting</td>
<td>5</td>
</tr>
<tr>
<td>RF assisted Valvotomy</td>
<td>3</td>
</tr>
<tr>
<td>RF + PDA stenting</td>
<td>6</td>
</tr>
<tr>
<td>PDA Stenting</td>
<td>3</td>
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<tr>
<td>Pulse oxymetry saturation</td>
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<tr>
<td>Before procedure</td>
<td>70 ± 6.14 (60-80)</td>
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<tr>
<td>After procedure</td>
<td>89.27 ± 4.61 (80-96)</td>
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<tr>
<td>Early/Late death</td>
<td>2 (%12) / 3 (%18)</td>
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