Non-cardiac Procedures in Infants after Palliative Cardiac Surgery: Palliation is just the Beginning

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Introduction

- Palliative procedures are common in infants with complex congenital heart defects (CHD). These procedures are a prelude to a definitive surgical correction of the underlying defect. Several months pass between palliation and the next corrective surgery. During this critical interval, infants often require additional procedures under general anesthesia.
- Our goal was to evaluate the need for additional procedures in patients with systemic-to-pulmonary artery shunts or hybrid procedures.

Background

- For many of the CHD, surgical repair can be accomplished in one-step; however, for lesions with single ventricle physiology or insufficient systemic or pulmonary blood flow, palliative surgeries may be required.
- Two of the more common palliative procedures are the Blalock-Taussing shunt (end-to-side anastomosis of the subclavian artery and the pulmonary artery) and the Hybrid procedure (stenting of the PDA, pulmonary banding, and/or PDA stenting). Exclusion criteria included patient death unrelated to cardiac disease and patients lost to follow-up or transfer of care.
- A descriptive analysis was performed to determine CHD diagnosis, palliation type, and clinical course between palliation and correction. Given the complexity in treatment of infants with HLHS who undergo Norwood or hybrid procedures, these infants were also evaluated separately.

Methods

- Medical charts were reviewed for all patients who underwent palliative cardiac surgery at Children's Hospital of Michigan from January 1, 2009 to December 31, 2012. Additional procedures for which the patient required anesthetic intervention were recorded.
- Palliative cardiac surgery was defined as Blalock Tausig (BT) shunt, central shunt, hybrid procedure, pulmonary banding, and/or PDA stenting. Exclusion criteria included patient death unrelated to cardiac disease and patients lost to follow-up or transfer of care.

Table 1: Non-cardiac Procedures after Palliative Cardiac Surgery

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Total (n = 60)</th>
<th>Shunt Group (n = 38)</th>
<th>HLHS Group (n = 22)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td># of patients</td>
<td>% of all patients</td>
<td># of Shunt Patients</td>
</tr>
<tr>
<td>Total</td>
<td>25</td>
<td>42%</td>
<td>12</td>
</tr>
<tr>
<td>DLB</td>
<td>9</td>
<td>15%</td>
<td>4</td>
</tr>
<tr>
<td>Broviac</td>
<td>15</td>
<td>25%</td>
<td>5</td>
</tr>
<tr>
<td>Imaging (MRI, CT)</td>
<td>7</td>
<td>12%</td>
<td>5</td>
</tr>
<tr>
<td>Abdominal Surgery</td>
<td>9</td>
<td>15%</td>
<td>5</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>4</td>
<td>7%</td>
<td>3</td>
</tr>
</tbody>
</table>

Shunt Group = patients who underwent a BT shunt or central shunt
HLHS Group = patients who underwent Norwood or Hybrid Procedures for HLHS palliation

Results

- Total of 60 patients underwent palliative cardiac surgery during the 3 year period.
- 38 (63%) had placement of BT or central shunts and 22 (37%) underwent either a Norwood or Hybrid Procedures for HLHS palliation.
- Additional procedures after palliation are outlined in Table 1.
- A total of 25 patients had at least one additional procedure between their palliative and corrective surgeries. Of these, 8 underwent more than one additional procedure.
- Maximum number of additional procedures for a patient was eight.
- The two most common additional procedures were Broviac placement and abdominal surgery, each with 9 (15%) patients.
- Patients who underwent palliation of HLHS required more additional procedures than those with shunt placement (59% vs. 32%).
- Out of the 60 patients, 40 (66%) have undergone their corrective surgery; 29 from the shunt group and 11 from the HLHS group.

Conclusion

- Many infants with complex CHD who undergo palliative cardiac surgery require additional non-cardiac procedures. These procedures are more common in HLHS infants after Norwood or hybrid surgery (59%) as opposed to other infants after shunt surgery (32%).
- Broviac placement & abdominal surgery are the most common procedures, each being performed in 9 patients, together representing 30% of all procedures.
- Knowledge of the types of additional procedures required in these patients, and under what circumstances, may help in developing a strategy to improve care of these patients before definitive repair.

References