Global Postoperative Mortality in Critical Congenital Heart Disease: A Systematic Review

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NO DISCLOSURES
INTRODUCTION

• 8 - 12 x 1000 newborns have a Congenital Heart Disease

• About 7,200 newborns, (18 per 10,000), in the United States are diagnosed with Critical Congenital Heart Disease (CCHD) each year.

• Part of cost effective analysis study for pulse oximetry routine screening in Colombia

• **Principal Objective:** Identify early postoperative mortality (30 days) in children < 1 year for each CCHD

• **Specific objectives:** Differentiate world-wide mortality rates Identify origin of published literature

(Genetics Home Reference, 2018)
METHODS

Key Words
- Cardiac Surgical Procedure
- Mortality OR Survival
- Pulmonary Atresia
- Tricuspid Atresia
- D - Transposition of Great Arteries
- Tetralogy of Fallot
- Hypoplastic Left Heart Syndrome (HLHS)
- Total Anomalous Pulmonary Venous Connection (TAPVC)
- Truncus Arteriosus

Inclusion Criteria
- **Type of Study**: Cohort or Case and Control Studies
- **Age**: Patients < 1 year old
- **Dates**: Between 01-01-2012 and 08-01-2017
- **Language**: Spanish and English
- **Mortality**: 30 day mortality

Exclusion Criteria
- Patients who underwent percutaneous or medical procedures

6 Data-bases
- Pubmed®, Sciencedirect®, Lilacs®, Ebsco-Host®, Cochrane®, Scopus®

STS/EACTS Latin America Cardiovascular Surgery Conference 2018
DATABASE SEARCH:

INCLUDED: 1045
EXCLUDED: 831
No Complete Abstract info: 55
Not specific CCHD: 372
Not Cohort or C&C: 147
Older than 1 year: 78
No surgical procedure: 179

COMPLETE ARTICLE:
INCLUDED: 214
EXCLUDED: 87

Combined patietnes greater and younger than 1 year of age: 22
Mortality was nor determined by specific heart disease: 31
Time of mortality was not clear or extended > 30 days: 15
Not specific language and English: 10
Not possible to obtain complete article: 9

INCLUDED: 127

STROBE® CRITERIA < 75% 7
# RESULTS

## Early Mortality in Cardiovascular Surgery for Critical Congenital Heart Disease in Children Under One Year of Age (Expressed in Percentage of Interventions 95% CI)

<table>
<thead>
<tr>
<th>Condition</th>
<th>Number of Studies</th>
<th>Number of Procedures</th>
<th>Global</th>
<th>North America</th>
<th>South America</th>
<th>Europe</th>
<th>Asia</th>
<th>Oceania</th>
<th>Africa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonary Atresia</td>
<td>5</td>
<td>342</td>
<td>9,94 (6,98-13,61)</td>
<td>17,07 (10,06-26,38)*</td>
<td>ND</td>
<td>18,88 (11,79-28,51)*</td>
<td>1,76 (0,45-4,72)</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Tricuspid Atresia</td>
<td>3</td>
<td>454</td>
<td>4,84 (3,06-7,24)</td>
<td>4,84 (3,14-7,12)</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>D-TGA</td>
<td>34</td>
<td>7099</td>
<td>6,39 (5,83-6,98)</td>
<td>3,04 (2,45-3,73)</td>
<td>23,95 (19,29-29,14)</td>
<td>6,73 (5,66-7,93)</td>
<td>5,95 (4,07-8,38)</td>
<td>2,88 (1,89-4,19)</td>
<td>3,52 (0,90-9,30)*</td>
</tr>
<tr>
<td>Tetralogy of Fallot</td>
<td>21</td>
<td>7323</td>
<td>1,80 (1,51-2,13)</td>
<td>2,13 (1,77-2,55)</td>
<td>ND</td>
<td>1,19 (0,58-2,17)</td>
<td>0,61 (0,19-1,47)</td>
<td>1,03 (0,45-2,04)</td>
<td>ND</td>
</tr>
<tr>
<td>HLHS</td>
<td>44</td>
<td>10145</td>
<td>17,02 (16,29-17,76)</td>
<td>17,12 (16,35-17,93)</td>
<td>23,07* (14,93-18,98)</td>
<td>16,88 (4,63-17,68)*</td>
<td>9,75 (4,38-29,1)*</td>
<td>13,3 (4,38-29,1)*</td>
<td>ND</td>
</tr>
<tr>
<td>TAPVC</td>
<td>7</td>
<td>598</td>
<td>12,2 (6,96-15,10)</td>
<td>6,66 (3,75-10,86)</td>
<td>ND</td>
<td>20,32 (14,54-25,96)</td>
<td>10,18 (6,65-14,77)</td>
<td>ND</td>
<td>ND</td>
</tr>
<tr>
<td>Truncus Arteriosus</td>
<td>6</td>
<td>150</td>
<td>12,00 (7,26-18,30)</td>
<td>16,66 (4,42-38,9)*</td>
<td>ND</td>
<td>3,27 (0,55-10,41)*</td>
<td>10,00 (1,71-29,29)*</td>
<td>21,56 (11,9-34,39)*</td>
<td>ND</td>
</tr>
</tbody>
</table>

*Information calculated from studies with less than 100 procedures performed

Average Mortality 9,17%
RESULTS

Comparison of Early Mortality

<table>
<thead>
<tr>
<th>Condition</th>
<th>Global Mortality (%)</th>
<th>STS Database 2018 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulmonary Atresia</td>
<td>9.94</td>
<td></td>
</tr>
<tr>
<td>Tricuspid Atresia</td>
<td>4.84</td>
<td></td>
</tr>
<tr>
<td>D-TGA</td>
<td>6.4</td>
<td>5.1</td>
</tr>
<tr>
<td>Tetralogy of Fallot</td>
<td>1.8</td>
<td>1.1</td>
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<tr>
<td>HLHS</td>
<td>17</td>
<td>15.8</td>
</tr>
<tr>
<td>TAPVC</td>
<td>12.2</td>
<td></td>
</tr>
<tr>
<td>Truncus Arteriosus</td>
<td>12</td>
<td>10.1</td>
</tr>
</tbody>
</table>

(Jacobs et al., 2018)
RESULTS

World-wide Publications

- N. AMERICA: 48%
- EUROPE: 28%
- ASIA: 16%
- OCEANIA: 4%
- S. AMERICA: 3%
- AFRICA: 1%
CONCLUSIONS

• Even though there are referral centers with low mortality rates, the aggregates demonstrated that mortality continues to be elevated

• There are important differences in regions regarding outcomes and publications

• Efforts have to be made to obtain global mortality indicator to compare to local results

• This study helped demonstrate that the use of pulse oximetry is cost effective and should be implemented as a national health policy in order to improve detection and survival rates of CCHD
LIMITATIONS

• Publication bias

• Pathology vs Procedure Mortality

• Risk Factors were not taken into account
THANK YOU