Anesthesia and the STS Congenital Database
Collaborative Approach for the Future

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Disclosures

• Thanks to Dr. Vener, CCAS Database Chair, and Associate Professor of Anesthesiology at Texas Children’s Hospital, as well as, the CCAS Database Committee.

• none
Congenital Heart Disease patients Outcomes

• Multiple variables: physiology, pathology, genetics, team managing patients
• Team: physicians, surgeons, trainees, nurses, respiratory therapists, pharmacy, blood bank and pathology medicine
• Both good and bad are not the result of any one group or individuals
CCAS Database

- Collaboration between Society of Thoracic Surgeons Congenital Heart Surgery Database
- Participants in the Multi-Societal Database Committee for Pediatric and Congenital Heart Disease helping standardization of nomenclature and communication across databases
  - Surgery (STS, EACTS, CHSS)
  - Anesthesia (CCAS)
  - Cardiology (ACC, AEPC)
  - Critical Care (PC4, PCICS, SCCM)
  - Nursing
  - Government Agencies
2010 – June 2014 Data

• From January 1, 2010 through December 2014
  • 122 Surgical Programs performing CHS in U. S.
  • 115 Surgical Programs participating
  • Anesthesia Programs paying to participate
    • 48 Anesthesia Programs submitting data
      • 60% of data is surgical only
      • 95,132 submitted; 57,862 have usable data beyond demographics
| Children’s Healthcare of Atlanta (Emory University) | Yale New Haven Hospital |
| All Children’s Hospital/Johns Hopkins Medicine | NYU Hospital Center |
| Children’s Hospital of Philadelphia | Washington University School of Medicine |
| University of Colorado Health Sciences Center | UCLA School of Medicine |
| Cincinnati Children’s Hospital Medical Center | University of Rochester Medical Center |
| Children’s Hospital and Clinics - Minneapolis | The Children’s Mercy Hospital |
| Nationwide Children’s Hospital | Children’s Hospital of the King’s Daughters |
| University of Minnesota Amplatz Children’s Hospital | University of Texas Health Sciences Center Houston |
| Saint Joseph’s Children’s Hospital of Tampa | Primary Children’s Medical Center |
| The University of North Carolina Hospitals | Cleveland Clinic |
| Arnold Palmer Medical Center | Le Bonheur Children’s Hospital |
| Arkansas Children’s Hospital | University of Mississippi Medical Center |
| Children’s Hospital Boston | Riley Hospital of Children (Clarian Health) |
| Methodist Children’s Hospital | Lucile Salter Packard Children’s Hospital at Stanford |
| Sutter Memorial Hospital | Children’s National Medical Center |
| Texas Children’s Hospital | UC Davis Medical Center |
| Kosair Children’s Hospital | Mayo Clinic Rochester |
| Duke University Hospital | Children’s Memorial Hermann Hospital |
| Alfred I. duPont Hospital for Children | Rush University Medical Center |
| Joe DiMaggio Children’s Hospital | Seattle Children’s Hospital |
| Monroe Carell, Jr. Children’s Hospital of Vanderbilt | Miami Children’s Hospital |
Why and How

• Anesthesia participation: $3300/yr per site
• Just need to addend signature page to include anesthesia group
• Data entry can be done by almost anyone
Why it Should be Important to Your Practice

• Children with history of Cardiac Disease have up to 85x higher likelihood of having cardiac arrest
• Anesthesia touches these children throughout their hospitalizations – OR, Cath labs, ICUs, Radiology, etc.
Why participate? How can one use the data?

• Document productivity and benchmark to national “standards”
  • Adverse Outcomes data
  • Medication Utilization
  • Transfusion Data
  • Practice changes
Why participate? How can one use the data?

- Example: Early Post-op Extubation
- Collaborative Learning – other centers are doing “Y” successfully, what can we learn?
- Everyone remembers an N=1, but when N=50 then there is more significance
- Leverage in administrative decisions, future planning. Data provides a strong component to the table.
Database Growth (Total Cases)
CPB Cases Only (Cumulative)
Cath Lab Procedures (Cumulative)

- Spring 2012
- Fall 2012
- Spring 2013
- Fall 2013
- Spring 2014
- Fall 2014
# Anesthesia - Related Unplanned Events

<table>
<thead>
<tr>
<th>Event Description</th>
<th>CPB / No CPB</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Unplanned Events</td>
<td>36,885</td>
<td>56,749 (98.1%)</td>
</tr>
<tr>
<td>Any Unplanned Events</td>
<td>801 (2.1%)</td>
<td>1,046 (1.8%)</td>
</tr>
<tr>
<td>- Cardiac Arrest UNRELATED to Surgery</td>
<td>44 (5.5%)</td>
<td>103 (9.8%)</td>
</tr>
<tr>
<td>- Airway Related Events (Difficult/Extubation/Injury)</td>
<td>293 (36.6%)</td>
<td>405 (38.7%)</td>
</tr>
<tr>
<td>- Vascular Related Events (Access&gt;60min/Hematoma/Arrhythmia/Injury)</td>
<td>316 (39.5%)</td>
<td>341 (32.6%)</td>
</tr>
<tr>
<td>- Medication Related Events (Anaphylaxis/Protamine/Wrong Drug-Dose/MH/Recall)</td>
<td>124 (15.5%)</td>
<td>151 (14.4%)</td>
</tr>
<tr>
<td>- TEE Related Events</td>
<td>66 (8.2%)</td>
<td>94 (9.0%)</td>
</tr>
</tbody>
</table>

4/18/2015
National Aggregate Data

- Invasive Monitoring in Neonates (0-30 days)
  - Central Lines
    - Internal Jugular – 36.5%
    - Femoral – 26.9%
    - Subclavian – 3.4%
- Extubation in OR by Age Groups
  - Neonates – 2.9
  - Infants – 12.0%
  - Children (1-18 yrs) – 28.5%
  - Adults (> 18 yrs) – 22.8%
Aggregate Extubation Data

• Extubation in OR by STAT Category
  • Category 1 – 29/5% (ASD, VSD, ToF)
  • Category 2 – 19.6% (Fontan)
  • Category 3 – 11.9% (AV Canal, MAPCA)
  • Category 4 – 7.8% (ASO)
  • Category 5 – 4.5% (Norwood, Hybrid, TA)
Updates to Database

- Changes Effective in v3.22 as of January 1, 2014
  - Medications
  - Increased adverse Events, including ocular and integument injury and cardiac arrest RELATED to surgical/cardiac manipulation
  - Antifibrinolytic Dosing and Pro-Coagulent Dosing

- Upcoming Changes for next Version
  - Consolidated Blood Product reporting
  - Further revisions to medication reporting
Recent FAQs

• Case Cancelled after inadvertent carotid artery cannulation by anesthesia
  • Adverse Event = Arterial Puncture, even though no hematoma, it resulted in cancellation of case

• Antifibrinolytic Dosing Question
  • Antifibrinolytic (TxA) load – exceeds maximum allowable
  • Antifibrinolytic (Amicar) – what is the definition of “loading dose”
Lessons to be Learned(1):

• Large numbers of patients do not make up for missing or wrong data but can begin to smooth out errors
• Unlike adult cardiac procedures, congenital cardiac surgery covers an enormous risk stratification, from nearly 0% morbidity and mortality (isolated ASD), to approximately 20% mortality (complex Arch/Single Ventricle neonates)
Lessons to be learned (2):

- Apples ≠ Oranges; dataset has to be large enough to allow reasonably equal patient populations in study to avoid conflicting differences in outcomes with differences in patient populations.
- Accumulating data takes time given the wide spectrum of lesions being treated.
- Also unlike adults; our patients need to be followed for decades to determine both mortality and, perhaps more importantly, morbidity.
Items of interest that CCAS Database Committee has been working on:

- Dashboards and Scorecards
- Establishing National Standards
- Working with PC4 and IMPACT
Thank You