Interdisciplinary databases in cardiac surgery

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Interdisciplinary databases

- Swedeheart
- CARATH
Why databases in cardiac surgery

- Standardized
- Large volumes
- Centralized
- "Technical"
  - Lots of things to register

- Perfusion/ECC "ideal" for database use
  - Automated recordings of well defined, often numeric data
Cardiac surgery:
Multidisciplinary cooperation
Aims and Advantages

• Collect data from multiple sources
  • over time
  • across professions

• Possibility to correlate data across medical disciplines
Clinical implications
Swedeheart annual report 2011
### Clinical Implications

M Vidlund, dissertation 2011

#### Table 13: Outcome for patients at Center A and B (mean±SD or count n %)

<table>
<thead>
<tr>
<th></th>
<th>Center A</th>
<th>Center B</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n=252</td>
<td>n=536</td>
<td></td>
</tr>
<tr>
<td>Primary endpoint</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>LV-failure at weaning from CPB</td>
<td>4.0%</td>
<td>8.1%</td>
<td>0.03</td>
</tr>
<tr>
<td>Perioperative myocardial infarction</td>
<td>2.8%</td>
<td>5.4%</td>
<td>0.14</td>
</tr>
<tr>
<td>30-day mortality</td>
<td>1.6%</td>
<td>1.5%</td>
<td>0.79</td>
</tr>
<tr>
<td>Secondary endpoints</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inotropes at weaning from CPB</td>
<td>25.9%</td>
<td>7.6%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>SvO2 at weaning from CPB</td>
<td>74.0±8.2</td>
<td>70.9±6.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>a-Lactate mmol/L 5 minutes after protamine</td>
<td>1.68±0.7</td>
<td>1.72±0.5</td>
<td>0.04</td>
</tr>
<tr>
<td>Hemodynamic state at completion of surgery</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Stable without inotropes</td>
<td>57.9%</td>
<td>86.9%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>- Stable with inotropes</td>
<td>41.3%</td>
<td>11.4%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>- Unstable with inotropes / IABP</td>
<td>0.8%</td>
<td>1.1%</td>
<td>1.0</td>
</tr>
<tr>
<td>IABP on admission to ICU</td>
<td>0.4%</td>
<td>0.7%</td>
<td>1.0</td>
</tr>
<tr>
<td>Severe circulatory failure</td>
<td>3.6%</td>
<td>2.6%</td>
<td>0.5</td>
</tr>
<tr>
<td>Stroke within 24h post op</td>
<td>1.2%</td>
<td>1.1%</td>
<td>1.0</td>
</tr>
<tr>
<td>Dialysis post op</td>
<td>1.6%</td>
<td>0.8%</td>
<td>0.28</td>
</tr>
<tr>
<td>Postop increase of p-Creatinine (Δμmol/L)</td>
<td>12±43</td>
<td>6±33</td>
<td>0.04</td>
</tr>
<tr>
<td>Cardiac mortality (in hospital or 30-day)</td>
<td>0.8%</td>
<td>0.6%</td>
<td>0.66</td>
</tr>
</tbody>
</table>
Before building a database

• What data to collect?

  What will we need? How to define? Valid data?
Building a database

• What is the aim of the registry?

• **How** to design, and **who** will design the database?

• Who will run the registry? Steering committe?
Multidisciplinary databases

• Who decides, and designs the database?

• Relations, definitions, time sequencies etc must be **crystal clear**

• **DO NOT UNDERESTIMATE** the complexity of medical processes
Design? 

Common database

Surgeon

Anesthesiologist

Perfusionist
Design?

Link or key
(Unique ID#, serial# etc)

Perfusion database

Surgical database
Pitfalls

• Too high ambition!
• Data
  – Too many variables
  – Poorly defined variables
  – Poor discipline regarding data entry
  => lost of missing/unvalid data

• Complex design/architecture of the database
Success factors

• Enthusiastic (but *realistic*) medical specialists with computer competence
• Strong support from chiefs
• Small scale start, often local database
Advice

• Think before! Preparation takes time!
• *Make it simple!* If it gets complicated - Kill your darlings!!
• Start small, advance one step at a time
• Define who is in charge of the design of the database
• Monitor data quality, feedback to users

• Get support by chiefs
Thank you