Critical Care Canada Forum

Maximizing Organ Donor Pool

Michael Sharpe MD
Wednesday, November 16, 2011
Objectives

Discuss methodologies to maximize solid organ donation:

• Capturing *ALL* potential solid organ donors
• Optimization of organ donor management
Maximizing Organ Donor Pool

1. “Capturing ALL potential solid organ donors”
MANDATORY ASK ALGORITHM

DECISION TO WITHDRAW LIFE SUPPORT

ABSOLUTE CONTRAINDICATIONS TO ORGAN AND TISSUE DONATION:
- HIV
- METASTATIC CA
- HEP B SURFACE ANTIGEN POSITIVE

NOT: DO NOT INITIATE WLS UNTIL ALGORITHM COMPLETED

INTIATION OF WITHDRAWAL OF LIFE SUPPORT POLICY
- no organ donation
- RNR tissue donation; contact TGLN

NDD CRITERIA PRESENT OR LIKELY PROGRESSION TO NDD

YES

CONTACT TRILLIUM GIFT OF LIFE
1-877-363-8456
Access patient registry
Confirm eligibility for NDD +/- DCD +/- tissue donation
Need assistance from TGLN coordinator?

NO

DISCUSSION WITH PATIENT/SDM RE: ORGAN/TISSUE DONATION

CONSENT FOR ORGAN DONATION

YES

CONTACT TGLN AND HOSPITAL DONOR COORDINATOR

WITHDRAWAL OF LIFE SUPPORT
- in OR for NDD
- in ICU or OR for DCD

NO

CONSIDER DONATION AFTER CARDIAC DEATH

NOTE: DO NOT INITIATE WLS UNTIL ALGORITHM COMPLETED
<table>
<thead>
<tr>
<th></th>
<th>Prior to Implementation</th>
<th>After Implementation (Oct 2010)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Referrals to TGLN</td>
<td>104</td>
<td>134</td>
</tr>
<tr>
<td>Organ Donors (Total)</td>
<td>24</td>
<td>23</td>
</tr>
<tr>
<td>NDD</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td>DCD</td>
<td>9</td>
<td>6</td>
</tr>
<tr>
<td>Missed Potential Donors (Total)</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>NDD</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>DCD</td>
<td>7</td>
<td>2</td>
</tr>
</tbody>
</table>

TGLN – Trillium Gift of Life Network
NDD – Neurologic Determination of Death
DCD – Donation after Cardiac Death
Maximizing Organ Donor Pool

2. Implementation/facilitation of a DCD program
### Ontario Deceased Organ Donors by Donor Type 2006 – 2011 (Oct 31, 2011)*

<table>
<thead>
<tr>
<th></th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>NDD</td>
<td>168</td>
<td>183</td>
<td>145</td>
<td>181</td>
<td>165</td>
<td>149</td>
<td>991</td>
</tr>
<tr>
<td>DCD</td>
<td>4</td>
<td>17</td>
<td>30</td>
<td>37</td>
<td>35</td>
<td>36</td>
<td>159</td>
</tr>
<tr>
<td>% of total donors</td>
<td>2</td>
<td>9</td>
<td>17</td>
<td>17</td>
<td>18</td>
<td>19</td>
<td>14</td>
</tr>
<tr>
<td>Total</td>
<td>172</td>
<td>200</td>
<td>175</td>
<td>218</td>
<td>200</td>
<td>185</td>
<td>1150</td>
</tr>
</tbody>
</table>

* Trillium Gift of Life Network
3. Optimization of organ donor management
Figure III-2. Nonrecovery of Consented Organs, 2002

<table>
<thead>
<tr>
<th>Organ</th>
<th>% Not Recovered</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kidney</td>
<td>7%</td>
</tr>
<tr>
<td>Pancreas</td>
<td>11%</td>
</tr>
<tr>
<td>Liver</td>
<td>61%</td>
</tr>
<tr>
<td>Intestine</td>
<td>97%</td>
</tr>
<tr>
<td>Heart</td>
<td>50%</td>
</tr>
<tr>
<td>Lung</td>
<td>83%</td>
</tr>
</tbody>
</table>

CCDT- Organ Donor Management Strategy:
A Canadian Consensus Forum-February 2004
in collaboration with:
• Canadian Critical Care Society
• Canadian Society of Transplantation
• Canadian Association of Transplantation
• Health care professionals from 27 organizations
• Donation-transplants agencies
• Health administrators
• Policy makers

Comparison of data before and after aggressive donor management (ADM)

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<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Referrals for donation</td>
<td>341</td>
<td>537</td>
<td>+57%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Potential donors</td>
<td>214</td>
<td>255</td>
<td>+19%</td>
<td>0.01</td>
</tr>
<tr>
<td>Actual donors</td>
<td>57</td>
<td>104</td>
<td>+82%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Family Decline (%)</td>
<td>109 (51%)</td>
<td>106 (42%)</td>
<td>-9%</td>
<td>&lt;0.05</td>
</tr>
<tr>
<td>Donors lost due to cardiovascular collapse</td>
<td>39</td>
<td>5</td>
<td>-87%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Medically unsuitable</td>
<td>9</td>
<td>40</td>
<td>+344%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Organs recovered</td>
<td>217</td>
<td>370</td>
<td>+71%</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Organs per donor</td>
<td>3.8</td>
<td>3.6</td>
<td>-6.5%</td>
<td>0.974</td>
</tr>
</tbody>
</table>

- Chi-square test.

Aggressive Organ Donor Management Significantly Increases the Number of Organs Available for Transplantation

Aggressive pharmacologic donor management results in more transplanted organs
Rosendale JD, Kauffman HM et al. Transplantation 2003;75:482
Improved Cardiac Allograft Function following Triiodothyronine therapy to both donor and Recipient


- Brain death results in significant reduction in thyroid hormones
- Absence of $T_3$ causes inhibition of aerobic metabolism leading to anaerobic metabolism
- Post tx function improved requiring less inotropy treated with $T_3$
Hormonal resuscitation yields more transplanted hearts, with improved early function. Rosendale JD et al. *Transplantation* 2003; 75:1336-41
Recommendation 5.1: Thyroid hormone, vasopressin and methylprednisolone

Combined hormonal therapy is defined as administration of
- Thyroid hormone (tetraiodothyronine or T4), 20 μg IV bolus followed by 10 μg/h IV infusion
- Vasopressin, 1 U IV bolus followed by 2.4 U/h IV infusion
- Methylprednisolone, 15 mg/kg IV every 24 h.

Indications:
1. EF < 40%
2. Escalating hemodynamic support
3. ALL donors (LHSC) (2 mcg/kg Q12H; iv or po)
Effect of a Lung Protective Strategy for Organ Donors on Eligibility and Availability of Lungs for Transplantation. A Randomized Controlled Trial

Mascia L et al

JAMA. 2010;304(23):2620-2627

- Low tidal volume (6-8 ml/kg) vs conventional (10-12 ml/kg); PEEP 8-10; PIP < 30

Reduced the decline in respiratory function following brain death
- Doubled number of lungs suitable for transplantation (27% vs 54%)
- Significant reduction in markers of inflammation
Conclusions

1. Develop simple process that captures *ALL* potential solid organ/tissue donors; NDD + DCD

2. Optimize organ donor management
Thank You
Pharmacokinetics of Oral versus Intravenous Thyroxine (T4) in Organ Donors

Administration of Levothyroxine Sodium

![Graph showing the change in total vasopressor dose (μg/kg per minute) over time.]