Donation After Circulatory Death (DCD) Heart Transplantation in Australia: a solution to the donor shortage?

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On Behalf of St Vincent’s Hospital DCD Heart Transplant Group
Transplantation pathways

**Donation after brain death (DBD)**
Controlled death - minimal to no warm ischaemic time (WIT)

**Donation after circulatory death (DCD)**
Uncontrolled progression to asystole - variable WIT
Overcoming the DCD heart barriers

Enhancing tolerance to warm ischemia with supplementation

**GTN** – nitric oxide donor


**EPO** – glycoprotein hormone, active in SAFE cardioprotective pathway


Normothermic perfusion device

- DCD hearts are exposed to an unavoidable warm ischaemic injury
- Ideal preservation modality
  - Minimizes ischaemic injury
  - Allow for organ resuscitation
  - Facilitate viability assessment prior to transplantation
Current outcomes of the clinical DCD program

Protocol modifications

- Commencement of WIT at systolic BP < 90 mmHg
- Extension of donor age to <55
- Addition of increased dose of methylprednisolone and regular albumin to combat oedema whilst on the TransMedics
Current outcomes of the clinical DCD program

St Vincent’s Experience

<table>
<thead>
<tr>
<th>Donor demographics</th>
<th></th>
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<tbody>
<tr>
<td>Male : Female</td>
<td>24 : 4</td>
</tr>
<tr>
<td>Average age</td>
<td>30 ± 8 (range 20 – 54)</td>
</tr>
<tr>
<td>Average weight</td>
<td>82 ± 15 kg</td>
</tr>
<tr>
<td>Vasopressor support</td>
<td>12 / 28 (43%)</td>
</tr>
<tr>
<td>Lungs used</td>
<td>19 / 28 (68%)</td>
</tr>
</tbody>
</table>

Donor C.O.D for All Transplanted

- TBI: 43%
- HBI: 11%
- Hanging: 14%
- ICH: 7%
- Other: 25%
## Current outcomes of the clinical DCD program

<table>
<thead>
<tr>
<th></th>
<th>No-ECMO</th>
<th>ECMO</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Warm Ischaemic Time</td>
<td>23 ± 6 mins</td>
<td>23 ± 3 mins</td>
<td>0.32</td>
</tr>
<tr>
<td>Time to Asystole</td>
<td>11 ± 5 mins</td>
<td>9 ± 3 mins</td>
<td>0.08</td>
</tr>
<tr>
<td>Asystole – Cardioplegia</td>
<td>12 ± 2 mins</td>
<td>15 ± 3 mins</td>
<td>0.003</td>
</tr>
<tr>
<td>Cold Ischaemic Time</td>
<td>29 ± 5 mins</td>
<td>27 ± 6 mins</td>
<td>0.20</td>
</tr>
<tr>
<td>OCS</td>
<td>277 ± 70 mins</td>
<td>306 ± 60 mins</td>
<td>0.14</td>
</tr>
</tbody>
</table>
Conclusion

• DCD heart procurement is a feasible alternative to the traditional DBD pathway, with excellent results in patient cohort to date

• Combined approach, to both further improve ischaemic tolerance and minimise asystole-plegia time required to reduce high early ECMO rates

• High staff requirements and cost may be prohibitive in some centres
Clinical studies
Heart and Lung Clinic
- Dr Mark Connellan
- Dr Alasdair Watson
- Dr Emily Granger
- Prof Chris Hayward
- A/Prof Andrew Jabbour
- Dr Paul Jansz
- Prof Anne Keogh
- A/Prof Eugene Kotlyar
- Dr Phillip Spratt

Perfusionists
- Mr Claudio Soto
- Mr Adam Roshan

Transplant Coordinators
ICU
- Dr Priya Nair

Pre-clinical studies
Victor Chang Cardiac Research Institute – Transplant laboratory
- Dr Ling Gao
- Dr Hong Chee Chew
- Dr Arjun Iyer
- Dr Jeanette Villaneuva
- Aoife Doyle
- Dr Mark Hicks