Organ Donation: Brain Death and Cardiac Death

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Objectives
- List clinical triggers for contacting UNYTS
- Define brain death
- Define donation after cardiac death
- Describe why DCD is a worthwhile goal
- Outline the process for DCD donation
- Discuss controversies in DCD

Upstate New York Transplant Services (UNYTS)
- Federally designated Organ Procurement Organization (OPO) for Western N.Y.
- Non-profit organization
- Responsible for the recovery and allocation of donor organs and tissues at all 28 hospitals in the 8 counties of our service area.
- Provides on-call donation services 24/7/365

Federal Regulations
- Centers for Medicare and Medicaid Services (CMS)
  - Conditions of Participation to receive Medicare funding
- Joint Commission on Accreditation of Healthcare Organizations (JACHO)
  - Similar, key requirements:
    - Agreement w/ an OPO, tissue and eye bank
    - Call on every death and imminent death
    - Provide option of donation to family of every medically suitable patient
    - Family approach by OPO staff

History and Facts
- As of today 105,499 people are on the waiting list for an organ transplant
- 23,847 transplants in 2009
- 17 - 20 people die waiting every day—new name added to the list approximately every 15 minutes

Clinical Triggers: All Potential Donors
- Every ventilated patient meeting any of the following:
  - GCS 5 or less w/o continuous sedation
  - Brain death testing planned or initiated
  - Patient being made comfort care – PRIOR TO
  - Life sustaining therapy to be withdrawn – PRIOR TO
- Every cardiac death (within 1 hour)
Brain death

- Most common type of organ donation
- Brain death criteria established in 1970's in response to
  - Development of ventilator therapy
  - Development of organ donation

Responsibilities of Physicians Determining Brain Death

- Evaluate the irreversibility and potential causes of coma
- Initiate hospital policy for notifying NOK
- Conduct and document 1st clinical assessment of brain stem reflexes
- Observe during defined interval

Responsibilities of Physicians Determining Brain Death

- Conduct and document second clinical assessment of brain stem reflexes
- Perform and document apnea test
- Perform confirmatory testing if indicated
- If religious or moral objection to brain death standard, implement hospital policy for reasonable accommodation

Certify brain death

- Withdraw cardio-pulmonary support in accordance with hospital policies, including those for organ donation

### Table 1. Clinical Criteria for Brain Death in Adults and Children

<table>
<thead>
<tr>
<th>Test</th>
<th>Abnormality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Event of cardiac arrest</td>
<td>Abnormality of pupil response to light and pupils mid-dilated with respect to illumination (1-2 hours)</td>
</tr>
<tr>
<td>Absence of corneal reflex</td>
<td>Absence of corneal reflex</td>
</tr>
<tr>
<td>Absence of gag reflex</td>
<td>Absence of gag reflex</td>
</tr>
<tr>
<td>Absence of corneal reflex</td>
<td>Absence of corneal reflex</td>
</tr>
<tr>
<td>Absence of respiratory arrest or pH &lt; 7.00 or PaCO2 &gt; 60 mm Hg or PaCO2 &gt; 35 mm Hg above normal baseline value</td>
<td></td>
</tr>
</tbody>
</table>
| Interval between two evaluations, according to patient's age | Time to 2 yrs old, 48 hrs
   - >2 yrs to 11 yrs old, 24 hrs
   - >11 yrs to 18 yrs old, 12 hrs
   - >18 yrs old, blood optional |
| Confirmatory tests | Time to 2 yrs old, 2 confirmatory tests
   - >2 yrs to 11 yrs old, 1 confirmatory test
   - >11 yrs to 18 yrs old, optional
   - >18 yrs old, optional |

*PaCO2 denotes the partial pressure of arterial carbon dioxide.*

*Note: Table 1 for descriptors of the available confirmatory tests. Tests may be required by law outside the United States.*
Confirmatory Testing for Determination of Brain Death
- Cerebral Angiography
- EEG
- Transcranial Doppler
- Cerebral Scintigraphy

Examples of Bedside Tests to Confirm Brain Death

DCD: History and Facts
- Institute of Medicine studied organ transplantation starting in 1996 and concluded:
  - Organ recovery following cardio-pulmonary death can positively impact the shortage of transplantable organs

History and Facts
- Prior to the acceptance of the “brain death” criteria in the mid-1970s, all organ donations were performed after cessation of cardiopulmonary function.
- In 1999, 68 of “Donation After Cardiac Death (DCD)” cases were accomplished across the United States.
- In 2006, 322 DCD cases were accomplished.

Fundamentally...
- The family should make the decision to withdraw life support independent of, and prior to, any discussion regarding organ donation.

Criteria
- The patient has a non recoverable illness or injury and has suffered neurologic devastation.
- The family, in conjunction with the medical staff, has decided to withdraw life support.
- Death will likely occur within one hour of withdrawal of life support.
### Potential DCD Donor

- Patients with severe neurological injury
  - *Intracranial hemorrhage, stroke, anoxia, trauma*
- Patients without neurological injury
  - *Degenerative neuromuscular diseases*
  - *End-stage cardiopulmonary diseases*

### Potential DCD Donor (cont’d)

- Do not meet the criteria for brain death
- No chance for survival off the ventilator
- Family elects to deescalate care or withdraw support (DNRs)

### Clinical Triggers: Potential DCD

- Illness or injury has caused an unrecoverable, neurological or physiological devastation resulting in ventilator dependency.
- Death from cardiac arrest likely to occur within one hour following withdrawal of mechanical support.
- Family has made patient DNR or plans to withdraw all life support
- Family inquired or initiated discussion about organ donation

### Process

- Refer the patient to UNYTS.
- A coordinator will come on site and evaluate the patient to determine suitability.
- In conjunction with the health care team, the family will be informed of the patient’s suitability.
- If suitable, the family will be fully informed about all procedures relating to the pronouncement of death and the organ recovery process by UNYTS

### Patient Management

- The patient will continue to be supported hemodynamically and on a ventilator until withdrawal of support.
- Standard comfort measures will be given at the discretion of the attending physician or their designee.
- UNYTS will provide recommendations for donor management and lab studies to be approved by the attending physician or their designee.

### Withdrawal of Support

- A UNYTS DCD consent form will be signed by the next-of-kin.
- Removal of life support usually takes place in the O.R.
- Organ recovery occurs 5 minutes after asystole/pronouncement of death
Pronouncement of Death

- The patient will be pronounced dead after 5 minutes of asystole or 5 minutes of ventricular fibrillation measured by electrical activity and arterial pulse monitoring.
- Death will be pronounced by a physician or designated nursing staff.
- The physician certifying death may not be involved in the recovery or transplantation of the organs.
- The physician will record the date and time of death in the medical record and, if applicable, complete the death certificate.

What Happens if the Patient does not Expire?

- Occurs in approximately 5-10% of DCD cases
- If the patient does not arrest within a time deemed suitable by the organ recovery team, the patient will be returned to a prearranged room and provided with comfort measures.
- UNYTS will be responsible for the costs relating to the evaluation and recovery of organs regardless of whether the organs are recovered.

Important Facts to Remember

- The family should make the decision to withdraw life support independent of the decision to donate organs.

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- This procedure should not be viewed as a way to circumvent brain death criteria but as a means to provide families with an additional option of donation that complies with the patient or authorized family directives.

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- The Institute of Medicine’s evaluation of the ethics of DCD stated that the procedure “should be considered a reasonable source of organ donors.”

Points for debate

- This procedure should not be viewed as a way to circumvent brain death criteria but as a means to provide families with an additional option of donation that complies with the patient or authorized family directives.
### When is autoresuscitation not possible?

<table>
<thead>
<tr>
<th><strong>For DCD</strong></th>
<th><strong>Against DCD</strong></th>
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<tbody>
<tr>
<td>In study of 108 patients, did not occur after 2 minutes</td>
<td>Case reports of &quot;Lazarus Phenomenon&quot; - spontaneous autoresuscitation &gt;10 min after CPR stopped</td>
</tr>
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### When is the heart’s being stopped considered irreversible?

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<td>Since all DCD patients are DNR patients, loss of circulation is irreversible when autoresuscitation cannot occur (after 5 min)</td>
<td>Loss of circulation is irreversible only after CPR would not be successful in restarting the heart (&gt;15 min)</td>
</tr>
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### When is the patient brain dead?

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<th><strong>Against DCD</strong></th>
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<td>Brain death is only one of 2 accepted criteria for defining death. Cardiac death is a well recognized definition of death.</td>
<td>Brain death may not be diagnosed for at least 15 min after heart and circulation stop</td>
</tr>
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### Conflict of interest?

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<th><strong>For DCD</strong></th>
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<tr>
<td>Doctors give their patient’s best interests priority in making decisions</td>
<td>Familiarity and desire for transplantation may make doctors unintentionally biased to promote DCD</td>
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