When and How to Perform a Brain death Exam

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Disclosures

- I have nothing to disclose
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- Except.....
Why should we know about donation??
The New Age of Transplantation

34,771 Transplants performed in 2017

16,477 Donors

114,892 on the waiting list
The Organ Shortage Problem

Waiting list: 19 deaths/day
Transplants: 7000/year
Did you know??

- Centers for Medicare/Medicaid Services & ACS
  - Notification process
  - Declaration of brain death
  - Organ procurement organization (OPO) relationship
  - Performance Improvement (PI) program
  - Patient/family opportunity to donate
Solid Organ Procurement
Level I, II, III Trauma Centers

- Must have an established relationship with a recognized OPO
- Must have a written policy for triggering notification of the regional OPO
- Must review its solid organ donation rate annually
- Must have written protocols defining clinical criteria and confirmatory tests for the diagnosis of brain death
Cause of Death of Donors

- Anoxia: 40%
- CVA/Stroke: 35%
- TBI: 4%
- Other: 21%
Outline

- Types of Donors
- Declaration of Brain Death
Types of Donors

- Living Donors

- Deceased Donors
  - Donors after Neurologic Determination of Death
  - Donors after Circulatory Determination of Death
Deceased and Living Donors
2004-2013
U.S.

Number of Donors

Year


Deceased Donor
Living Donor

8267
5988

UNOS
DONATE LIFE
UNITED NETWORK FOR ORGAN SHARING
Cadaveric “Brain Dead” Donors

Living donors 18%

Cadaveric donors 82%
Types of Donors

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Two Ways to Declare Death

- **Cardiac Death**
  - Death declared on basis of cardiopulmonary criteria
  - Irreversible cessation of circulatory and respiratory function
  - DCD
  - 8% deceased donors

- **Brain Death**
  - Irreversible loss of all functions of the brain, including brain stem
  - Non-DCD or DBD
  - 92% deceased donors
Types of Donors

- Deceased Donors
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  - Donors after Circulatory Determination of Death
Declaring Brain Death

1. Pre-requisites
2. Clinical Examination
3. Ancillary Testing
4. Documentation & Organ Donation
Declaring Brain Death

1. Pre-requisites
2. Clinical Examination
3. Ancillary Testing
4. Documentation & Organ Donation
Pre-requisites

- Known proximal cause & irreversibility
- Absence of confounders
  - Electrolyte, metabolic, endocrine, acid-base disturbances
  - Intoxication/drug effects
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Hypothermia
- \( \geq 36 \, \text{C (from 32)} \)
Systolic Blood Pressure
- \( \geq 100 \, \text{mm Hg (from 90)} \)
Declaring Brain Death

1. Pre-requisites
2. Clinical Examination
3. Ancillary Testing
4. Documentation & Organ Donation
Clinical Exam: COMA

Motor response to painful stimuli

- Sternum
- Supraorbital nerve
- Nail bed

Adapted from: Wijdicks. NEJM. 2001
Clinical Exam: BRAINSTEM REFLEXES

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Clinical Exam: BRAINSTEM REFLEXES

- Pupillary Light Reflex
- Corneal Reflex
- Gag Reflex
- Oculocephalic Reflex (Dolls Eyes)
- Oculovestibular Reflex (Cold Calorics)
Clinical Exam: APNEA

- Absence of a breathing drive
  - Tested by CO2 challenge

- Prerequisites
  - Normotension
  - Normothermia
  - Euvolemia
  - Eucapnia (35-45)
  - Absence of hypoxia
Clinical Exam: APNEA

Apneic oxygenation-diffusion technique

Repeat ABG: 8 min

Arterial PCO2
• $\geq 60 \text{ mm Hg}$ OR
• 20 mm Hg increase over baseline

Adapted from: Wijdicks. NEJM. 2001
Declaring Brain Death

1. Pre-requisites
2. Clinical Examination
3. Ancillary Testing
4. Documentation & Organ Donation
Ancillary Tests

Only if clinical exam incomplete, unreliable or unsafe

1. Brain perfusion scan
2. EEG
3. Transcranial doppler
4. Conventional angiography
Declaring Brain Death

1. Pre-requisites
2. Clinical Examination
3. Ancillary Testing
4. Documentation & Organ Donation
Documentation & Donation

Time of death:

- $p\text{CO}_2$ reached target value
- Ancillary test interpretation
Documentation & Donation

Organ donation:

- Federal & State law requires contact with organ procurement association
- OPO to approach family
Organ Donor Timeline

1. Injury
2. 1st Brain death
3. 2nd Brain Death
4. Family consent
5. OPO Management
6. Organ Retrieval
Types of Donors

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Timeline of DCDD

- Cessation of circulation/respiration
- Declaration of death and organ procurement
- Withdrawal of life support

2-5 min
Outline

- Types of Donors
- Declaration of Brain Death
Outline

- Types of Donors
  - Living, Deceased (DCD, DBD)

- Declaration of Brain Death
  - Protocols need to be in place