Experiences as a Donation Support Physician

Dead or not Dead?

Are the following statements consistent with neurological determination of death (dead)?

or not (not dead)?

With thanks to Drs. Alex Manara, Dale Gardiner, Sam Shemie
During your brainstem testing investigation the patient blinks to command.

A> NDD Yes? (Dead)

B> NDD No? (Not Dead)

Not Dead - inconsistent with NDD
The patient had absent brainstem reflexes, but once removed from midazolam, had a generalized tonic-clonic seizure?

A> NDD Still Possible? (Dead)

B> NDD Not Possible? (Not Dead)

Not Dead – the patient must have intact neural connections to have a motor seizure, though EEG is not a required test.
Always Ask: Is There Any Reason This Patient is Not Brain Dead?

Clinical diagnosis

Established etiology or mechanism

Absent Brainstem reflexes including apnea test

Absent Confounding Factors
NDD Confounding Factors

- Shock
- Hypothermia
- Metabolic Disorders
- PN or NM Dysfunction
- Drug Intoxication

Pediatric (n=11)
Adult (n=26)
Supra-orbital painful stimulus leads to flexion in one of the right hand?

A> NDD Yes? *(Dead)*

B> NDD No? *(Not Dead)*

Not dead – one must actively ensure that this was a coincidental spinal reflex but until proven this may represent retained brainstem function.
Some common movements

- Brief attempt of body to flex at waist (seeming to rise)
- Arms may raise independently or together
- Slow turning of head to one side
- Undulating toe sign (snapping of big toe)
- Facial twitching
- Tendon, abdominal and cremasteric reflexes
- Large muscle contractions sometimes seen on discontinuation of ventilation (Lazarus sign)


Spinal reflexes

Reproducible on repeat

Typically not reproducible on change in stimulus location

Typically present in lower extremities

Common!

One study of 144 patients → 55% had plantar reflexes
Due to left orbital trauma you can't visualize or observe the left eye but absent pupil and corneal reflexes in right eye?

A> NDD Still Possible? (Dead)

B> NDD Not Possible? (Not Dead)

Not Dead: may still be dead even if one can’t carry out the full test. However, incomplete clinical exam mandates ancillary testing. Rest of clinical exam including apnea test still to be performed despite ancillary testing.
During the second set of brainstem testing the second clinician finds a ruptured tympanic membrane?

A> NDD Yes? *(Dead)*

B> NDD No? *(Not Dead)*

**Not dead** – this finding may invalidate the first oculovestibular test and thus the patient may not be declared dead.
The patient starts making spontaneous respirations after declarations including apnea testing?

A> NDD still possible? **(Dead)**

B> NDD not possible? **(Not Dead)**

Dead - **May represent auto-triggering of the ventilator (high sensitivity and/or cardiac pulsations)**

*Best to disconnect from ventilator to do apnea testing.*

*Balance with need for CPAP*
The patient’s pulse increases from 70 bpm to 110 bpm during apnea testing?

A> NDD yes? (Dead)

B> NDD no? (Not Dead)

Dead - Hypercarbia results in endogenous adrenaline release with little parasympathetic regulation
Physiology of brain arrest

- ICP increases: MAP increases to maintain CPP
  - Tachycardia, and hypertension
  - Progressive limitation of cerebral blood flow
- *Medulla* ischemia: vagal/parasympathetic activation
  - Apnea, bradycardia, hypotension
- *Pons* ischemia: sympathetic stimulation superimposed
  - Bradycardia (sometimes tachycardia), and now hypertension
- *Midbrain* ischemia: vagal tone prevented
  - Unopposed sympathetics stimulation
  - Tachycardia, vasoconstriction, organ ischemia
- *Pituitary and hypothalamic* ischemia
  - Thyroid, vasopressin, adrenals dysfunction
18 hours after resuscitated cardiac arrest on hypothermia protocol, all brainstem signs are absent

A> NDD Yes? **(Dead)**

B> NDD No? **(Not Dead)**

**Not Dead**- clinical exam after anoxic brain injury may be unreliable in the acute phase- should wait 24-? Hours. Declarations must be done at normothermia.
A patient with known tumor and obstructive hydrocephalus is awaiting VP shunt. He develops acute bradycardia, hypertension, unresponsive coma, fixed dilated pupils.

A> NDD Yes? (Dead)

B> NDD No? (Not Dead)

Not sure – Potentially reversible etiology.
A teenager on valproate and phenobarbital for epilepsy arrives after unwitnessed cardiac arrest at home. 24 hours later, no brainstem function.

NDD Yes? *(Dead)*

NDD No? *(Not Dead)*

**Not Sure** – Questions of primary etiology, imaging support, confounding factors
American Academy of Neurology addressed questions

1. Are there patients who recover?
   - NO Cases reported of recovery using the 1995 brain death guidelines

2. What is an adequate observation period to ensure that cessation of neuro function is permanent?
   - Varied practice globally
   - Insufficient evidence to determine minimally acceptable observation period

DCD candidate after WLST, cessation of pulsatile activity on arterial waveform, declared by one physician.

A> DCD Yes? (Dead)

B> DCD No? (Not Dead)

**Not Dead** – For the purposes of DCD, declaration only after 5 minute observation period by the first physician. Second physician then confirms
KEEP CALM AND PHONE A FRIEND

© 2012 KeepCalmStudio.com