

Standard Practice

TITLE: **Brain Death Policy and Protocol**

EFFECTIVE: February 16, 2004

REVIEWED: February 9, 2004

PURPOSE: To provide guidelines for declaration of death by brain criteria.

I. GENERAL STATEMENT

It is the policy of George Washington University Hospital to meet the requirements of federal and state law when making a declaration of death. Maryland law defines death, under Section 5-202, as the complete and irreversible cessation of all cardiac and respiratory function **or** the complete and irreversible cessation of functions of the entire brain, including the brain stem.

Death, as diagnosed by brain criteria, within the George Washington University Hospital will be declared by an attending physician licensed to practice medicine in the District of Columbia.

It is the purpose of the following protocol to outline diagnostic criteria for the clinical diagnosis of brain death in adult patients (18 years and older).

II. BACKGROUND

Brain death is most often seen as a result of sudden and irreversible brain injury caused by trauma, subarachnoid hemorrhage, intracerebral hemorrhage, large ischemic strokes or hypoxic encephalopathy. Brain death is confirmed by clinical diagnosis and often by additional confirmatory tests. Caregivers should be aware that the presence of certain conditions could mimic brain death. Therefore, the following conditions must be taken into consideration prior to the declaration of brain death:

- Known cause (or high degree of certainty) of loss of consciousness, usually confirmed by CT or MRI abnormality
- Hypothermia
- Drug intoxication or drug-induced coma: barbiturate levels must be subtherapeutic
- Acute metabolic or endocrine abnormalities

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III. CLINICAL DIAGNOSIS

A. Coma or Unresponsiveness

In the presence of brain death there is no cerebral motor response to pain in all extremities (nail bed pressure and supraorbital pressure). Occasionally spontaneous spinal movement of limbs may be seen and should not be misinterpreted as evidence of brain stem function.

B. Absence of Brain Stem Reflexes

- Absence of pupillary response to bright light
- Absence of ocular movements after head-turning and caloric testing with ice water
- Absence of facial grimacing to painful stimuli
- Absence of corneal reflexes to touch with a swab
- Absence of the gag response to stimulation of the posterior pharynx with a tongue blade
- Absence of the cough response to bronchial suctioning

C. Apnea

Before testing for apnea, the patient must meet the following criteria::

- Core temperature $\geq 36.5^{\circ}$ Centigrade
- Systolic blood pressure ≥ 90 mm Hg
- Normal PCO₂ or elevated PCO₂ with normal pH (7.35 – 7.45) if the patient has chronic, compensated respiratory acidosis.
- Normal PO₂.

Testing:

1. Place patient on 100% FiO₂.
2. Reduce respiratory rate on the ventilator for 15 minutes to mildly increase PCO₂ above baseline to diminish the length of apneic time to achieve an adequate PCO₂ to make a diagnosis.
3. Change ventilator settings to deliver 100% O₂ CPAP of 5 cmH₂O
4. Observe for respirations (abdominal or chest excursions that

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produce adequate tidal volumes)

5. Perform Arterial Blood Gas (ABG) after approximately 8 minutes and reconnect the ventilator
6. If respirations are not observed and the PCO₂, after 8 minutes, is \geq 20mmHg above baseline, the test is positive for apnea and supports the diagnosis of brain death. If respirations are observed, the test is negative and does not support the diagnosis. If no respirations are observed and the PCO₂, after 8 minutes, is $<$ 20 mm Hg above baseline, the test can be repeated for 10 minutes.

If, at any time during the apnea test, the systolic blood pressure becomes $<$ 90mm Hg, the pulse oximeter indicates marked desaturation and cardiac arrhythmias occur, immediately draw an ABG and connect the ventilator.

IV. CONFIRMATORY TESTS

A confirmatory test is not mandatory in most situations. A confirmatory test is needed for patients in whom specific components of clinical testing cannot be reliably evaluated. The following is a list of potential confirmatory tests and some of the pros and cons associated with them:

Four vessel angiography visualizes brain stem circulation and is the test of choice in cases where patient has complicating medical conditions. These include but are not limited to drug intoxication, high cervical fractures or acute metabolic or endocrine derangement.

V. ADDITIONAL CONSIDERATIONS

Consistent with State and Federal law and with the rights of the individual patient, the Hospital will report **ALL DEATHS** to the Washington Regional Transplant Consortium (WRTC), the local Organ Procurement Organization (OPO), for evaluation for potential organ/tissue donation.

WRTC may be reached by telephone at **703-641-0100**. The WRTC Coordinator will function as the routine contact person for the Hospital and will assist in the evaluation of potential organ/tissue donors on a 24-hours per day basis. To facilitate early identification of medically suitable donors, WRTC **must be notified prior to the cessation of mechanical ventilation**. The WRTC Coordinator will make the approach to the next of kin with the option of donation.