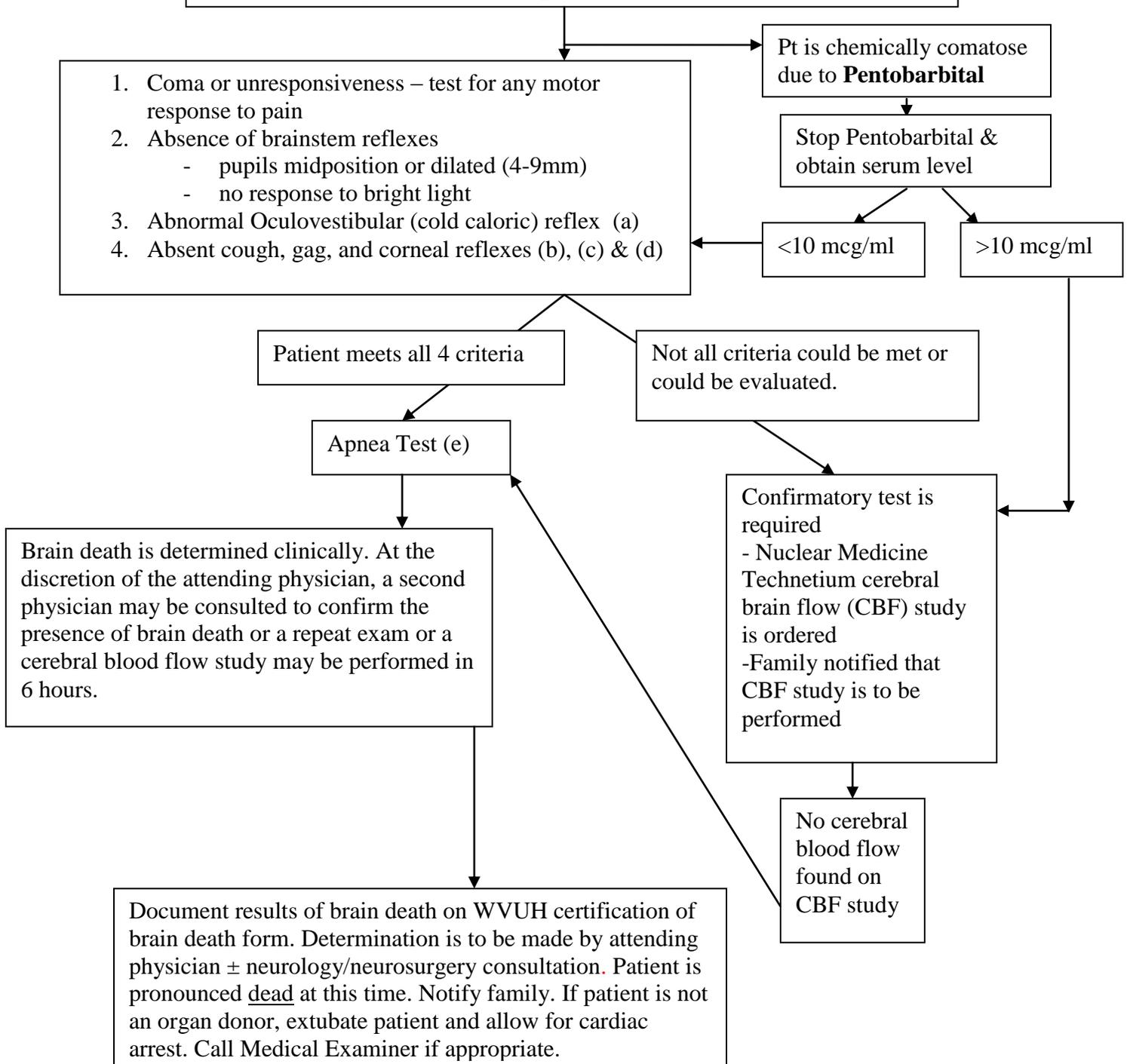


Determining Brain Death in Adults at WVU Hospital*

Definition: Irreversible loss of brain function, including the brainstem.

- Clinical and/or radiological imaging evidence of an acute CNS catastrophe that is compatible with the brain death diagnosis
- Exclude complicating medical conditions; systolic BP \geq 100
- No drug or alcohol intoxication or poisoning
- Core temperature of >36 degrees Celsius



Document results of brain death on WVUH certification of brain death form. Determination is to be made by attending physician ± neurology/neurosurgery consultation. Patient is pronounced dead at this time. Notify family. If patient is not an organ donor, extubate patient and allow for cardiac arrest. Call Medical Examiner if appropriate.

Oculovestibular Reflex (a):

1. Place patient in a 30 degree head-up position. This can be done by raising the head of the bed, or placing the entire bed in a 30 degree reverse-Trendelenberg position.
2. Mix 200 cc tap water in ice. Place a kidney basin below the ear. Have an assistant open both eyelids.
3. Examine both external auditory canals. Clear away cerumen.
4. Using a Toomey syringe, slowly inject 50 cc into the external auditory canal on one side. Observe over 5 minutes for conjugate tonic eye movement towards the side of the stimulus. Repeat 50 cc in the same EAC.
5. After a rest period of 5 minutes, repeat the entire procedure in the other ear canal.
6. If in both cases there is no deviation of the eyes towards the stimulus side, the test is considered abnormal and consistent with brainstem death.

Gag and cough reflexes (b) & (c):

1. Insert an ETT suction catheter all the way into the ETT, suction, move the catheter side to side as it is withdrawn, and observe for cough, head movement, or facial expression change.
2. Wiggle the ETT. Observe for a gag reflex. Insert a Yankauer suction into the oropharynx and wiggle back and forth. Observe for any gag, head movement, or facial expression change.
3. No response to either or both tests is consistent with brainstem death.

Corneal Reflex (d):

1. With a gloved finger, touch the cornea over the iris of the eye. Observe for any eyelid reflex or motion, any eye movement.
2. Repeat on the contralateral eye.
3. If there is no motion or reflex, the test is consistent with brain death.

Apnea Test (e)

1. Pre-oxygenate the patient for 10 minutes with FIO₂=1.0
2. Adjust ventilator so PaCO₂ is 35-45 if possible. Confirm with EtCO₂ or ABG # 1
3. Disconnect the ventilator. Apply 10 L/min O₂ aerosol T-piece to the end of the ETT.
4. Allow a maximum of 10 minutes. Observe for any chest wall motion. Obtain ABG # 2. If there are any spontaneous breaths, stop the test. If SaO₂ drops below 92%, stop the test & reconnect the ventilator.
5. If the PaCO₂ on ABG # 2 is 60mm Hg or > or ≥20 mmHg rise from baseline, reconnect the ventilator.
6. Test is considered positive for “absent hypercarbic respiratory drive.”

*Revised in accordance with Wijdicks EF et al. American Academy of Neurology. Evidence-based guideline update: determining brain death in adults: report of the Quality Standards Subcommittee of the American Academy of Neurology. *Neurology* 2010;74 (23):1911-1918. For patients on ECMO, the apnea test will be modified according to the protocol described in

Smilevitch P et al. Apnea test for brain death determination in a patient on extracorporeal membrane oxygenation. *Neurocrit Care*. 2013 Oct;19(2):215-217