Ancillary confirmatory tests for Brain Death

Used when parts of the clinical exam or apnea test cannot be completed:

- Cerebral angiography
- Radionuclide cerebral perfusion scan (e.g., HMPAO-SPECT)
- Transcranial Doppler ultrasonography
- CT angiography / perfusion
- Electroencephalogram (EEG) showing electrocerebral silence

> ⚠ Some jurisdictions mandate ancillary tests; others use them only as confirmation.

General information

There is insufficient evidence that any ancillary test can accurately determine brain death [1].

Preferred tests: angiography, EEG, or cerebral radionuclide angiograms (CRAG).

Common confirmatory tests in Brain Death

Cerebral angiography

Contrast medium under high pressure in both anterior and posterior circulation injections No intracerebral filling at the level of the carotid or vertebral artery entry to the skull Patent external carotid circulation Possible delayed filling of the superior longitudinal sinus

Electroencephalography

Minimum of eight scalp electrodes Interelectrode dependencies should be between 100 and 10,000 Integrity of the entire recording system should be tested Electrode distances should be at least 10 cm Sensitivity should be increased to at least 2 µV for 30 minutes with inclusion of appropriate calibrations High-frequency filter setting should be at 30 Hz, and low-frequency setting should not be below 1 Hz There should be no electroencephalographic reactivity to intense somatosensory or audiovisual stimuli

Transcranial Doppler ultrasonography

Bilateral insonation. The probe is placed at the temporal bone above the zygomatic arch or the vertebrobasilar arteries through the suboccipital transcranial window• The abnormalities should include a lack of diastolic or reverberating flow, small systolic peaks in early systole, and a lack of flow found by the investigator who previously demonstrated normal velocities

Cerebral scintigraphy (technetium Tc 99m hexametazime)

Injection of isotope within 30 minutes of reconstitution Static image of 500,000 counts at several time intervals: immediately, between 30 and 60 minutes, and at 2 hours.

Information based on: Evidence-based guideline update: Determining brain death in adults: Report of the Quality Standards Subcommittee of the American Academy of Neurology Eelco F.M. Wijdicks,

Panayiotis N. Varelas, Gary S. Gronseth and David M. Greer 181e242a8 Neurology 2010;74;1911-1918.

1)

Wijdicks EF, Varelas PN, Gronseth GS, et al. Evidence-based guideline update: determining brain death in adults: report of the Quality Standards Subcommittee of the American Academy of Neurology. Neurology. 2010; 74:1911–1918