

CRITICAL CARE PROTOCOL

Brain Death Determination

Determination of death by neurologic criteria (BD/DNC). A diagnosis with profound consequences — work the sequence in order: confirm prerequisites and clear all confounders **before** the exam, perform the clinical exam and apnea test, and use ancillary testing only when the exam or apnea test cannot be completed. Follow your institutional and jurisdictional policy at every step.

PATIENT -----	MRN -----	ETIOLOGY OF INJURY -----	DATE / TIME ONSET -----
EXAM 1 — EXAMINER / TIME -----	EXAM 2 — EXAMINER / TIME -----	ANCILLARY TEST (IF ANY) -----	DECLARED TIME OF DEATH -----

01 Administrative & legal

ADMISSION / LEVEL OF CARE

- ☐ Level of care: **ICU**; attending of record — Critical Care / Neurocritical Care
- ☐ Diagnosis — primary: **severe anoxic / traumatic brain injury** (specify); secondary: evaluation for brain death
- ☐ Code status — Full Code / per family discussion until determination complete (institution-specific)

CONSULTS

- ☐ **Neurology / Neurocritical Care** — “Brain death evaluation”; Neurosurgery if primary team
- ☐ Ethics / Palliative care — support and goals-of-care discussion

OPO **Organ Procurement Organization** — notify per local law and hospital policy, usually after clinical determination, or earlier when there is catastrophic injury with likely progression.
The care team does not raise donation with the family — that is the OPO's role.

02 Prerequisite conditions for the exam

GATE Every prerequisite must be met and every confounder excluded **before** the clinical exam — an uncorrected confounder invalidates the determination.

- ☐ Etiology of an irreversible, catastrophic brain injury established and documented (CT / MRI, clinical events)

PHYSIOLOGIC PREREQUISITES

- ☐ Core temperature $\geq 36^{\circ}\text{C}$ (96.8°F)
- ☐ SBP ≥ 100 mmHg (or MAP ≥ 60 – 65 mmHg), with or without vasopressors
- ☐ No severe metabolic derangement able to confound — Na, glucose, pH, PaCO₂, PaO₂, severe hepatic / uremic encephalopathy

DRUG CLEARANCE

- ☐ Review MAR for sedatives, opioids, paralytics; serum drug levels if applicable (phenytoin, barbiturate, valproate, etc.)
- ☐ Allow ≥ 5 **half-lives** for sedatives / opioids; adjust for hypothermia and organ dysfunction

PARALYSIS EXCLUSION

- ☐ **Train-of-four** peripheral nerve stimulator check (if recent neuromuscular blockade) — confirm full neuromuscular recovery before the exam

SUPPORTING LABS

- | | |
|---|---|
| ☐ Basic metabolic panel; arterial blood gas | ☐ LFTs, ammonia (if hepatic failure) |
| ☐ CBC, coagulation profile (if needed for ancillary testing) | ☐ Toxicology screen (urine $\pm$ serum) if indicated |

03 Neurologic examination

EXAMINER Performed by attending physician(s) credentialed per hospital policy; record time of exam and examiner(s). Three findings together define the syndrome — **coma, absent brainstem reflexes, and apnea.**

NURSING PREPARATION

- ☐ Stop sedative / analgesic infusions as clinically safe; confirm no neuromuscular blocker infusing; ensure adequate SBP and oxygenation; head of bed ~30°

A · COMA

- ☐ No response to verbal commands; no response to noxious stimulation (central and peripheral)

B · ABSENT BRAINSTEM REFLEXES

- | | |
|---|---|
| ☐ Pupillary light — absent; pupils fixed, midposition or dilated | ☐ Corneal — absent bilaterally |
| ☐ Oculocephalic (doll's eyes) — absent (only if no cervical spine injury) | ☐ Oculovestibular (cold caloric) — absent to ice-water irrigation |
| ☐ Facial movement to noxious stimulation — absent | ☐ Gag — absent; cough — absent to tracheal suctioning |

C · MOTOR RESPONSE

- ☐ No purposeful or brain-mediated motor response to noxious stimuli; spinal reflex movements, if present, documented explicitly **as spinal reflexes**

REPEAT Second examination by an independent attending at least ___ hours after the first (per institutional / state requirement).

04 Apnea test

PRE-TEST

- ☐ Confirm prerequisites — $T \geq 36^{\circ}\text{C}$, $\text{SBP} \geq 100$ ($\text{MAP} \geq 60\text{--}65$), euvolemic / adequate intravascular volume

- ☐ Baseline ABG to confirm PaCO₂ and PaO₂; **pre-oxygenate FiO₂ 1.0 for 10–15 min**, target PaO₂ > 200 mmHg

PROCEDURE

- ☐ Disconnect ventilator; deliver O₂ via T-piece 100% O₂, CPAP system, or tracheal catheter at **6 L/min** 100% O₂ (per local protocol)
- ☐ Observe chest / abdomen for respiratory effort throughout; continuous pulse oximetry, cardiac and BP monitoring

ABORT & DOCUMENT IF

SBP < 90–100 mmHg or MAP < 60 despite support · SpO₂ < 85% for > 30 s · hemodynamic instability (arrhythmia, severe tachy / bradycardia)

POSITIVE TEST (SUPPORTS BD)

Post-test ABG at 8–10 min (or per protocol):
PaCO₂ ≥ 60 mmHg AND increase ≥ 20 mmHg from baseline, with no respiratory effort

IF INCOMPLETE If the apnea test cannot be completed or is unsafe (severe hypoxemia, hemodynamic instability), reconnect the ventilator, document the reason, and proceed to ancillary testing per policy.

05 Ancillary testing (only if required)

ADJUNCT Ancillary tests do **not** replace the clinical exam — use only when the exam or apnea test cannot be completed, a confounder cannot be corrected, or jurisdiction requires it.

INDICATIONS

- ☐ Inability to complete an adequate neurologic exam or apnea test; uncorrectable confounder (severe facial trauma, high cervical cord injury, uncertain drug effect); or jurisdictional requirement

APPROVED MODALITIES — institution selects

- ☐ CT angiography of head (if validated in your jurisdiction)
- ☐ Radionuclide cerebral perfusion scan
- ☐ Conventional (4-vessel) cerebral angiography
- ☐ EEG (electrocerebral silence) or transcranial Doppler — if accepted and protocolized locally

ORDER “Ancillary test for brain death determination: [test name] — assess for absence of cerebral blood flow / electrocerebral silence per protocol.”

06 Supportive care during evaluation

HEMODYNAMICS

- ☐ 0.9% NaCl or balanced crystalloid titrated for **MAP** $\geq$ 60–65 mmHg
- ☐ **Norepinephrine** infusion titrated to MAP goal; **vasopressin 0.01–0.04 units/min** (common in brain death); dopamine / epinephrine per institutional practice

ENDOCRINE — often for donor management

- ☐ Serum glucose **q1–2 h**; insulin infusion protocol for hyperglycemia
- ☐ **Vasopressin** for diabetes-insipidus–like polyuria / hyponatremia; stress-dose hydrocortisone if refractory shock; thyroid hormone only if part of institutional donor protocol

VENTILATION & TEMPERATURE

- ☐ Until apnea test — maintain adequate oxygenation and normal-range PaCO₂; continuous pulse oximetry; ventilator checks per unit protocol
- ☐ Maintain $\geq$ 36 °C — warming blanket, warmed IV fluids; **avoid therapeutic hypothermia** during evaluation

07 Communication & documentation

TASKS

- ☐ Family meeting — discuss prognosis and the possibility of brain death; document the discussion
- ☐ Notify OPO per policy if catastrophic injury and/or after determination; social work / chaplaincy for family support

REQUIRED DOCUMENTATION

- | | |
|---|--|
| ☐ Date / time of each exam; examiner name, role, credentialing | ☐ Prerequisites met and confounders excluded |
| ☐ Full neurologic exam findings | ☐ Apnea test — pre/post ABGs, duration, hemodynamics, presence / absence of |

☐ Ancillary test used and official interpretation (if any)

respiratory effort

☐ **Time of death** — when the determination is completed and documented (per local law / policy)

08

After determination of brain death

☐ Change diagnosis to **brain death**; code status — **dead**

IF PURSUING DONATION

☐ Continue hemodynamic and ventilatory support per OPO donor-management protocol

IF NOT PURSUING DONATION

☐ Terminate life-sustaining therapies per institutional process and family communication

EDUCATIONAL USE ONLY

Not a substitute for clinical judgement or law. Brain death determination is governed by jurisdiction- and institution-specific policy, including the number of examiners, observation intervals, and accepted ancillary tests. Follow your local protocol and credentialing requirements at every step.

Spreading knowledge
Improving outcomes