Understanding the Mystery of Brain Death

Natalie A. Felter
Otterbein University, natalie.felter@otterbein.edu

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Pathophysiological Process

Brain death is defined as "irreversible loss of all brain function, or "whole brain" death (Copnell, 2014, p.291). Brain death can be caused by various factors, such as trauma, ischemia, meningitis, anoxic injury, or intracranial hemorrhage (Arbour, 2013). The diagnosis of brain death is determined by absence of brain reflexes, presence of apnea, and coma (Lugt, 2010). The diagnosis of brain death is considered to be equal to death (Thomas, 2012).

Signs and Symptoms of Brain Stem Death

Signs of brain death include no chest and abdominal movement for 8 to 10 minutes, and PaCO2 levels increasing 20mmHg or greater, or reaching 60mmHg. The diagnosis of brain death is determined by absence of brain reflexes, presence of apnea, and coma (Lugt, 2010). The diagnosis of brain death is considered to be equal to death (Thomas, 2012).

In response to the pressure or ischemia on the brain, the brain activates the Cushing response to attempt to maintain adequate blood flow to the brain (Arbour, 2013). Clinical manifestations of the Cushing response are hypertension, bradycardia, and a widening pulse pressure (Arbour, 2013; McCance & Huether, 2014). As CTP rises and the brain becomes more hypoxic, the Cushing response eventually fails to maintain adequate blood flow to the brain (Arbour, 2013). With decreased blood flow to the brain, the brain begins to show signs of brain death (Lugt, 2010). The presence of apnea is one of the most confirmatory signs of brain death. The brain’s ability to cause breathing is tested by performing a CO2 challenge (Shutter, 2014). Specific criteria must be met prior to initiating apnea testing. If criteria is met close monitoring is required to minimize risk during apnea testing (Arbour, 2013). Strict guidelines are set and must be followed in order to safely and adequately perform apnea testing (Shutter, 2014). Oxygen desaturation, unblended breaths, or unstable cardiac rhythms are indications for stopping apnea testing (Arbour, 2013). Findings consistent with brain death include no chest and abdominal movement for 8 to 10 minutes, and PaCO2 levels increasing 20mmHg or greater, or reaching 60mmHg (Shutter, 2014).

References


Additional Sources


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Pathophysiological Process

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