"Brain Dead" Donor: A Case of Brain Death Mimic Due to Pentobarbital Overdose

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**Recommended Citation**

Minalyan, Artem; Chan, Vincent; and Zhang, Qian, ""Brain Dead" Donor: A Case of Brain Death Mimic Due to Pentobarbital Overdose" (2020). *Abington Jefferson Health Papers*. Paper 49.  
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SESSION TITLE: Medical Student/Resident Critical Care Posters

SESSION TYPE: Med Student/Res Case Rep Postr

PRESENTED ON: October 18-21, 2020

INTRODUCTION: Brain death is the irreversible loss of function of the brain, including the brainstem. Clinical criteria as well as neurological exam findings are used to define it. In order to be declared brain dead, a comprehensive workup to rule out brain death mimics should be conducted in suspected cases.

CASE PRESENTATION: A 29-year-old female veterinary assistant with PMH most significant for IVDU, anxiety, and depression, on chronic opioids, was brought to the ED by EMS after she was found unconscious at home by her friend. En route to hospital, she was intubated. Reportedly, she had a palpable carotid pulse as well as a normal serum glucose level prior to arrival to the ED. In the ED, she was found to be hypotensive (65/42mmHg) and hypothermic (95F). Physical exam revealed fixed dilated pupils, absent corneal and gag reflexes, no withdrawal to noxious stimuli. IV fluids followed by vasopressors (norepinephrine) were initiated. CT of the head was unremarkable. A urine drug screen was positive for barbiturates and oxycodone. She was admitted to the ICU. On day 2, the patient became hyperthermic (102.9F), requiring 3 vasopressors for hemodynamic control. Broad-spectrum antibiotics were started. Neurologic evaluation revealed absent oculocephalic, cold caloric, and spontaneous respiratory reflexes. Phenobarbital level came back as 1.2MG/L (below therapeutic level). Gift of Life donor program was consulted given the patient’s wishes to be a potential donor (a record in the driver’s license). An extensive drug screen panel was ordered. Pentobarbital level came back as high as 94.9MG/L (cut-off value <0.15MG/L). On day 4, noted to have a bilateral sluggish pupillary reflex. On day 5, weaned off all vasopressors, slightly positive gag reflex. On day 6, she opened her eyes and was able to follow some commands. Extubated on day 7. On day 11, the patient was transferred to an inpatient psychiatric rehabilitation center.

DISCUSSION: Barbiturate overdose manifestations are known to mimic brain death. Barbiturates exert inhibitory effects on different organ systems leading to cardiovascular collapse, respiratory depression, sedation, coma, and even death. Pentobarbital is rarely used in human beings. It is commonly encountered in veterinary medicine for anesthesia and euthanasia. Treatment should be aimed at airway protection, hemodynamic support, prevention of infectious complications. Importantly, cardiac manifestations of the overdose resolve first followed by improvement in respiratory drive. Manifestations caused by central nervous system depression are the slowest to improve.

CONCLUSIONS: Brain death mimics (including barbiturate overdose) should be ruled out in patients with suspected brain death. Specifically, pentobarbital overdose should be considered in veterinary workers presenting to hospital with signs and symptoms of cardiovascular and respiratory collapse with central nervous system depression.