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1. I am Paul A. Byrne, M.D., Board certified in Pediatrics and Neonatal-Perinatal Medicine.
2. I have served in many academic positions including Clinical Professor of Pediatrics at St. Louis University, Creighton University and University of Toledo and Professor and Chairman of Pediatrics at Oral Roberts University. I was Chairman of the Ethics Committee of The City of Faith Medical and Research Center in Tulsa, Oklahoma. I am the founder of the Neonatal Intensive Care Unit at SSM Cardinal Glennon Children's Medical Center in St. Louis, Missouri and served there as Director of Neonatology 1963-1981. Most recently, I was Chairman of Pediatrics and Director of Neonatology, St. Charles Mercy Hospital, 1991-2012, Oregon, OH. Attached is a copy of my Curriculum Vitae.
3. I am licensed to practice medicine in Ohio, Nebraska, and Missouri.
4. I have published numerous articles on "brain death" and related topics in the medical and law literature and the lay press for more than thirty years. Attached is a copy of an article "Brain Death-The Patient, The Physician, and Society." ⁱ
5. I have been qualified as an expert in matters related to central nervous system dysfunction in the United States District Court for the Eastern District of Virginia and Courts of Michigan, Ohio, New Jersey, New York, Montana, Nebraska, Missouri, Virginia and South Carolina.
6. Beverly Finnegan is currently a patient in the Intensive Care Unit at Framingham Hospital, which is part of Metro West Medical Center.
7. The admission note on 11/30/2017 includes Hyperthyroidism as PMH.
8. Review of note in record of Beverly Finnegan on 12/19/2017 includes that Beverly Finnegan is "a 69-year-old female who was admitted with PEA s/p cardiac arrest and CPR, severe malnutrition, in the setting of anorexia and multiple psychiatric issues.

Patient is intubated, no sedatives used since 12/1 afternoon.

Cooling protocol was never performed. Initially patient was hypothermic around 90°F, then DIC which is a contraindication for cooling protocol.

Neurology consult: "anoxic encephalopathy with vegetative state. She remains comatose without cortical function and the only brainstem function is an occasional spontaneous respiration. There will be no meaningful recovery in a patient who had a cardiac arrest and has been comatose since 11/30/2017, who has almost no brainstem function."

Patient is not responsive and has been off sedatives for several days, neurology evaluated the patient. EEG shows no seizure activity. Neurology indicated that there is basically no cortical activity.

Respiratory effort minimally present but rest of neurologic reflexes absent. CT shows no herniation but cerebral edema, likely in the setting of anoxic brain injury. No intervention given that no outcome will be obtained.

Temperature between 95 to 96 overnight is improving likely due to autonomic this regulation per brain injury, will consider placing her on Bair Hugger if persists.

Pulmonary-

Currently intubated.

Per respiratory patient over breathing ventilator is happening less frequently and while she has sporadic cough and agonal breathing she pulls very limited amount of volume.

VBG today with normal pH, minimal increase in CO₂.

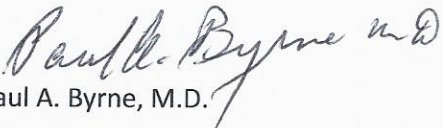
"12/19 Hypothyroidism being treated with levothyroxine. TSH 6.3 T4 0.67 a possible cause for this is secondary or tertiary hypothyroidism due to hypothalamic or pituitary dysfunction. T3 also decreased most likely patient has secondary or tertiary hypothyroidism do to – ACTH is pending. Cortisol initially 121 today 16."

My comments, conclusions and recommendations:

9. There is history of hypothyroidism and respiratory arrest. On admission Beverly was cachectic with bedsores.
10. Beverly has swelling of her brain. Often with increased intracranial pressure, there is decreased production of Thyroid Releasing Hormone (TRH). The effect of this is commonly measured in the level of Thyroid Stimulating Hormone (TSH), which in turn causes thyroid hormone (T3 and T4) to be produced.
11. Levothyroxine has been started but Beverly needs the dosage increased and given every 6 hours.
12. When a patient has swelling of the brain and insufficient TSH to stimulate the thyroid to produce sufficient T3 and T4, the patient has hypothyroidism. Hypothyroidism is manifest with swelling throughout the body called myxedema. Myxedema of the brain compounds the swelling that is presumed to be there because of insufficient oxygen.
13. It is not clear how much thyroid Beverly was getting before admission. But it is clear that Beverly is hypothyroid on 12/19. This is considered to be secondary or tertiary hypothyroidism.
14. Beverly has a functioning brain. Beverly Finnegan does not fulfill any set of "brain death" criteria.

15. For example, small amounts of thyroid releasing hormone (TRH) and thyroid stimulating hormone (TSH) may still be produced by the brain but not in sufficient amounts for the thyroid gland to produce adequate thyroid hormones that the brain and entire body needs to function.
16. Thyroid hormone is necessary for normal cardiac function.
17. Exclusion of a treatable endocrine disturbance, hypothyroidism, and malnutrition is a prerequisite before neurological function or dysfunction can be assessed adequately.
18. Evaluating functioning and dysfunction of the nervous system includes exclusion of a treatable endocrine disturbance.
19. Clinically, it is expected that Beverly Finnegan would have hypothyroidism following her acute episode on 11/30/217.
20. The diagnosis of central hypothyroidism and adequate replacement of thyroid hormone were exceedingly delayed, possibly impacting the therapeutic window for neurological recovery.
21. There was a deficiency in making the diagnosis and a major lag between diagnosis and proper treatment, which still has not occurred.
22. Complete evaluation of hypothalamic hormonal function, including Thyroid Releasing Hormone (TRH), Adrenocorticotrophic Hormone (ACTH) and Growth Hormone (GH) synthesis, is required. The replacement of these may enhance chances of recovery.
23. The doctors and hospital put Beverly Finnegan on levothyroxine 100 mcg once a day. This is not enough. T4 is 0.67 (ref range 4-12). T3 is also low. She needs 100 mcg every 6 hours for 3 days then repeat levels of T3 and T4 are necessary at this time and ongoing to properly assess endocrine and thyroid function.
24. There may be increased urinary loss of proteins as a consequence of increased glomerular permeability associated with hypothyroidism (hypothyroidism increases capillary permeability to proteins). Therefore, Beverly may be losing thyroid binding globulin (TBG - the protein carrier of thyroid hormones).
25. Beverly Finnegan is a living person. Beverly's heart is beating about 100,000 times a day without stimulation from an electronic pacemaker or medication, blood pressure, respiration, i.e., exchange gases between lungs and blood, the blood and the tissues albeit with the use of a ventilator to push air into Beverly, but with the living Beverly causing the exhalation of carbon dioxide. Beverly is maintaining her temperature at 95-96 indicative of someone who is alive.
26. Beverly is anemic. Her hemoglobin is 7.8 and hematocrit is 26.4. Beverly needs a blood transfusion.
27. Beverly has been on ventilator for about 3 weeks. Tracheostomy is indicated. Ventilator can then be continued until her malnutrition and hypothyroidism are adequately treated.
28. Beverly is very likely deficient in Vit D. This needs to be tested and treated.

29. With adequate thyroid hormone, vitamins including Vitamin D, riboflavin, Vitamin B 6, Folic acid, Vitamin B 12, arginine, taurine, omega 3 fatty acids, melatonin, and sufficient protein, being provided as treatment, there is a reasonable likelihood of improvement in Beverly Finnegan's condition. None of these measures have been initiated to my knowledge.
30. Beverly is malnourished, hypothyroid and on a ventilator. Tracheostomy, feeding tube (PEG tube), thyroid medication and adequate nutrition can help Beverly. To remove the ET tube from Betty with or without the ventilator will do harm and might impose death on Beverly Finnegan. There is little risk of harm to Beverly to attempt such treatment measures, and the prospect of recovery outweighs the limited costs of treatment.
31. A severely sick and damaged brain leads to a sick thyroid gland that worsens brain sickness. At this time Beverly Finnegan is in "global ischemic penumbra" and declared to be in a "vegetative state." Beverly Finnegan needs treatment, not harm and death imposed on her. With treatment there is every reasonable likelihood of improvement.


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ⁱ Byrne, P, O'Reilly, S, Quay, P, and Salsich, P, Brain Death—the Patient, Physician and Society. *Gonzaga Law Review*, Vol 18 1982/83, 429-516