Predictors of recovery of responsiveness in prolonged anoxic vegetative state

G. Bryan Young, Anna Estraneo, Adrian M. Owen, et al.

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WriteClick: Editor's Choice

Editors' Note: The 1994 guidelines for the diagnosis of the vegetative state (VS) should be revised, Young and Owen suggest. Estraneo et al. agree, pointing to the development of new, advanced tools that improve recognition of discernible intentional responses in patients with prolonged anoxic VS. Some corrections and interesting additions to the historical article on cerebral PET scanning are made by Singhal. Okun et al. agree and explain the challenge of word count limit.

Chafic Karam, MD, and Robert C. Griggs, MD

PREDICTORS OF RECOVERY OF RESPONSIVENESS IN PROLONGED ANOXIC VEGETATIVE STATE

G. Bryan Young, Adrian M. Owen, London, Canada: Estraneo et al.[1] prospectively studied 43 patients post cardiac arrest who had been clinically vegetative for over a month. Nine (21%) of the patients regained behavioral responses—although still disabled in motor function—when the period of observation was extended to 23–26 months.

With the use of advanced technology—fMRI, event-related potentials, and quantitative EEG measures of responsiveness[2–4]—the yield of responsive patients may have been higher. The additional yield of such responses is approximately 17% in patients deemed vegetative for much longer.[3] It is possible that another 6 patients of the 34 behaviorally unresponsive patients in this study[1] might have shown responses on further testing.

Although patients may have severe motor disabilities, it is important to be able to communicate with patients to determine their needs and wishes and for families to know that their injured loved ones are aware. Thus, precision in diagnosis and prognosis is vital.

The 1994 guidelines[5] for the diagnosis of VS should be revised. Patients require much longer follow-ups and, we argue, the use of state-of-the-art brain imaging techniques before a firm diagnosis of VS is made.

Author Response: Anna Estraneo, Pasquale Moretta, Telese Terme; Luigi Trojano, Caserta, Italy: Detecting signs of covert cognition in VS is difficult for clinicians. Technologically advanced tools have been developed to improve recognition of discernible, intentional (nonreflexive) responses in such patients.[6] We agree that the use of more sensitive methods could help identify a higher number of responsive patients and to redefine classical diagnostic criteria. This seems to be particularly relevant since it is appears that clinical evolution of VS is changing, and that, for instance, "late recovery" of responsiveness and consciousness can no longer be regarded as exceptional.[7] However, such technological advances present several limitations: only a selected sample of patients' clinical features can be assessed; study paradigms and methods of analysis are complex; and acquisition and management costs are high.[8,9] These restrictions prohibit large-scale studies aimed to assess diagnostic sensitivity and specificity of modern technologies. Widely available diagnostic tools should be studied to assess their possible prognostic value and to provide reliable information for clinical decision-making and treatment management.[1]

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THE HISTORY OF CEREBRAL PET SCANNING: FROM PHYSIOLOGY TO CUTTING-EDGE TECHNOLOGY

Tarun Singhal, Boston: The title of the article by Portnow et al.[1] is not suitable because there is uneven coverage of the development of PET imaging devices and inadequate coverage of radiopharmaceuticals or their translational applications. There are some key conceptual and factual errors as well.

Contrary to the authors' contention, half-life of Carbon-14 is approximately 5,730 years, while half-life of Fluorine-18 is only 110 minutes: the latter's half- life is shorter—not longer—than the former's. Moreover, there was a need for an alternative agent for glucose imaging because Carbon-14 decays by beta particle formation and beta particles cannot penetrate the human body for image formation. Gamma rays formed after the positron decay of fluorine-18 and other positron emitters can penetrate the human body to enable emission imaging in living humans. Additionally, authors show an image of a "^{18}F-spiperone" scan but do not mention the pioneering studies by Wagner et al.[2,3] on neuroreceptor imaging in the brain with 3-N-[^{11}C] methylspiperone. Dr. Wagner is considered a forefather of nuclear medicine.[4]

Finally, PET can also be used for cerebellar and brainstem imaging—in addition to cerebral imaging—which is of relevance for several brain disorders.

Author Response: Michael Okun, Leah Portnow, David Vaillancourt, Gainesville, FL: We appreciate the comments by Dr. Singhal. Dr. Singhal is correct that we should have used the word "shorter half-life" instead of "longer half-life" when describing the half-life of FDG compared with 14CDG. We are grateful that this error was noticed. We also agree that other elements of PET imaging including radiopharmaceuticals and the translational applications should have been included. In prior drafts, we had a more developed version consistent with these suggestions, but with the word count limits we were constrained to focus on key areas that were of particular interest to our research.

Editors' Note: A correction regarding the half-life of FDG appears on page 1275.

1. Portnow LH, Vaillancourt DE, Okun MS. The history of cerebral PET scanning: from physiology to cutting-edge technology. Neurology 2013;80:952–956.
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CORRECTION

The history of cerebral PET scanning: From physiology to cutting-edge technology

In the Historical Neurology article "The history of cerebral PET scanning: From physiology to cutting-edge technology" by L.H. Portnow et al. (*Neurology*® 2013;80:952–956), there is an error on page 954. When describing the half-life of FDG compared with [^{14}C]DG, the authors should have used "shorter half-life" instead of "longer half-life." The authors regret the error.

Author disclosures are available upon request (journal@neurology.org).