2007

Wada Test Reliability (Response to Haber et al.)

T. Loddenkemper

H. H. Morris

Tara T. Lineweaver
Butler University, tlinewea@butler.edu

C. Kellinghaus

Wada Test Reliability (Response to Haber et al.)

Tobias Loddenkemper MD, Harold H. Morris MD, Tara T. Lineweaver PhD, Christoph Kellinghaus MD

To the Editors:

We thank Dr. Haber and colleagues for their kind letter, and we are grateful for their comments. We also thank the editors for an opportunity to respond.

We agree with Dr. Haber that our results alone cannot support a strong conclusion about the statistical reliability of the Wada test. Our study was not specifically designed to test IAT reliability. Because of the retrospective study design, the two tests that were being compared on each patient differed in a number of respects (Loddenkemper et al., 2007b). In fact, as Haber and colleagues point out, failure of the first test was the most frequent trigger for the second test in our study. Even prospective studies may encounter similar difficulties due to ethical and procedural difficulties in the future.

Our conclusions in the last paragraph of our paper were drawn not only from our own results, but also from a review of the literature. This review included the experience from the South Florida Comprehensive Epilepsy Center including the authors of the letter to which we are responding (Benbadis and Heriaud, 2005). Interestingly, their abstract demonstrated the largest percentage change in repeated IAT memory test results without "confounding factors" reported to date (89%). Benbadis and Heriaud found "reversed memory test scores without obvious cause" in 9 cases. "Of 9 'reversed' Wadas, 8 repeat tests were no longer 'reversed,'" and this was interpreted as "significant test-retest variability for memory results." We believe that their findings (which take into account confounding factors), together with our own (which show that most repeat IAT tests involve confounding factors), call into question the reliability of the memory part of the IAT.

Haber et al. mention invalidity of the IAT as possibly limiting our ability to draw conclusions about its reliability. We would argue that invalidity of the IAT actually limits its reliability. Problems with the validity of the memory IAT have been discussed in detail in our manuscript. No gold standard for memory assessment–besides resection and subsequent amnesia–exists. Neuropsychological testing, fMRI, and IAT may all assess different aspects of memory and may therefore be hard to compare. "Validity" of the test may therefore be influenced by the observer. How to judge a trial as valid is unclear, particularly since, as Haber et al. state, "memory testing requires the sustained attention and participation of the patient…, and reactions to the various medications used in the Wada test can vary unpredictably." With so much variability, it is difficult to determine whether a trial is valid. As a result, we would argue that clinicians should seriously question whether the result of an IAT memory test would be the same or different if repeated later.

We agree with Haber et al. that Brevital may be an alternative to amobarbital. However, Brevital injections bear the increased risk of more frequent seizures (Loddenkemper et al., 2007a). Additionally, retesting with Brevital during a single catheterization will also require more time and more frequent injections. This prolonged interval and additional manipulations with an indwelling intraarterial catheter in place may also cause additional complications (Loddenkemper et al., 2002).

We appreciate Dr. Haber's comments about our paper and the opportunity to respond to them. Issues surrounding the IAT are important not only to us as clinicians, but also to our patients. We encourage further discussion of this test and future research addressing these questions.

References

Benbadis SR, Heriaud L. (2005) Repeating the Wada test: how often, why and with what results? *Epilepsia* 46(Suppl 8):83.

Loddenkemper T, Morris HH III, Perl J. *(*2002*)* Carotid artery dissection after the intracarotid amobarbital test. *Neurology* 59*:*1797–1798.

Loddenkemper T, Moddel G, Schuele SU, Wyllie E, Morris HH III. (2007a) Seizures during intracarotid methohexital and amobarbital testing. *Epilepsy Behav* 10:49–54.

Loddenkemper T, Morris HH, Lineweaver TT, Kellinghaus C. (2007b) Repeated intracarotid amobarbital tests. *Epilepsia* 48:553–558.