Clinical significance of a “wrong-way” Wada

Kirsch et al. examine the clinical value of Wada memory asymmetry to predict postoperative seizure freedom and postoperative verbal memory. Wada memory asymmetry in the unexpected direction may signal increased risk of poor surgical outcome after nondominant temporal lobectomy. It is not a predictor of persistent postoperative verbal memory decline.

The Wada test for language and memory lateralization

Commentary by Kimford J. Meador, MD, and David W. Loring, PhD

For over 50 years, the Wada test has been a component of the preoperative evaluation for epilepsy surgery. Juhn Wada introduced the intracarotid amobarbital procedure to lateralize language in 1949, and soon thereafter, Brenda Milner included memory testing during the procedure to help determine risk for postoperative amnesia. Prior studies have demonstrated that memory performance, as assessed by the Wada procedure, is related to seizure onset laterality, and predictive of postoperative memory change and seizure outcomes.1,2

Kirsch et al. report that their Wada procedure fails to predict memory outcome, and question its clinical utility. If a Wada memory score is poor opposite the proposed side of surgery (“wrong way” Wada) this is considered an unanticipated asymmetry, as it would be predicted that the temporal lobe that harbors the seizure focus would have poor memory. In some centers, surgery may not be offered, as the patient may be functionally amnestic after surgery if memory is poor in the remaining temporal lobe. The Wada test, however, is not a uniform procedure and no standard Wada test exits. The protocol of Kirsch et al. includes written words and sentences as memory stimuli. Encoding verbal stimuli, however, will be affected by the aphasia induced by anesthesia of the language dominant hemisphere, which is independent from the amobarbital-induced dysfunction of the mesial temporal lobe that affects memory more generally. For this reason, many Wada protocols do not rely on word memory, so as to avoid this confound. Consequently, it is not surprising that these authors report that their Wada procedure predicted seizure outcome for right temporal lobectomy patients, but not left. For lobectomies on the right, an unanticipated asymmetry (worse memory on the left) was associated with a worse memory outcome; in left lobectomy patients, asymmetry (worse memory on the right) was not associated with a worse memory outcome. In a Wada procedure relying on word memory items, the expectation might be for greater word memory difficulties when testing the left hemisphere; the difficulty is distinguishing between mesial temporal lobe memory dysfunction and deficits that might be due to the effects of aphasia on verbal memory items. Thus, the findings of Kirsch et al. cannot be generalized to all other Wada procedures.

It may soon be possible to replace the Wada test for many patients. This is an issue that has been previously recognized and discussed in Neurology.3 Language lateralization can be determined using fMRI or MEG, although localizing critical language areas requires additional research. More problematic has been lateralization of memory function. Two studies have reported a relationship of fMRI memory activation to memory outcomes following temporal lobectomy,4,5 but these two studies involved only 35 patients, and application of fMRI on an individual basis has been less consistent. Additional studies are necessary to establish the ability of various noninvasive techniques and protocols to predict individual postoperative outcomes. Each center should assess the clinical utility and risk/benefit ratio of their Wada procedure and alternative functional assessments.

References


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