WADA TEST PROTOCOL

Introduction

Wada (intracarotid amobarbital) tests are performed at MGH to determine hemispheric language dominance and to determine whether a single hemisphere is capable of supporting memory. While commonly ordered as part of a presurgical epilepsy investigation, Wada testing is occasionally obtained as a pre-operative planning tool in patients being evaluated for tumor or vascular anomaly resection. Wada testing is a complex activity that requires multiple individuals from different departments to work together as an integrated team. This protocol is designed to review the practical issues encountered in performing these tests.

Participants and Scheduling

Wada tests are conducted in the angiography suite in neuroradiology. The angiogram aspects of the test are performed by Neuroradiology. In most cases patients undergoing Wada testing must be monitored by EEG. Kara Houghton coordinates this. The actual language and memory testing is performed by Neuropsychology (Catherine Leveroni and/or Lauren Moo). An epilepsy/EEG neurologist must be present to oversee the test. This is the responsibility of the Monitoring Fellow under the supervision of the monitoring attending or Dr. Moo. Scheduling for Epilepsy Wada tests is done through the Epilepsy Service Office (Laura McComb). Scheduling for non-epilepsy Wada tests should be done by the requesting surgeon's office. The Epilepsy staff is glad to help but will not take primary responsibility. Epilepsy staff is unavailable for tests on Friday mornings. Therefore, Wada tests should be scheduled some other time during the week. A minimum of 2 hours in the angiography suite is required.

Patient Instructions

Patients should be NPO after midnight prior to the test. If they have eaten, the test will be cancelled. Medications are permitted and we encourage Epilepsy patients to take their anti-epilepsy medications as per their usual schedule. Patients should plan to stay at MGH for a minimum of 6 hours after the test is completed. They will be assigned a sleep-off bed and discharged by the Neuroradiologist after the puncture is checked and stable. Patients must have a friend or family member drive them home.

Testing Procedure

Patients will be prepared in the EEG lab for recording. They will then be brought to the neuroradiology holding area on Gray 2. Once the patient is set up in the angiography suite, the Wada team (EEG technician, epilepsy neurologist, and neuropsychologist) will be paged by neuroradiology to report for the test. Except in extenuating circumstances, all tests are done bilaterally. The prospective surgical side should be studied first. After diagnostic angiography, a hand held 3cc injection of contrast should be performed to document any crossover of dye. Machine injection is not appropriate for this purpose due to the higher injection pressure, which may overestimate crossover. Prior to drug administration the EEG should be started and optimized. EEG should run throughout the procedure.
Sodium amytal or methohexital (Brevital) may be used for testing. While amytal has been the standard, methohexital has certain advantages including a shorter half-life and less lipophyllicity. Both Amytal and Brevital have been difficult to obtain at various times in the last few years and therefore it is important to check with the pharmacy prior to the procedure.

Amytal is used at 100-125 mg diluted at 25 mg/cc. An additional syringe with amytal should be available for possible follow-up injections of up to an additional 50 mg should the initial dose be insufficient to produce a complete flaccid hemiparesis.

Methohexital is used at an initial dose of 0.075 mg/kg. For an average adult this translates to approximately 5-7 mg. This should be diluted at 1 mg/cc. Additional aliquots of 5 mg diluted at 0.5 mg/cc should be available for follow-up injections, not only to achieve the initial hemiparesis, but also for subsequent injections should the anesthetic effect wear off before sufficient testing has been administered.

Drugs should be injected at a rate of 1-2 cc/sec by hand.

Regardless of the anesthetic used, the catheter should remain in place until the neuropsychologist indicates that test stimuli are completed. This allows additional dosing should the effect of the initial bolus not last long enough to allow completion of the test. Premature withdrawal of the catheter may lead to an inadequate test, requiring additional washout time and then repeat injection.

Prior to anesthetic injection, the neurologist in attendance should ask the patient to raise both arms and begin counting backwards from 30 to 1. The start of injection should be clearly signaled to both the neuropsychologist and the EEG technologist who will mark the record. Test stimuli will be presented to the patient while he/she is hemiparetic. Caution should be used to avoid the hemianopic visual field. Once power returns (tested every minute until full strength returns), the EEG returns to the patient’s baseline, and a minimum of ten (10) minutes has elapsed from the time of the initial anesthetic injection on that side, recall and recognition of presented material will be assessed.

At the completion of the first side, the patient should be allowed to recover for 20-30 minutes prior to testing the contralateral side. A minimum of 30 minutes should elapse between amytal injections. A minimum of 20 minutes should elapse between methohexital injections. Whether or not to test the opposite side is ultimately the decision of the neurologist present, depending on the clinical circumstances. Remember, it is difficult to defend unilateral injection in most circumstances. Testing of the contralateral side should be done using the same anesthetic and same dose as the initial side.

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