



Brief Communication

The intracarotid etomidate Wada test: A 54-patient series

Valmir Passarelli ^{*}, Lecio F. Pinto, Carmen L. Jorge, Paulo Puglia, Carla C. Adda, Hung-Tzu Wen, Luiz H. Castro

Department of Neurology, Hospital das Clinicas, Universidade de São Paulo, São Paulo, Brazil

ARTICLE INFO

Article history:

Received 3 June 2014

Revised 12 August 2014

Accepted 13 August 2014

Available online 16 September 2014

Keywords:

Wada test

Etomidate

Epilepsy surgery

ABSTRACT

Hemispheric language dominance and isolated hemispheric memory function evaluation can be undertaken with the intracarotid injection of a general anesthetic agent (Wada test). Amobarbital has been traditionally used as the anesthetic agent, but legal and commercial constraints limit its use. We evaluated the use of etomidate as an alternative agent for the Wada test in a series of 54 consecutive adult patients with mesial temporal sclerosis undergoing presurgical evaluation for epilepsy surgery. Language lateralization and hemispheric memory function evaluation were successfully achieved in all cases. Side effects (somnolence, tremor, and dys-tonia) were infrequent, minor, and transient and did not require interruption of the procedure. Etomidate appears to be a safe and effective alternative agent to amobarbital in the Wada test. Similarly to the amobarbital Wada test, the ability of the etomidate Wada test to predict postoperative memory decline remains unclear.

© 2014 Elsevier Inc. All rights reserved.

1. Introduction

In 1949, Juhn Wada described the use of intracarotid amobarbital injection to assess language laterality in candidates for epilepsy surgery [1]. Indications for the Wada test were later expanded to include evaluation of hemispheric memory function in candidates for temporal lobe resection and epileptogenic zone lateralization. Improved neuroimaging methods, widespread use of video-EEG monitoring, and, more recently, use of functional MRI resulted in more restricted indications for the procedure [2,3].

The Wada test remains useful to determine memory reserve in selected candidates for temporal lobectomy and to evaluate language laterality when fMRI is inconclusive, not available, or not achievable [4].

Sodium amobarbital is the standard drug for the Wada test because of its short action and low toxicity as well as clinicians' extensive experience with its effects. However, amobarbital availability has been a problem, with frequent shortages worldwide and legal restrictions to amobarbital use in some countries. Uncertainty about amobarbital availability has led to the evaluation of alternative anesthetic agents, such as methohexital, pentobarbital, propofol, and etomidate [5]. Etomidate is an extremely safe short-acting intravenous anesthetic agent used for general anesthesia induction and for sedation in short procedures [6,7].

We report our experience with etomidate use in the Wada test in a consecutive case series of adult patients with temporal lobe epilepsy

associated with mesial temporal sclerosis who were being evaluated for epilepsy surgery.

2. Patients and methods

2.1. Patients

Fifty-four adult patients with medically refractory temporal lobe epilepsy (TLE) secondary to unilateral mesial temporal sclerosis (MTS) underwent the intracarotid etomidate Wada test as part of a presurgical evaluation protocol. Two patients underwent repeat tests, totaling 56 procedures. All patients signed an informed consent form prior to the procedure.

2.2. Study design

This was a prospective case series from a large tertiary epilepsy center in São Paulo, Brazil as part of a larger project that is evaluating pre- and postoperative neuroimaging and cognitive aspects of temporal lobe epilepsy (Cinapce Project).

2.3. Procedure

2.3.1. Anesthetic agent

Etomidate was used in all cases.

2.3.2. Baseline evaluation

Language and strength were assessed before anesthetic injection. The procedure was explained, and questions were answered.

^{*} Corresponding author at: Rua Oscar Freire, 1380 apto: 51, CEP: 05409-010, Brazil. Tel.: +55 11 9633 8439 (cell number).

E-mail address: valmirpas@ig.com.br (V. Passarelli).

2.3.3. Wada procedure

Both hemispheres were sequentially evaluated in all patients. Initial injection was performed in the hemisphere ipsilateral to the MTS. A neuroradiologist performed a carotid angiogram and inserted the catheter in the internal carotid artery, maintaining continuous intraarterial saline infusion throughout the procedure. After an initial fixed etomidate bolus dose (0.8 mg), we evaluated the level of consciousness, strength, visual fields, and signs of hemispatial neglect. Language testing was performed after contralateral hemiplegia was noted, and memory items were presented during the hemiplegia period, with stimuli presented in the contralateral visual field. Strength and language were repeatedly assessed. If partial motor recovery was observed, an additional etomidate fixed-dose bolus was given (0.4 mg). Catheter removal from the internal carotid artery position was performed as soon as all memory items had been presented. Memory item recall was performed upon complete drug effect cessation.

2.3.4. Cognitive tests

Testing was carried out both during the anesthetic effect and after resolution of drug effects. Language was evaluated for comprehension, naming, repetition, and reading during the etomidate effect. Additionally, during the drug effect, sixteen items (four objects, four figures, four words, and four abstract figures) were presented for memorization, in four blocks with four items each, consisting of one of each stimulus type. On each block, items were presented in a fixed order, which was different for each block, alternating stimulus type. Language and strength were evaluated after each block. Patients were evaluated for comprehension with a simple yes–no question (Does a stone float in the water?) and for the ability to follow a simple motor command (Show me your thumb) as well as with sentence repetition (The train arrived in the station one hour late). Naming was tested upon memory item presentation. Naming difficulties and paraphasic errors were noted. Upon complete reversal of drug effects, patients were asked to spontaneously recall the previously presented items. Items not recalled spontaneously were later tested on a multiple-choice format in which four items (one correct and three foils) were presented.

2.4. Cognitive test scoring

2.4.1. Language

Language representation was considered unilateral (right or left) when global aphasia was observed after anesthetic injection in one of the hemispheres and bilateral (with or without predominance) when some degree of preservation of expressive or receptive language was seen after injection in both hemispheres.

2.4.2. Memory

Memory reserve (MemRes) was defined by the number of recalled items (spontaneously or with multiple choices) after ipsilateral injection (to the lesion). Memory capacity (MemCap) was defined as the number of recalled items (spontaneous or cued) after contralateral injection. According to MemRes scores, patients were classified into three categories: passed (>70% recalled items), borderline (50–70%), and failed (<50%). Additionally, a Wada memory asymmetry score (MemAsym) was calculated for each patient subtracting MemRes from MemCap. Patients were classified as displaying expected asymmetry (ExpAsym) when the memory asymmetry score was greater than zero and as reversed asymmetry (RevAsym) when the memory asymmetry score was less than or equal to zero.

2.5. Adverse effects and complications

We registered the occurrence, severity, and duration of etomidate adverse effects as well as of angiographic complications and procedure discontinuation events.

2.6. Wada retest

Wada tests were repeated when the epilepsy team deemed necessary after a multidisciplinary epilepsy surgery conference.

2.7. Wada efficacy in causing hemispheric anesthesia

We evaluated Wada efficacy in causing hemispheric anesthesia, comparing MemRes and MemCap for all injections with Mann–Whitney U test and a $p < 0.05$ significance level.

2.8. Correlation between Wada test results and neuropsychological evaluation

We analyzed the preoperative neuropsychological testing memory score of 43 patients for whom data were available. We evaluated the correlation of Wada results (MemRes, MemCap, and the sum of MemRes and MemCap scores) and scores in the Rey Auditory Verbal Learning Test (RAVLT T – total score for five learning trials and RAVLT5 – immediate recall score) and in the Rey Visual Design Learning Test (RVDLT T – total score for five learning trials and RVDLT5 – immediate recall score) [8] with Pearson correlation, with a significance level of $p < 0.05$.

2.9. Predictive value for memory decline for the Wada test

All patients were operated by the same surgeon (W.H.T.) with the same surgical technique (anteromesial temporal lobectomy with minimal neocortical resection [9]) for both hemispheres.

An 85% reliable change index was adopted to define postoperative memory decline in 32 patients who had undergone both preoperative memory testing and one-year postoperative memory testing. We then compared the proportion of patients who showed decline in at least one postoperative memory test and Wada test performance, including memory reserve scores (comparing pass versus borderline and fail groups combined) and the Wada memory asymmetry score (comparing groups with expected versus reversed asymmetry), both for all patients and for groups of patients with right and left MTS separately, with Fisher's exact test, with a $p < 0.05$ significance level.

3. Results

We evaluated 54 patients (28 (51.9%) men, mean age of 34.0 ± 9.2 years (range: 22–54 years), 10.0 ± 1.9 education years (range: 8–15 years), 49/54 (90.7%) right-handed, 22.4 ± 9.8 years of epilepsy history (range: 8–48 years)) of which 23 (42.6%) had right MTS.

3.1. The general procedure

Intracarotid injection of a 0.8 mg etomidate dose resulted in contralateral hemiplegia in all cases, except in one male patient, who needed an additional 0.4 mg etomidate bolus dose to obtain contralateral hemiplegia. Most patients maintained preserved attention allowing adequate cognitive evaluation during the procedure. Initial bolus effect lasted 3 to 8 min (mean: 4.8 ± 0.86).

An additional etomidate bolus was necessary in six patients (10.7%) because of partial motor recovery during the procedure. One patient required additional doses in both hemispheres, and the remaining five

Download English Version:

<https://daneshyari.com/en/article/6012132>

Download Persian Version:

<https://daneshyari.com/article/6012132>

[Daneshyari.com](https://daneshyari.com)