



Patterns of use of somatosensory-evoked potentials for comatose patients in Canada ☆☆☆



Lawrence R. Robinson, MD*, Martin Chapman, BM, Michael Schwartz, MD, MSc, Allison J. Bethune, MSc, Ekaterina Potapova, BSc, Rachel Strauss, Damon C. Scales, MD, PhD

Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada

ARTICLE INFO

Available online xxxx

Keywords:

Somatosensory-evoked potentials

Coma

Hypoxic ischemic encephalopathy

Traumatic brain injury

Prognosis

ABSTRACT

Purpose: To measure how frequently somatosensory-evoked potentials (SEPs) are used in comatose patients after traumatic brain injury (TBI) and hypoxic ischemic encephalopathy (HIE), how SEPs contribute to outcome prediction and clinical decision making, and how available they are to clinicians.

Methods: A novel factual and scenario-based survey instrument to measure patterns of SEPs use in comatose patients due to HIE or TBI was distributed to critical care, neurology, and neurosurgical physicians across Canada. The analysis was based on 86 completed surveys from specialists in neurology (36), neurosurgery (24), and critical care (22).

Results: Most (73%) of respondents reported that SEPs were available. When provided clinical vignettes, only 36% indicated that they would use them in TBI and 49% would use them in HIE. When respondents ranked the various methods available for establishing prognosis for awakening, SEP was ranked after cerebral blood flow and magnetic resonance imaging. The majority did not accurately estimate chances of awakening when SEP responses were bilaterally absent.

Conclusions: There are significant opportunities to optimize the use of SEPs in comatose patients including standardizing SEP testing and reporting, better communicating results to critical care physicians, and improving the understanding regarding the recommended use and interpretation of these tests.

© 2016 Elsevier Inc. All rights reserved.

1. Introduction

Coma due to hypoxic ischemic encephalopathy (HIE) and traumatic brain injury (TBI) are important causes for admission to intensive care units. With improved postresuscitation care and targeted temperature management (for HIE), many of these patients will have a good neurologic recovery, whereas others will die or remain unresponsive. In the early phase after onset of coma, clinical examination alone is often inadequate to clearly distinguish which patients will have a poor prognosis from those who are transiently comatose but might subsequently awaken and eventually have a good recovery [1]. Adequate prognostication of neurologic outcome in the early phase is important, particularly because it allows families to make better informed choices for their

loved ones, it permits treatment teams to target the types and intensities of therapeutic interventions, and it promotes health care systems to guide appropriate allocation of resources.

Prognostication of patients with acute brain injury is a difficult task for clinicians. There are a number of tests that can assist with the estimation of prognosis. In addition to clinical examination, imaging, blood and cerebrospinal fluid markers, and electroencephalography have been used. Somatosensory-evoked potentials (SEPs) have been shown to demonstrate good sensitivity and very high specificity for determining the prognosis of nonawakening [2–4]. This is true even in those treated with hypothermia [5–9]. Somatosensory-evoked potentials are noninvasive, can be performed at the bedside, have relatively low cost, and are unaffected by sedative agents. Recent reviews of comatose survivors of cardiac arrest have identified bilateral absence of either pupillary and corneal reflexes or N20 wave of short-latency SEPs as the most robust predictors of nonawakening [10,11]. Patients who have bilaterally absent N20 potentials invariably do not awaken from HIE coma [3] [12]. Only about 5% of such individuals awaken from coma after TBI; of those who do awaken, it is rare (roughly 1%) to achieve an outcome better than moderate disability [2].

Although there is strong scientific rationale for using SEPs to improve prognostication of outcome in coma, it is unclear how frequently clinicians actually use this test for prognosis or how these

☆ Financial support: St John's Rehab Foundation.

☆☆ There are no financial conflicts of interest to disclose.

* Corresponding author at: John and Sally Eaton Chair in Rehabilitation Science, Sunnybrook Health Sciences Centre, St John's Rehab, S125, 285 Cummer Ave, Toronto, ON, Canada M2M 2G1.

E-mail addresses: Larry.Robinson@Sunnybrook.ca (L.R. Robinson), Martin.Chapman@Sunnybrook.ca (M. Chapman), Michael.Schwartz@sunnybrook.ca (M. Schwartz), Allison.Bethune@sunnybrook.ca (A.J. Bethune), Ekaterina.Potapova@sunnybrook.ca (E. Potapova), Rachel.Strauss@sunnybrook.ca (R. Strauss), Damon.Scales@sunnybrook.ca (D.C. Scales).

tests influence clinical decision making in practice. We also do not know how available they are and what factors influence clinicians' perceptions of the test.

Because of this uncertainty, we embarked upon a study to examine the use of SEPs by neurocritical care physicians across Canada. Our objective was to measure how frequently SEPs are used in comatose patients after TBI and HIE, how SEPs contribute to outcome prediction and clinical decision making, and how available they are to clinicians. We recognized that SEPs need to be interpreted with caution in TBI given the higher incidence of focal injuries, and hence have wider confidence intervals for predicting nonawakening. However, we thought it useful to compare the usage patterns in both diagnostic groups to gain a better understanding of the variation by clinicians in Canada.

2. Methods

We developed a novel factual and scenario-based survey instrument to measure the use of SEPs in comatose patients due to HIE and to TBI. Item generation and reduction was conducted by the authors, who represented a group of content experts covering several disciplines involved in the care of comatose patients (eg, electrophysiology, neurology, neurointensive care). These experts met several times to develop representative case scenarios for which SEPs could be considered and to iteratively generate and refine a set of questions to elicit information on how clinicians use SEPs in clinical practice.

The questionnaire was then evaluated using a structured sensibility tool to assess face and content validity, ease of use, and feasibility by 5 neurosurgeons, 2 intensive care unit neurologists, and 2 critical care intensivists [13]. Based on this feedback, we made minor modifications to the initial survey to create the final survey.

We administered the final questionnaire by postal mail to members of the Canadian Neurosurgical Society and members of the Canadian Neurological Society; members of both societies were identified using their respective membership databases. In an attempt to capture primarily those specialists with a hospital practice, we included only those with "Hospital," "University," "Medical Centre," "Health Sciences Centre," or "Institute" in the address name. We excluded those listed as retired, in ambulatory practice only, or those with addresses outside Canada. We tracked returned questionnaires using unique numerical identifiers. We also sent the survey by e-mail (street addresses were unavailable) to intensivists identified using the Critical Care Canada Forum database using the same inclusion and exclusion criteria. This study was reviewed and approved by the Sunnybrook Health Sciences Centre Research Ethics Board.

Our primary outcome was the percentage of respondents who would obtain SEPs for each clinical scenario. Secondary outcomes included the following: the contribution of SEPs to outcome prediction and management, how readily SEPs were available to clinicians, how

subjects rated usefulness compared with other clinical measures, and demographic information regarding the respondents.

3. Analysis

All data were stored in a spreadsheet (Excel 2010, Redmond, Wash) and analyzed using IBM SPSS Statistics version 22 (Armonk, NY). We report responses to each question as the proportion of total respondents. If a question was unanswered, we deleted that respondent's response from the denominator for that question in our analysis unless otherwise noted.

4. Results

4.1. Characteristics of respondents

Of 535 surveys sent out by hardcopy, 29 surveys were undeliverable; 69 (13%) were completed and returned. Of 236 surveys distributed by e-mail, 27 (11%) were completed and returned. Of those returned, 10 respondents indicated they do not see comatose patients and thus did not fill out the remainder of the survey. The analysis was thus based on 86 completed surveys.

Of those who returned the survey, 16 (19%) had less than 5 years independent clinical practice experience, 37 (45%) had more than 20 years experience, and the remainder had between 5 and 20 years. The specialty training identified was most commonly neurology ($n = 36$; 43%), followed by neurosurgery ($n = 24$; 29%) and critical care ($n = 22$; 26%). The majority worked at a university hospital (76; 91%), whereas few worked at university-affiliated hospitals (6; 8%) or community hospital (1; 1%). The estimated number of comatose patients seen each year by respondents followed a non-Gaussian distribution for the 2 conditions: the median number of comatose TBI patients was 8 (25th percentile 2, 75th percentile 25, maximum 625) and the median number of comatose HIE patients was 10 (25th percentile 3, 75th percentile 22, maximum 225).

4.2. Availability and utility of SEPs

Most respondents reported that SEPs were available: 24 (30%), easily available; 34 (43%), available with difficulty; and 21 (27%), not available. Respondents' perceptions of the utility of SEPs in comatose patients was most influenced by (percent ranking option as the no. 1 influence): literature, 47%; local practice, 22%; personal experience, 11%; expert opinion, 8%; opinions of colleagues, 3%; and other, 9%.

The rates of use and influence of SEPs varied by the type of coma (Table 1). They were more frequently used in patients after TBI than in those with HIE, and seemed to have a bigger impact on discontinuing life support and changing management in the TBI group. Rates were

Table 1
Respondents' use of SEPs in patients with coma due to TBI and HIE (95% confidence intervals)

Survey question	TBI (% strongly or somewhat agree)	HIE (% strongly or somewhat agree)
"I routinely order SEPs in the first week for these patients"	76% (67%-85%)	65% (55%-75%)
"SEPs contribute to outcome prediction for these patients"	38% (28%-48%)	31% (21%-41%)
"Bilaterally absent median nerve SSEPs would allow me to recommend discontinuing life support in these patients"	56% (46%-66%)	43% (33%-53%)
	TBI (% always or usually)	HIE (% always or usually)
"How often do you use SEPs to help prognosticate in these patients?"	80% (72%-88%)	73% (64%-82%)
"How frequently do SEPs contribute to a change in management?"	85% (77%-93%)	74% (65%-83%)

The possible responses for the first 3 questions ranged from "strongly agree" to "strongly disagree." The possible responses for the latter 2 questions ranged from "always" to "not at all."

Download English Version:

<https://daneshyari.com/en/article/2764387>

Download Persian Version:

<https://daneshyari.com/article/2764387>

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