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ORIGINAL RESEARCH

Accuracy of Self-reported Length of Coma and Posttraumatic Amnesia in Persons With Medically Verified Traumatic Brain Injury

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Abstract

Objective: To determine the accuracy of self-reported length of coma and posttraumatic amnesia (PTA) in persons with medically verified traumatic brain injury (TBI) and to investigate factors that affect self-report of length of coma and PTA duration.

Design: Prospective cohort study.

Setting: Specialized rehabilitation center with inpatient and outpatient programs.

Participants: Persons (N=242) with medically verified TBI who were identified from a registry of persons who had previously participated in TBI-related research.

Intervention: Not applicable.

Main Outcome Measures: Self-reported length of coma and self-reported PTA duration.

Results: Review of medical records revealed that the mean medically documented length of coma and PTA duration was 6.9±12 and 19.2±22 days, respectively, and the mean self-reported length of coma and PTA duration was 16.7±22 and 106±194 days, respectively. The average discrepancy between self-report and medical record for length of coma and PTA duration was 8.2±21 and 64±176 days, respectively. Multivariable regression models revealed that time since injury, performance on cognitive tests, and medical record values were associated with self-reported values for both length of coma and PTA duration.

Conclusions: In this investigation, persons with medically verified TBI showed poor accuracy in their self-report of length of coma and PTA duration. Discrepancies were large enough to affect injury severity classification. Caution should be exercised when considering self-report of length of coma and PTA duration.

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Clinicians treating persons with traumatic brain injury (TBI) and investigators studying persons with TBI begin by classifying individuals on the basis of the severity of injury. Knowledge of injury severity provides a basis for determining treatments and expected outcomes. Determination of severity of TBI is based on the degree of disturbance of consciousness (Glasgow Coma Scale [GCS] score), duration of coma (length of coma), or duration of acute confusion (posttraumatic amnesia [PTA]).[1] Measurements of GCS score, length of coma, and PTA duration are based on direct examinations conducted for patient management during the early postinjury period.

Unfortunately, such data are not available for all persons. When assessing persons with moderate or severe TBI in the postacute period, original medical records may be difficult to obtain. Persons with mild TBI may not seek medical care after injury, and so documentation of PTA duration does not occur.

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Consequently, clinicians and investigators rely on sources of information such as secondary medical records or self-report. Thus, it is important to know the accuracy of self-reported TBI severity and to investigate factors that affect this accuracy.

Reliance on self-report in diagnosing mild TBI is a particular concern for veterans or military service members. Given the inherent difficulty of obtaining accurate medical assessment of brief periods of loss of consciousness or PTA on the battlefield, diagnosis of mild TBI in veterans or military services members has depended substantially on self-report to screening questions followed-up by clinical assessments that also rely on self-report.[2,3] Further complicating this diagnostic process, these self-report data are often collected months, if not years, postinjury.[4] Given the potential inaccuracies of self-report and the possible harm associated with invalid positive screening results, some[5] have questioned whether population-based screening is warranted.

Corrigan and Bogner[6,7] developed a structured interview, the Ohio State University Traumatic Brain Injury Identification Method, to obtain lifetime history of TBI. Their investigations have shown that self-reported TBI history is associated with scores on cognitive tests and self-report of cognitive impairments.

Studies that compared medically documented injury status and severity with patient self-report have yielded variable findings. McMillan et al[8] compared prospectively assessed PTA duration (based on the Galveston Orientation and Amnesia Test)[9] with patient self-reported PTA duration in 79 persons with predominantly severe TBI (78%). Prospective PTA duration was strongly associated with self-reported PTA duration (Spearman coefficient = .87).

Other findings have been less encouraging. Mayou et al[10] compared self-report of loss of consciousness for 1148 persons injured in motor vehicle collisions to data collected from emergency medical transport services, emergency departments, and hospital records. A total of 124 (11%) participants reported a period of "definite" loss of consciousness. Of these, only 19 (15%) were classified as having definite loss of consciousness on the basis of medical data, 29 (23%) were classified as having probable loss of consciousness, and the remaining 76 (61%) were determined to have had no loss of consciousness. Furthermore, in a sample of 167 combat veterans determined to have sustained mild TBI on the basis of self-report, self-report of loss of consciousness was not related to cognitive performance but was related to self-reported cognitive problems.[11] Other studies have found that symptom complaints in persons diagnosed with mild TBI on the basis of self-report are more strongly related to psychiatric comorbidity than to injury characteristics.[12,13]

We sought to bring additional clarity to the issue of accuracy of patient self-report of injury severity by carrying out a new study comparing self-reported length of coma and PTA duration with objectively determined length of coma and PTA duration derived from clinical records. This investigation had 2 goals: (1) to evaluate the accuracy of self-reported length of coma and PTA duration in persons with TBI and (2) to determine factors that affect self-report of length of coma and PTA duration. Possible predictors included age, sex, years of education, time since injury, cognitive abilities, performance validity, depression, and prospectively documented length of coma and PTA duration. We expected that factors other than medically documented injury severity, such as time since injury, cognitive performance, performance validity, and depression, would affect participants' estimates of length of coma and PTA duration.

List of abbreviations:

GCS **Glasgow Coma Scale**
PTA **posttraumatic amnesia**
TBI **traumatic brain injury**

Methods

Participants

Data for this study were collected as part of a program of research on self-report in persons with TBI. The study population consisted of persons with medically documented TBI who had previously participated in TBI research projects and who had given permission to be contacted regarding additional research. Participants could have sustained mild, moderate, or severe TBI, though given the nature of research conducted at our center, virtually all participants classified with mild TBI on the basis of the initial GCS score were better classified as suffering from complicated mild TBI.[14] Inclusion criteria were (1) contemporaneous definitive medical documentation of TBI, (2) age 18 to 64 years at the time of study participation, (3) capacity to consent for study participation, and (4) ability to tolerate a lengthy assessment at the research center. Exclusion criteria were (1) inadequate English proficiency and (2) primary impairments due to a medical condition other than TBI (eg, concurrent stroke).

Research assistants searched Brain Injury Research Center databases, contacted potential participants, described the study to them, and conducted assessments for those who provided consent. Potential subjects who agreed to participate were scheduled for assessment sessions, and informed consent was obtained. Data were collected from October 2011 through July 2013. The resulting study sample was a convenience sample of community-dwelling persons with TBI. This study was approved by the Institutional Review Board Committee of the Baylor College of Medicine.

Demographic, medical, and behavioral data

Information regarding participants' date of birth, date of injury, and injury severity (GCS score, length of coma, and PTA duration) was abstracted from study databases. These data were based on clinical examinations of patients in acute and rehabilitation hospital settings and were abstracted directly from original clinical records. Data collected in the interview included race/ethnicity, sex, years of education, self-reported length of coma, and self-reported PTA duration. To obtain participants' self-reported length of coma, participants were asked, "Now I want to find out if you lost consciousness after your injury. To be unconscious means you were not able to talk or to respond to anyone around you. Were you ever unconscious after your injury?" If the participant responded no, self-reported length of coma was recorded as 0 days. If the participant responded yes, the interviewer asked, "How long was it before you became conscious or came to yourself?" Responses were recorded in days, with responses of less than a day recorded as 0.5 and responses of a day or more recorded as a number of days. To obtain participants' self-reported PTA duration, participants were asked, "I want to find out how long it was after your injury before you started remembering things consistently again. Not just when you woke up, but when you began remembering things from day to day. I want you to tell me what you remember, not what others have told you. So, how