ORIGINAL ARTICLE

Accuracy of Mild Traumatic Brain Injury Diagnosis

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ABSTRACT. Powell JM, Ferraro JV, Dikmen SS, Temkin NR, Bell KR. Accuracy of mild traumatic brain injury diagnosis. Arch Phys Med Rehabil 2008;89:1550-5.

Objective: To determine how often emergency department (ED) patients meeting the Centers for Disease Control and Prevention (CDC) mild traumatic brain injury (TBI) criteria were diagnosed with a mild TBI by the ED physician.

Design: Prospective identification of cases of mild TBI in the ED by study personnel using scripted interviews and medical record data was compared with retrospective review of ED medical record documentation of mild TBI.

Setting: EDs of a level I trauma center and an academic nontrauma hospital.

Participants: Prospective cohort of subjects (N=197; mean age, 32.6y; 70% men) with arrival at the ED within 48 hours of injury, Glasgow Coma Scale score of 13 to 15, and injury circumstances, alteration of consciousness, and memory dysfunction consistent with the CDC mild TBI definition.

Interventions: Not applicable.

Main Outcome Measure: ED medical record documentation of mild TBI.

Results: Fifty-six percent of mild TBI cases identified by study personnel did not have a documented mild TBI-related diagnosis in the ED record. The greatest agreement between study personnel and ED physicians for positive mild TBI-related findings was for loss of consciousness (72% vs 65%) with the greatest discrepancy for confusion (94% vs 28%).

Conclusions: The diagnosis of mild TBI was frequently absent from ED medical records despite patients reporting findings consistent with a mild TBI diagnosis when interviewed by study personnel. Asking a few targeted questions of ED patients with likely mechanisms of injury that could result in mild TBI could begin to improve diagnosis and, in turn, begin to improve patient management and the accuracy of estimates of mild TBI incidence.

Key Words: Brain concussion; Craniocerebral trauma; Head injuries, closed; Post-concussive syndrome; Rehabilitation.

TRAUMATIC BRAIN INJURY is a significant public health problem in the United States. As many as 1.4 million people sustain a TBI each year[1] with the lifetime total costs associated with these injuries estimated at $60 billion.[2] Of all TBIs, approximately 75% to 80% are considered mild.[3] Although the majority of persons with a mild brain injury recover from within days to up to 3 months, others experience long-term impairments that affect their ability to resume their prior social roles and responsibilities.[3-11]

Mild TBI is often treated in the ED with as many as 80% of all adults with a TBI discharged home the same day without being admitted to the hospital.[1] Accurate identification and diagnosis of a mild TBI is the first step toward providing appropriate clinical care. However, accurate clinical identification of patients with mild TBI is complicated with variation in the criteria used for diagnosis[3,12-16] and in diagnostic terminology (ie, concussion, minor head injury, minor brain injury, minor head trauma, and minor TBI all used to refer to a mild TBI).[12,17-19]

Accurate diagnosis and written documentation of the diagnosis of mild TBI in the ED is also important for epidemiologic studies. The CDC mild TBI work group[3] and others[20] have recommended that ED and hospital-based data be given the first priority for surveillance studies (ie, those that provide incidence and prevalence estimates). These studies typically identify cases of mild TBI based on ICD-9-CM diagnostic codes[21] found in administrative datasets.[3] Because the ICD-9-CM codes are based, in part, on the clinical diagnosis, clear documentation of a mild TBI diagnosis in the ED is critical for subsequent identification of cases.[22]

Even though accurate diagnosis of mild TBI is important for appropriate care and accurate incidence estimates, there is limited evidence as to whether persons with mild TBI are accurately diagnosed and identified in ED medical records.[12] As a step toward quantifying the accuracy of mild TBI diagnosis in medical records, this study investigated how often ED patients identified as meeting the CDC mild TBI work group[3] mild TBI criteria by study personnel using scripted interviews

List of Abbreviations

CDC	Centers for Disease Control and Prevention
CHI	closed head injury
CT	computed tomography
ED	emergency department
GCS	Glasgow Coma Scale
ICD-9-CM	*International Statistical Classification of Diseases, 9th Revision, Clinical Modification*
LOC	loss of consciousness
PTA	posttraumatic amnesia
TBI	traumatic brain injury

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along with medical record data were diagnosed with a mild TBI by the ED physician as documented in the medical record. Additionally, we examined how often these ED patients were assigned one or more mild TBI ICD-9-CM codes to determine the extent that these patients would be identified in a typical surveillance study.

METHODS

Study Design

This study compared prospective identification of ED patients with mild TBI by study personnel with the clinical diagnoses given by medical personnel as determined through retrospective chart review. Retrospective chart review was also used to investigate the assignment of ICD-9-CM diagnostic codes.

Setting

We conducted this study in the emergency departments of 2 academic, urban hospitals, one of which is a level I trauma center, in Seattle, WA.

Participants

Subjects in this study were the first 197 enrollees meeting eligibility criteria for a larger study investigating a scheduled telephone follow-up intervention for mild TBI patients.[23] The entrance criteria for the umbrella study included: (1) age 16 to 70 years, (2) arrival at the ED within 48 hours of injury, (3) GCS score of 13 or higher at or prior to ED evaluation, and (4) injury circumstances and alteration of consciousness consistent with the CDC definition of mild TBI (see Measurement section below for a detailed definition). Exclusion criteria (based on requirements of the umbrella study) included homelessness, non-English speaking, current alcohol and drug abuse, current active major psychiatric disease, abnormality on a CT scan of the head, and severe other system injuries. The study was approved by the University of Washington Review Board.

Measurement

Study diagnosis. We used the conceptual definition of mild TBI formulated by the CDC mild TBI work group[3] to identify study subjects. This definition characterizes mild TBI in adults as an injury to the head resulting from blunt trauma or acceleration or deceleration forces with one or more of the following conditions attributable to the head injury: (1) any period of observed or self-reported transient confusion, disorientation, or impaired consciousness; (2) any period of observed or self-reported dysfunction of memory (amnesia) around the time of injury lasting 24 hours or less; (3) any period of observed or self-reported LOC lasting 30 minutes or less; and (4) acute seizure after injury to the head. The definition excludes more severe brain injuries (ie, those with LOC lasting $\geq$30min, PTA lasting $\geq$24h, and/or penetrating craniocerebral injury). We did not consider postinjury symptoms (eg, headache, dizziness, irritability, fatigue, or poor concentration) in the identification of mild TBI cases based on the CDC guideline that postinjury symptoms can be used to support a diagnosis of mild TBI in adults, but cannot be used to make the diagnosis.

To identify cases, research assistants staffed the ED from 10 to 16 hours a day with the afternoon and evenings found to yield the highest number of subjects when ED admission patterns were analyzed at the study start. The research assistants were trained and supervised by the study physician and research team regarding all aspects of the study including approaching subjects, sources of information to be reviewed, and interviewing subjects to determine whether CDC definition of mild TBI had been met. The research assistants were instructed to limit their questioning during the interview to the written set of screening questions to eliminate the possibility of asking leading questions.

The research assistants identified possible subjects based on information in the emergency medical technicians or ambulance reports or ED records indicating (1) that the cause of injury (eg, motor vehicle collision, fall) or injury description (eg, bruising, swelling, head lacerations) was consistent with a possible head injury; (2) GCS score of 13 or 14; and/or (3) positive or possible altered state of awareness (ie, LOC, confusion) less than 30 minutes.

For those cases where the mechanism of injury and/or medical findings were consistent with a mild TBI, the research assistants questioned the patient and/or witnesses to the injury to determine if the CDC criteria for memory gaps, LOC, and/or confusion were met. The interview was conducted following a structured format. For most cases, the interview was conducted at the ED bedside. Occasionally (ie, $\approx$5% of the time), it was conducted at an inpatient location when patients were admitted to the hospital for observation or treatment of injuries that did not preclude participation. The interview questions included (1) asking the patient to recap the injury events to determine the presence and length of amnesia for events before or after the injury (ie, retrograde amnesia or PTA) and (2) questions regarding the presence and length of a LOC or period of confusion. The screening process also included gathering additional information to determine eligibility for the umbrella telephone intervention study.

Clinical diagnosis. To determine if a mild TBI diagnosis had been documented, retrospective chart reviews were performed by a physician using all medical records encompassing the ED stay. These reviews were conducted up to 24 months after the ED visit. The diagnoses listed by the ED physicians were recorded. Any diagnosis indicative of a mild TBI (ie, mild TBI; TBI; concussion; CHI; mild CHI; LOC; and postconcussive or concussive syndrome, symptoms, or injury) was used to determine a positive clinical diagnosis for the purposes of this study. Further documentation in the medical records for key criteria from the CDC conceptual definition (ie, confusion, disorientation, decreased or altered level of consciousness, memory problems or amnesia, LOS, seizure or convulsion) were recorded as a positive finding, as a negative finding, or as not mentioned in the chart.

ICD-9-CM diagnostic codes. Retrospective chart review was used to investigate the assignment of ICD-9-CM codes[21] as per the guidelines of the CDC mild TBI work group[3] for the use of administrative data sets. These codes are assigned retrospectively (ie, after hospital discharge) by professional coders for billing purposes and are based on the clinical diagnosis and other medical record documentation. According to the CDC guidelines,[3] a case of mild TBI is recognized for persons treated in health care facilities who are assigned an ICD-9-CM code where (1) the first 4 digits of the code equal 800.0, 800.5, 801.0, 801.5, 803.0, 803.5, 804.0, 804.5, 850.0, 850.1, 850.5, or 850.9 and the fifth digit is either 0, 1, 2, 6, 9, or missing; (2) the first 4 digits equal 854.0 and the fifth digit is either 1, 2, 6, 9, or missing; or (3) the code equals 959.0. The 800.0 through 804.0 codes indicate fracture of the skull with the 850.0 through 854.0 codes indicating intracranial injury, but excluding those with skull fracture. The 0 fifth digit classification for these codes indicates unspecified state of consciousness, the 1 indicates no LOC, the 2 indicates brief ($<$1h) LOC, the 6 indicates LOC of unspecified duration, and the 9 indicates with concussion, unspecified. The CDC guidelines note that the

Table 1: ED-Documented Diagnoses Relating to Mild TBI (N=197)

Diagnosis	n (%)
None	110 (56)
CHI	39 (20)
Concussion	24 (12)
CHI plus concussion	14 (7)
Mild CHI/mild TBI	2 (1)
Other*	8 (4)

*Including TBI; LOC; postconcussive or concussive syndrome, symptoms, or injury.

959.0 code (ie, head injury, unspecified) is included on a provisional basis because it is still used by coders for mild TBI despite recent revisions designed to exclude this diagnosis. All ICD-9-CM codes assigned for the ED visit were recorded.

Data Collection and Processing

The sample was divided into 2 groups based on the presence (or absence) of documentation of a mild TBI-related diagnosis in the ED records. The total number of positive mild TBI findings documented in the medical record (ie, confusion, feeling dazed, decreased level of consciousness, disorientation, memory problems, LOC, acute seizure, and the terms concussion or postconcussive other than mentioned as a diagnosis) was determined for the 2 groups.

To compare the study interview and the medical record findings, a system of coding confusion-related findings in the medical record was developed. For this purpose, a positive finding of confusion included those subjects with documented positive findings for (1) confusion, (2) feeling dazed, (3) disorientation, and/or (4) decreased level of consciousness (but not LOC). A not-mentioned finding for the medical record confusion category required all of these 4 symptoms not to have been mentioned in the medical record. A negative finding for confusion required a statement about lack of confusion or lack of decreased level of consciousness. Because disorientation was usually based on an exam in the ED (ie, O×3 or O×4) rather than history, an indication of full orientation was not taken as a statement of lack of confusion since injury.

Primary Data Analysis

The odds of receiving a mild TBI-related diagnosis in the ED were determined using logistic regression analyses. For the comparison by age, subjects were divided into 4 categories. For the comparisons with positive confusion, memory, and LOC findings, the negative and not-mentioned groups were collapsed due to the small number of subjects in most of these groups. The number of diagnoses that did not relate to the TBI was compared for the 2 groups using a Mann-Whitney *U* test.[24] We excluded those diagnoses relating to the cause of injury from this comparison because they did not indicate a need for ED personnel attention (eg, status-post motor vehicle collision). We used SPSS[a] for data analyses.

RESULTS

The 197 subjects in this study were enrolled between February 2004 and February 2006. Of those cases identified in the ED by study personnel as meeting the CDC mild TBI criteria, 110 (56%) did not have a documented diagnosis from the ED physician indicative of a mild TBI. The nondiagnosis group included 8 subjects for whom the terms concussion or postconcussive were mentioned in other parts of the medical record, but for whom concussion was not listed as one of the ED diagnoses. Details of the mild TBI-related diagnoses given in the ED are presented in table 1.

As seen in figure 1, the number of documented positive mild TBI-related findings was greater in those who received the diagnosis of mild TBI in the ED. As seen in table 2, the odds of having a documented clinical mild TBI diagnosis from the ED physician were significantly higher for those with documented positive findings, for example, 3.5 times as high for those with positive findings relating to confusion, 3 times as high for those with a positive finding of memory dysfunction relating to the injury, and approximately 2.5 times as high for those with a positive finding of LOC. There were no subjects with acute seizures. CT head scans were administered to 191 of the 197 subjects with no visible pathology on 189 (99%) of those scans. (Note that although CT scan pathology was an exclusion criterion for the umbrella study, this decision was made on the basis of the initial scan and a few subjects were randomized before CT results were available. All subjects who were randomized remained in the study based on the intent to treat analysis.) As seen in table 3, the greatest discrepancy between the study interview findings and the documentation in the medical record was for confusion with the highest agreement for LOC.

In analyzing the impact of other diagnoses, we found a total of 320 nonbrain injury diagnoses for the 197 subjects in the full sample. The most frequent type of nonbrain injury diagnosis, overall, was soft tissue contusions or lacerations, followed by fractures and diagnoses indicating muscle sprains, muscle or joint pain, or headache. The next most frequent type of diagnosis was indication of the cause of injury (eg, status-post fall). Other nonbrain injury diagnoses included medical diagnoses (eg, hematuria) and drug or sensory-related diagnoses. A comparison of the nonbrain injury diagnoses that may have required treatment in the 2 groups (ie, excluding the status-post diagnoses) found a significantly ($P=.001$) greater number of nonbrain injury diagnoses per participant in the group that did not receive a mild TBI diagnosis in the ED (1.7 diagnoses a person) compared with the group that did (1.2 diagnoses a

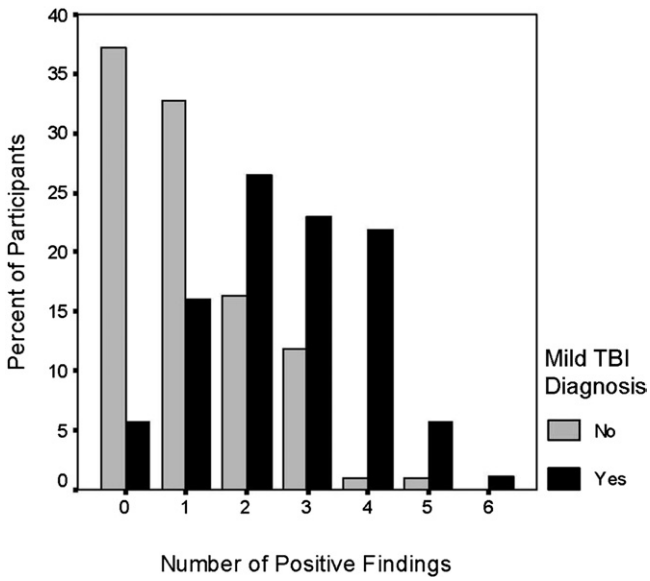

Fig 1. Number of positive mild TBI-related findings documented in the medical record for the ED stay by diagnosis (n=87) and nondiagnosis (n=110) groups.

Table 2: Odds of Receiving a Mild TBI Diagnosis for Demographic Factors and Medical Record Documentation

Characteristics	Total Sample (N=197)	Documented Mild TBI Diagnosis (n=87)	Not Documented Mild TBI Diagnosis (n=110)	OR (95% CI)		*P*
Age (y)						.493
Mean	32.6±12.6	33.4±13.8	32.0±11.5			
16–20	33 (17)	17 (20)	16 (15)	16–20 vs 41–68	1.29 (0.54–3.11)	
21–30	72 (37)	27 (31)	45 (41)	21–30 vs 41–68	0.73 (0.35–1.52)	
31–40	41 (21)	20 (23)	21 (19)	31–40 vs 41–68	1.16 (0.51–2.64)	
41–68	51 (26)	23 (26)	28 (26)			
Sex						
Men	137 (70)	68 (78)	69 (63)	Men vs women	2.13 (1.12–4.03)	.018*
Admitted to hospital	84 (43)	48 (55)	36 (33)	Admitted vs not admitted	2.53 (1.42–4.52)	.002*
Confusion, feeling dazed, etc.						.000*
Positive finding	56 (28)	37 (43)	19 (17)	Positive vs neg/nm	3.54 (1.85–6.80)	
Neg/nm	141 (72)	50 (57)	91 (83)			
Memory						.000*
Positive finding	70 (36)	43 (49)	27 (25)	Positive vs neg/nm	3.00 (1.64–5.00)	
Neg/nm	127 (64)	44 (51)	83 (75)			
LOC						.001*
Positive finding	128 (65)	67 (77)	61 (55)	Positive vs neg/nm	2.69 (1.44–5.03)	
Neg/nm	69 (35)	20 (23)	49 (45)			

NOTE. Values are mean ± SD or n (%) or as indicated otherwise.
Abbreviations: CI, confidence interval; neg/nm, negative finding/not mentioned; OR, odds ratio.

person). One or more mild TBI-related diagnoses were the only diagnoses recorded for 23 of the subjects (26%) in the diagnosis group.

The review of administrative data found that 116 subjects (59%) were assigned one or more of the ICD-9-CM codes defined as indicative of mild TBI by the CDC.[3] Ninety-two percent of subjects in the positive diagnosis group were assigned one or more mild TBI codes compared with 32% in the nondiagnosis group. Of those subjects who were assigned mild TBI codes, the provisional ICD-9-CM code 959.01 was the only brain injury-related code for 35% in the diagnosis group and 69% in the nondiagnosis group.

Table 3: Comparison of Study Interview and Medical Record Findings (N=197)

Finding	Study Interview	Medical Record
Confusion, feeling dazed, disorientation, and/or decreased level of consciousness		
Positive finding	185 (94)	56 (28)
Negative finding	11 (6)	3 (2)
Unknown/not mentioned	1 (0.5)	138 (70)
Memory problems (ie, retrograde amnesia or PTA)		
Positive finding	153 (78)	70 (36)
Negative finding	34 (17)	8 (4)
Unknown/not mentioned	10 (5)	119 (60)
LOC		
Positive finding	140 (72)	128 (65)
Negative finding	41 (21)	61 (31)
Unknown/not mentioned	16 (8)	8 (4)

NOTE. Values are n (%) and may be greater than 100% due to rounding.

DISCUSSION

Greater numbers of people with mild TBI are being seen and released from hospital EDs than ever before. Accurate diagnosis of such cases is needed for appropriate ED management and education; later rehabilitation care, if indicated; and reporting purposes. This study found a substantial discrepancy in identification of mild TBI cases by study personnel and documentation of the diagnosis by medical personnel in the ED with over half of cases identified as having mild TBI by study personnel not having a corresponding clinical diagnosis documented in the medical record.

The discrepancy in identifying mild TBI appears to result from differences in the methods and clinical reasoning used by the 2 groups. For the study purposes, research assistants, whose sole purpose was to gather information relating to the brain injury, conducted structured interviews of the patient and other witnesses. Although patients sometimes denied altered states of consciousness with a simple yes or no question, a simple recapping of events immediately before and after the injury identified clear memory gaps, LOC, and/or transient periods of confusion. The study personnel also had time to carefully review the available emergency medical technician and transport records. In doing so, they found that the medics and their reports were particularly useful sources of information because the medics often collected accounts from witnesses or witnessed the participant confused, disoriented, or unconscious at the scene or during transport, which was helpful in clarifying the events with the patient.

On the other hand, it appears that the ED medical personnel focused on ruling out a more severe brain injury for patients who arrived at the ED with a likely mechanism for TBI. It appears that negative CT scan findings were probably given the greatest weight, followed by determination of LOC, as appropriate for this purpose. Although this may reflect prudent ED guidelines given the serious medical and legal consequences of not identifying a more severe brain injury that may require intervention or additional monitoring, it appears that once a

more severe brain injury was ruled out, findings of shorter lengths (ie, <30min) of LOC (along with other mild TBI-related findings) did not necessarily lead to a written diagnosis of mild TBI. This seems to be especially true for those cases where there were other injuries to be addressed, even if the other injuries were relatively minor.

This approach likely reflects the primary mission of the ED to stabilize and treat serious injuries and illnesses, as well as time constraints inherent in ED practice. However, it means that those persons with no frank clinical signs of mild TBI by the time they arrive at the ED are more likely not to be diagnosed. Lack of diagnosis may also reflect reduced recognition by medical providers and the lay public of the potential for prolonged effects of a brain injury when the presenting symptoms appear to be minor or even resolved by the time of medical assessment.[25,26]

It is possible that the nondiagnosed group may have milder TBI and recover without difficulties. We cannot answer that question with this study. However, for those with no diagnosis who do not fully recover, and, especially, for those with no diagnosis and no documented evidence for (and, perhaps, evidence against) a diagnosis of mild TBI, there are clinical and legal implications. Nondiagnosis with a resulting lack of treatment or education about the possible consequences and expected course of recovery of mild TBI may result in anxiety and complicated recovery if patients experience difficulties after leaving the ED. Similarly, lack of education regarding activity restrictions (eg, limitations on participation in contact sports and operating automobiles or heavy equipment) could result in compromised safety for the patient and others. Furthermore, if patients seek medical help, including rehabilitation services, or legal recourse for unresolved symptoms at a later date, there would not be documentation of a mild TBI to guide those health care providers or legal counsel.

From a health services perspective, the low rates of documented mild TBI diagnosis and related ICD-9-CM codes found in this study might lead one to conclude that the true incidence of mild TBI is higher than previously reported. However, these numbers cannot be used for incidence estimates because the EDs were not staffed continuously by study personnel, and due to the exclusion of persons who likely had a mild TBI, but who did not qualify for the umbrella telephone intervention study for other reasons. Furthermore, it should be noted that a previous study of mild TBI ICD-9-CM codes by Bazarian et al[22] found almost 3 times as many false-positives (ie, cases that were not clinically identified with mild TBI, but had at least 1 mild TBI ICD-9-CM code) as false-negatives (ie, clinically identified mild TBI, but no mild TBI ICD-9-CM codes). It is most likely that factors resulting in underestimation, as well as overestimation, are at work.

It appears that an increased emphasis on a standard patient history would be helpful in accurately and comprehensively diagnosing mild TBI in the ED. Asking patients with a likely mechanism of mild TBI to recap the events leading up to, during, and immediately after the injury may be especially informative. This should take only a few minutes a patient and it is possible that a triage nurse or other health care provider could assume this responsibility to assist the ED physician. Although this approach would likely be less effective for some (eg, intoxicated persons), it should be a relatively efficient and effective approach toward reaching a diagnosis for most others. Close attention to information from the medic reports regarding patient behavior at the time of injury may also improve accuracy of diagnosis.

With improved diagnostic recognition comes the possibility for improved care that could shorten recovery time, reduce the fraction of cases with persistent symptoms, and improve the quality of life and productivity of those coping with the consequences of mild TBIs. Prompt educational intervention seems to be effective in reducing such consequences.[27-31] Although it appears that only a small fraction (perhaps 5%–20%) of those with mild TBI fail to recover spontaneously, this translates into a very large number of cases given the size of the denominator. Reducing the persistence of symptoms and functional impact for even this small group would be worthwhile. Improved early identification of mild TBI cases would also allow researchers to more accurately study the natural history of recovery and factors related to poor outcomes.

Accurate diagnosis is also needed to improve estimates of incidence rates of mild TBI which, in turn, would assist with appropriate allocation of public funding and provision of services. At this time, there appears to be both over-identification and under-identification of cases. Even if physicians diagnose and treat more cases than those formally documented in the medical record, the issues for follow-up care, litigation, and TBI incidence estimate studies, which rely on documentation, remain.

Study Limitations

The findings of this study are based on 1 set of mild TBI diagnostic guidelines and do not allow for direct comparison with other commonly used definitions. However, the CDC guidelines were developed to refine the definition of mild TBI based on extensive review of the literature and other commonly used definitions. It is likely that expanding the definition of mild TBI to include postinjury symptoms as per the American Congress of Rehabilitation Medicine guidelines would have resulted in more cases identified by study personnel. On the other hand, reliance on GCS scores of 13 through 15 alone or *Diagnostic and Statistical Manual of Mental Disorders, 4th Edition* criteria, which require 2 of the following: LOC greater than 5 minutes, PTA greater than 12 hours, or new onset of seizures, would likely result in a much broader severity range including those with more severe TBI (ie, GCS scores of 13 and 14 with CT abnormalities) and those potentially without TBI (ie, GCS score 15 with no documentation of altered state of consciousness).

Subjects for this study were recruited from 2 EDs under an umbrella study protocol that required additional selection criteria and in which funding did not allow for full-time staffing. These factors may have impacted our findings. In other words, given these constraints, our results may not be entirely representative of the extent of the problem more generally. An additional concern is that the presence of study personnel influenced the clinicians and resulted in an increased rate of ED diagnosis over the course of the study. If so, these results provide a more conservative estimate and the problem may be even greater than reported here.

CONCLUSIONS

Although mild TBI is often viewed as a minor medical problem, there are many complex issues surrounding diagnosis, treatment, reimbursement, and population estimates. The importance of an accurate diagnosis and documentation of that diagnosis, at onset, cannot be underestimated. Adding a brief set of targeted questions to the patient history in the ED may be helpful in improving diagnostic accuracy and clinical treatment and bring us closer to understanding the scope of mild TBI.

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Supplier

a. Version 10.0; SPSS Inc, 233 S Wacker Dr, 11th Fl, Chicago, IL 60606.