

# Traumatic brain injury and iatrogenic morbidity

How confident can we be in the diagnostic criteria for mild traumatic brain injury?

**ABSTRACT: There is no consensus on a definition of mild traumatic brain injury, and no symptom complex that demonstrates diagnostic specificity for mild traumatic brain injury. Overdiagnosis of mild traumatic brain injury is possible when using the definition adopted by the American Congress of Rehabilitation Medicine and may result in iatrogenic morbidity: that is, production of symptoms *de novo* by well-meaning medical and nonmedical personnel. The use of symptom checklists and the overreliance on subjective complaints alone may also result in misdiagnosis.**

In their article “Early interventions for mild traumatic brain injury: Reflections on experience,” Dr Dhawan and colleagues<sup>1</sup> have correctly stated that one difficulty in identifying and reporting mild traumatic brain injury involves the many definitions used. Mention is made of the definition proposed by the Mild Traumatic Brain Injury Committee of the American Congress of Rehabilitation Medicine. This committee, chaired by Thomas Kay, neuropsychologist and senior contributor, consisted of seven psychologists, five psychiatrists, one registered nurse, and one registered clinical counselor. There were no neurologists, no neurosurgeons, and no psychiatrists on the committee.<sup>2</sup>

The authors state that a patient with mild traumatic brain injury (mTBI) is a person who has had a traumatically induced physiological disruption of brain function as manifested by at least one of the following:

- Any period of loss of consciousness.
- Any loss of memory for events immediately before or after the incident.
- Any alteration in mental state at the time of the accident (e.g., feeling dazed, disorientated, or confused).
- Focal neurological deficits that may or may not be transient.

Further, the severity of the injury must not exceed the following:

- Loss of consciousness of approximately 30 minutes or less.

- After 30 minutes, an initial Glasgow coma scale (GCS) of 13 to 15.
- Posttraumatic amnesia (PTA) not greater than 24 hours.

The authors go on to say that traumatic brain injuries result when the head is struck or strikes an object or the brain undergoes an acceleration/deceleration movement, that is, whiplash without direct external trauma to the head. It excludes anoxia, tumor, encephalitis, and so on. It can thus be seen that the criteria offered are lax and do not make a provision for any distraction, surprise, or transient anxiety at the time of the traumatic event.

The term *TBI* is not international, and indeed the World Health Organization notes no consensus with regard to the definition of mTBI.<sup>3</sup> There is also no symptom complex that demonstrates diagnostic specificity for mTBI, although the most common symptoms are similar to those of the post-concussion syndrome. These include headache, fatigue, dizziness, sleep disturbance, and concentration as well as memory difficulties.<sup>4</sup> Furthermore,

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without a preinjury history, no single test is effective in establishing the diagnosis of mTBI and thus premorbid personality functioning is important, especially with regard to neurotic symptoms predating the alleged head injury. Indeed, there continues to be some controversy, even among psychiatrists themselves, regarding the role of this medical specialty in the care of people with alleged traumatic brain injury.<sup>5,6</sup>

The current literature on mild traumatic brain injury is of variable quality<sup>7</sup> and the authors advocate use of standard criteria for defining mTBI. Indeed, in a review article,<sup>8</sup> Kushner suggests that mild traumatic brain injury is misleading as a diagnostic term as it may include a spectrum of manifestations ranging from transient mild symptoms to ongoing disabling problems. Symptomatic individuals will frequently present to primary care general practitioners days, weeks, or even months after the trauma.

Indeed, in many respects the term mTBI is a misnomer,<sup>9</sup> unlike criteria for mild head injury, which are based on the Glasgow coma scale score between 13 and 15, loss of consciousness under 20 minutes, and posttraumatic amnesia (PTA) of under 1 hour.

**While neuropsychological testing is frequently used to identify cognitive impairment, poor performance on these tests also occurs with depression, headache, chronic pain, fatigue, and pre-existing attention problems.**

Quoting several authors,<sup>10</sup> Hall and colleagues state that individuals likely to recover in 6 to 12 weeks experience a brief loss of consciousness, PTA lasting less than 1 hour, and a score of 15 on the GCS. When patients have persistent, dramatic, or unusual complaints, other factors, such as personality disorder, psychosocial problems, or secondary gain, should be considered as causative.<sup>11</sup>

Several studies have found that patients who are involved in litigation demonstrate more pronounced and intense symptoms from postconcussion syndrome than do similar patients not involved in litigation, and clinical evaluation of patients after closed head injury, particularly mild head trauma, must include consideration of the effect of financial incentives on symptoms and disability.<sup>12</sup>

### **The role of the neuropsychologist**

A valid interpretation of neuropsychological tests includes assessment of the patient's premorbid intelligence and other higher levels of functioning, as well as the base rates of common neuropsychological signs and symptoms. Neuropsychologists often diagnose cerebral dysfunction, based, in

part, on marked variation in an individual's cognitive test performance.<sup>13</sup> Marked individual variability is very common in normal adults and underscores the need to base diagnostic inferences on clinically recognizable patterns rather than psychometric variability alone.

The use of symptom checklists and the overreliance on subjective complaints alone may yield misleading results; patients with any psychiatric disorder may do as badly on psychological tests as those with a closed head injury.<sup>14</sup> While neuropsychological testing is frequently used to identify cognitive impairment, poor performance on these tests also occurs with depression, headache, chronic pain, fatigue, and pre-existing attention problems. Stress alone has been shown to significantly, although reversibly, impair memory as a result of excess cortisol production and thus, neuropsychological testing cannot make the diagnosis of a brain injury, though it is a valuable tool in assessing cognitive impairment and tracking the progress of the condition.<sup>15</sup>

A statement by the American Academy of Neurology urges caution in attributing a cause to any observed decrement in neural-behavioral test performance as these tests are extremely sensitive but not specific. Indeed, no neuropsychological tests have been shown to have consistent diagnostic validity.<sup>16</sup>

### **Summary**

Given the imperfect accuracy of state-of-the-art assessment in mTBI, there is significant risk for both overdiagnosis and underdiagnosis of mTBI and postconcussive symptoms. The term *mTBI* is not universally accepted, unlike concussion, a term that may be applied to all patients with a closed head injury, and once a patient is labeled with the term *brain injury*, an

anxiety state is introduced. As Dr Anne Taylor writes,<sup>17</sup> “Given that brain damage is a devastating diagnosis, I am alarmed at the ease with which it is conferred even on patients who suffer uncomplicated whiplash with no further neurological consequences.”

There is thus the danger of iatrogenic morbidity and physicians should be most cautious in labeling any patient with a traumatic brain injury, especially as the proposed criteria in making such diagnosis are so lax and ill-defined. Indeed, the term *mTBI* has become a favorite of the legal fraternity in compensation cases. It is the function of the physician to allay, not convey, anxiety.

Indeed, we have a clinical responsibility to our patients and, if any of their symptoms are iatrogenic, we have done them a disservice.<sup>18</sup> If the outcome in the small percentage of patients who have suffered a cerebral concussion or mild TBI present with continuing deficits due to factors such as depression and psychosocial environment concerns and we do not address these issues clinically, we are not discharging our duties as medical practitioners.

#### Competing interests

None declared.

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