

Epidemiology, Definitions, and Classification of Mild TBI

Approximately 1.4 million patients attend accident and emergency with head injury in England and Wales (1). Data from the Trauma Audit and Research Network has revealed that the vast majority of patients with a traumatic brain injury (TBI) are defined as ‘mild’ (2). Definitions of what constitutes a mild TBI vary. The criteria proposed by the World Health Organization Collaborating Center Task Force on Mild TBI considers an individual to have experienced a mild TBI after a head injury if they have a documented Glasgow Coma Scale (GCS) score of 13–15 at presentation to hospital and/or a loss of consciousness <30 minutes duration and/or post-traumatic amnesia <24 hours (3). The Mayo Clinic classification system of TBI (Table 1, (4) has a similar approach, but also incorporates information from imaging findings. According to the Mayo Clinic classification, a patient is said to have experienced a mild (probable) TBI if they have at least one of the following: a loss of consciousness of less than 30 minutes duration; post-traumatic amnesia of less than 24 hours; and normal standard imaging (excluding a depressed, basilar, or linear skull fracture with intact dura). An absence of loss of consciousness or post-traumatic amnesia would place the patient in the symptomatic (possible) category. However, mild (probable) and symptomatic (possible) are often jointly referred to as ‘mild TBI’ (5). Death, loss of consciousness of greater than 30 minutes, post-traumatic amnesia of greater than 24 hours, a documented GCS score of <13 in the first 24 hours, or any of the imaging abnormalities detailed in Table 1 would place the patient in the moderate–severe (definite) category. The rationale for excluding individuals with abnormal imaging findings from the ‘mild TBI’ group is supported by work that revealed that evidence of contusion, subarachnoid haemorrhage, and/or subdural haematoma on CT scanning predicted incomplete recovery in patients with mild TBI classified on GCS scores alone (GCS score of 13–15) (6).

The term mild TBI is often used interchangeably with the term concussion (5). A precise definition of concussion has not been established, but it is often considered to be a syndrome, including a wide range of symptoms such as headache, dizziness, fatigue, irritability, reduced concentration, sleep disturbance, memory impairment, anxiety, depression, photophobia, and phonophobia. It is not uncommon for a patient with such a constellation of symptoms to be diagnosed with a concussion and given simple reassurance, which can be problematic. Firstly, although prognosis in mild TBI is generally good with most

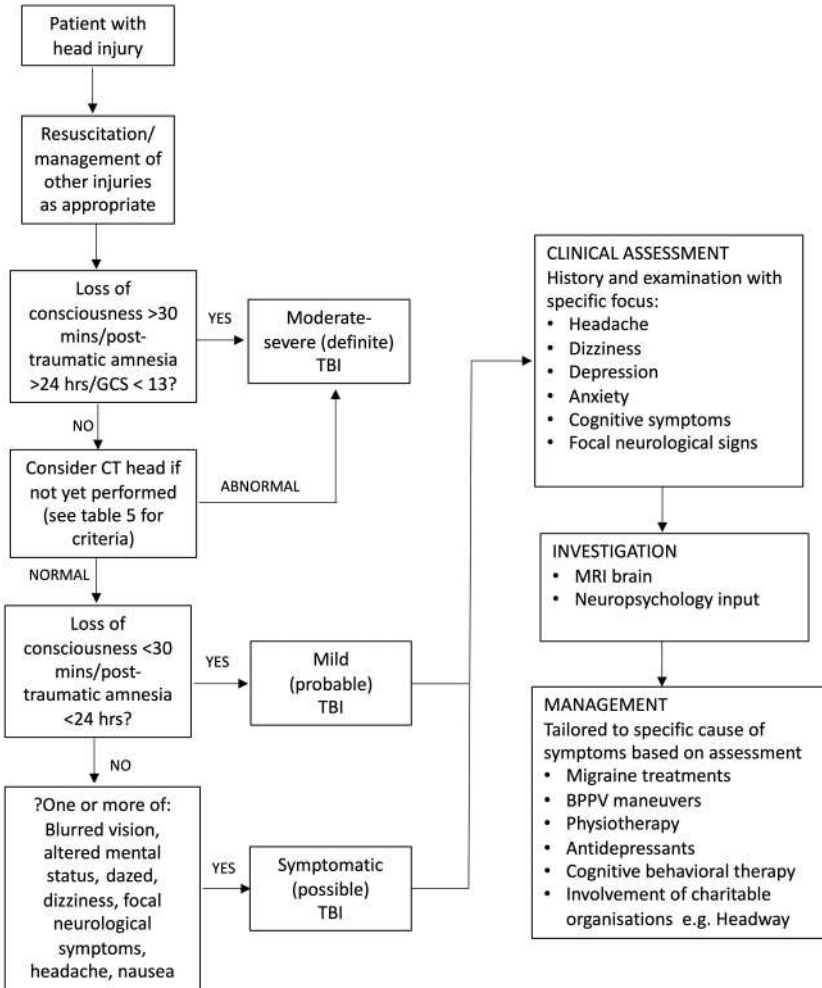


Figure 1 Algorithm providing overview of mild TBI diagnosis, investigation, and management.

patients recovering in the first three months, many report on-going symptoms persisting beyond six months (7), which challenges the concept that the natural history of concussion is one of relatively quick and benign recovery. It should be noted that many argue that the term ‘mild’ in mild TBI is also somewhat of a misnomer in this context as well and does not capture the significant physical, cognitive, and psychosocial morbidity that can occur (8). Secondly, this approach often precludes more detailed clinical assessment of individual symptoms, which in turn limits the ability to address individual symptoms by instituting tailored

Table 1 Mayo Clinic classification system of TBI (4)

Mayo Clinic classification of TBI – category	Criteria
Moderate–severe (definite)	One or more of the following: <ul style="list-style-type: none"> • Death due to this TBI • Loss of consciousness >30 minutes • Post-traumatic anterograde amnesia >24 hours • Worst GCS in first 24 hours <13 (unless invalidated by other factors such as intoxication, sedation, and systemic shock) • Evidence of one of the following: intracerebral haematoma, subdural haematoma, epidural haematoma, cerebral contusion, haemorrhagic contusion, penetration of dura, subarachnoid haemorrhage, or brainstem injury
Mild (probable)	Does not fulfil any criterial of moderate–severe (definite) TBI plus one of the following: <ul style="list-style-type: none"> • Loss of consciousness <30 minutes • Post-traumatic anterograde amnesia <24 hours • Depressed, basilar, or linear skull fracture (dura intact)
Symptomatic (possible)	Does not fulfil any criterial of moderate–severe (definite) TBI <i>or</i> mild (probable) plus one or more of the following: <ul style="list-style-type: none"> • Blurred vision • Confusion (mental state changes) • Daze • Dizziness • Focal neurological symptoms • Headache • Nausea

strategies (see Figure 1 for overview). A prime example being dizziness, which may be a result of brain injury, vestibular migraine, or peripheral vestibular dysfunction, all of which necessitate a tailored diagnostic and management approach (5).