Diagnosis and Management of Acute Concussion

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KEYWORDS

• Concussion • Mild traumatic brain injury • Acquired brain injury • Sports injuries

KEY POINTS

- An estimated 80% to 90% of all traumatic brain injuries are classified as mild traumatic brain injury, or concussion.
- Recent reports suggest that a high percentage of concussions go undiagnosed and unidentified in the acute care setting (eg, hospital emergency department, sports).
- Over the past 20 years, there has been great progress toward standardized definition, diagnosis, assessment, and management of acute concussion.
- Consensus guidelines now provide guidance regarding injury management and approaches to ensure safe return to activity after acute concussion.

INTRODUCTION

Mild traumatic brain injury (mTBI), or concussion, is now recognized as a major public health problem in the United States and around the world. Each year in the United States, there are approximately 2.5 million visits to hospital emergency departments (EDs) for traumatic brain injury (TBI), with an estimated 80% to 90% classified as mild based on traditional case definitions and acute injury characteristics.[1–3] The World Health Organization Collaborating Centre Task Force on Mild Traumatic Brain Injury cited the incidence of hospital-treated mTBI to be 100 to 300 per 100,000.[4] These figures likely significantly underestimate the true incidence of mTBI, because most patients with concussion do not receive hospital treatment and many do not seek any form of medical attention after their injury.

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For many reasons, identification and diagnosis of mTBI in the ED and other acute trauma settings has proved challenging. First, there has been great variability in operational definitions and criteria for diagnosis of mTBI. Second, there have been no systematic, standardized processes for assessing patients with probable or suspected mTBI. Third, other more severe or life-threatening injuries understandably take priority during triage, and the effects of mTBI are often uncovered later. In addition, several comorbidities that either mask or mimic the effects of concussion often complicate the routine examination of patients with mTBI.[5] The collective result is that a high percentage (50%–90%) of patients with mTBI often go unidentified and undiagnosed in the hospital ED.[6,7]

Over the past 2 decades, there has been considerable progress toward advancing the basic and clinical science of concussion in all populations at risk, including civilians, athletes, and military service members. As a result, there is now a new understanding of the defining characteristics of concussion, on which current definitions of injury and diagnostic criteria are based.[8] These research advances have directly affected the development of evidence-based, best-practice guidelines for the diagnosis, assessment, and management of concussion, including protocols that drive the decision-making process regarding an individual's fitness to return to activity (eg, work, play, duty) after concussion. This article provides a brief, high-level overview of evidence-based approaches to best practice in diagnosis, assessment, and management of acute concussion.

DEFINITION AND DIAGNOSIS OF ACUTE CONCUSSION

There has been a large amount of variability in concussion definitions developed over the past 30 years, but more recent progress toward greater consensus based on the latest evidence. Central to all concussion definitions is the rapid onset of impairment of neurologic function, which most often and typically resolves spontaneously over a short time frame.

Historically, the definition of mTBI developed by the Mild Traumatic Brain Injury Committee of the Head Injury Interdisciplinary Special Interest Group of the American Congress of Rehabilitation Medicine (ACRM)[9] was commonly used in both research and clinical settings. The ACRM definition required a single criterion of unconsciousness, amnesia, or alteration in mental status for the diagnosis of mTBI. More recently, the US Centers for Disease Control and Prevention (CDC), US Department of Defense (DoD), and the World Health Organization (WHO) have developed operational definitions of mTBI, which place varied emphasis on acute injury characteristics and other signs and symptoms to establish a diagnosis. **Box 1** shows the clinical definition of mTBI developed by the CDC mTBI Working Group.[10]

Published definitions specific to sport-related concussion have also gained consensus. The 4th International Consensus Conference on Concussion in Sport (Zurich 2012) consensus statement defines concussion as a brain injury characterized by a complex pathophysiologic process affecting the brain, induced by biomechanical forces.[11] Similarly, the American Medical Society for Sports Medicine (AMSSM) defines concussion as a traumatically induced transient disturbance of brain function involving a complex pathophysiologic process.[12]

Ultimately, concussion is a clinical diagnosis based on the combination of injury mechanism and acute symptoms and signs.[8,11,12] The mechanism of injury is an important consideration showing a causal link between injury and clinical signs and symptoms, as well as ruling out other causes of more nonspecific signs or symptoms. Once the mechanism is better delineated, the signs and symptoms essentially represent the clinical criteria used to diagnose concussion.