

Causes and Management of Head Injuries in Emergency Room

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Abstract

Background: Head injuries are a common worldwide problem. Head injury was defined as physical damage to the brain or skull caused by external forces, it is any injury that results in trauma to the skull or brain.

Aim: The review aimed to determine Causes and management of head injuries in emergency room.

Conclusion: Head injury is any injury that results in trauma to the skull or brain. It can be either closed (blunt) or open (penetrating) injury and is further classified into primary injury and secondary injury. Each year, nearly 50000 people in United States die after a head trauma that most of them experience lifelong disability associated with brain injury. The most common cause for inciting head injury is motor vehicle accident and other causes are falls from heights, physical assaults, accidents at home, offices or while playing sports, gunshot and blast injuries. The commonest symptoms of head injury recalled were persistent vomiting, dizziness and persistent headache, with the least common recalled symptom being seizures, the person may become sleepy, behave abnormally, lose consciousness, have mismatched pupil sizes, and/or be unable to move certain parts of the body. Head injuries are very common, but the majority will have no consequences and need no specific treatment. However, some patients have on-going symptoms (known as the post-concussion syndrome) and a minority will require urgent intervention (such as neurosurgery). It has been recommended that all patients with acute severe head injuries are managed in a specialist neurosurgical/critical care center.

Keywords: Head Injury; Management; Emergency

Introduction

Head injuries are a common worldwide problem. Trauma is the main cause of mortality, hospitalization, and disability in society in all age groups which leads to about 16000 deaths daily in society. Among all types of trauma, head injury is one of the most important causes of death in patients under 25 years and responsible for one-third of total deaths caused by trauma [1]. A head injury is any injury that results in trauma to the skull or brain. The terms traumatic brain injury and head injury are often used interchangeably in the medical literature [2]. Head injury was defined as physical damage to the brain or skull caused by external forces [3,4]. In developed countries, the rate of deaths caused by head injury was about 21% in first month and this rate rise to 50% in developing countries [1]. Each year, nearly 50000 people in United States die after a head trauma that most of them experience lifelong disability associated with brain injury [5]. Head injury can be either closed (blunt) or open (penetrating) injury and is further classified into primary injury and secondary injury. Many studies showed that brain damage is classified to primary and secondary head injury. The primary head injury is the primary damage that causes brain injury, such as bruising of the brain, crush, and rupture of blood vessels. Secondary damage within a few hours to several days after the primary injury is caused due to brain swelling and bleeding [6]. Brain tissue destroyed by the primary impact is very difficult to be salvaged. Secondary brain injury, the sequel of primary insult, is potentially treatable and most of the therapies are targeted to prevent these sequelae [7]. The morbidity, mortality and long-term disability are substantially dependent on the management of secondary brain insult. Therefore, functional outcome may be improved by good intensive medical care and by prompt surgical interventions [8]. Patients with head injury comprise approximately 10% of total attendances at A&E departments in the UK [9]. It is estimated that about 1 000000 recently head injured patients attend hospital each year in the UK - 1 per 50 of the population [10]. Head injuries are classified as serious or nonserious. The nonserious injuries make up, by far, the vast majority of all head injuries. Roughly speaking, in the USA, 1300/100,000 people suffer concussions each year. Of these, 300/100,000 are treated in emergency departments. Of these, 90/100,000 are retained in the hospital. Around 25/100,000 die [11]. Head injury may be major or minor; a major head injury is any Traumatic brain injury (TBI) with a severe disturbance of consciousness and/or a focal neurological deficit. In a minor TBI, there is no loss of consciousness or loss of consciousness is limited to 10 min or less [12].

Causes of head injury

The most common cause for inciting head injury is motor vehicle accident (MVA) [13-15]. The other causes of TBI are falls from heights, physical assaults, accidents at home, offices or while playing sports, gunshot and blast injuries. Adults have head injuries more frequently than any age group resulting from falls, motor vehicle crashes, colliding or being struck by an object, or assaults. Children, however, may experience head injuries from accidental falls or intentional causes (such as being struck or shaken) leading to hospitalization [16].

Diagnosis

A complete examination of a head injured patient in the hospital requires a number of instruments. These include a stethoscope, sphygmomanometer, ophthalmoscope, otoscope, cotton wool, safety pin, tuning fork, reflex hammer and a small key to test the plantar response [12]. Physiological parameters including Glasgow Coma Scale (GCS) score, systolic blood pressure and respiratory rate are useful predictors for the outcome and can be utilized in the pre-hospital triage of patients with head injury [8]. The GCS is a quick, reproducible scoring system that has worldwide acceptance and is used to define the severity of injury, with severe TBI defined as GCS of ≤ 8 . It is based on eye opening, verbal response and the best motor response. However, the severity and prognosis are predicted more accurately by also considering the computed tomography (CT) scan findings and other clinical factors including a disturbed pupil reflex and arterial hypotension [17,18]. Other investigations like X-ray and ultrasound are also helpful to rule out other major injuries. The outcome in patients with TBI is also found to be affected by the transport methods, duration and physician or paramedics lead team [19,20]. Therefore, there is a need to integrate the most effective transport system through which patients of TBI can be shifted to a specialized trauma center within the minimum possible time. The time is a crucial factor for the occurrence as well as the prevention of secondary brain injury; therefore, the transport vehicle should have all possible drugs/equipment and monitoring devices [7].

Symptoms

Heng, *et al.* explores patient's understanding of head injury and found that the commonest symptoms recalled were persistent vomiting, dizziness and persistent headache, with the least common recalled symptom being seizures [21]. Other obvious symptoms can be neurological in nature. The person may become sleepy, behave abnormally, lose consciousness, have mismatched pupil sizes, and/or be unable to move certain parts of the body. While these symptoms happen immediately after a head injury occurs, many problems can develop later in life. Alzheimer's disease, for example, is much more likely to develop in a person who has experienced a head injury [22]. Brain damage, which is the destruction or degeneration of brain cells, is a common occurrence in those who experience a head injury. Neurotoxicity is another cause of brain damage that typically refers to selective, chemically induced neuron/brain damage.

Epidemiology

Estimated epidemiology data depicted that the frequency of traumatic brain injury (TBI) is higher in North America and Europe. On average, 2.8 million people had a TBI annually [23]. The estimated population incidence of traumatic brain injury in the United States was 73.5/100,000. A US-based study reported that head injuries were most common among young children [24,25]. One epidemiology study stated that 69 million individuals worldwide were estimated to suffer from TBI [26]. According to a Nigerian study, head injury was observed to be the most common among all injuries [27]. Another study from KSA, found that 32.1% of 1,219 patients suffered head injuries [28].

Management

Head injuries are very common, but the majority will have no consequences and need no specific treatment. However, some patients have on-going symptoms (known as the post-concussion syndrome) and a minority will require urgent intervention (such as neurosurgery) [29]. Patients presenting with head injury in primary care challenge general practitioners (GPs) to differentiate between those who may be reassured, and those who are at risk of serious intracranial injury. Intracranial injuries such as epidural and subdural hematoma or skull fractures may lead to death or permanent damage if left untreated [30]. It has been recommended that all patients with acute severe head injuries are managed in a specialist neurosurgical/critical care center [31]. High-quality clinical management of head injury takes the small chance of intracranial injury into account. Safe and cost-effective practice guidelines for primary care must therefore be based on a reliable risk calculation. In Europe, the annual incidence of head injury presenting in hospital emergency departments (EDs) is 2.3 per 1000 person-years. In general practice, this incidence is expected to be higher because only a subset of patients is referred to hospital [32,33]. Currently, guidelines for the identification, referral and management of patients with head injury at risk for intracranial damage are based on epidemiological studies from secondary or tertiary care [34,35]. The treatment of moderate and severe head injuries begins with initial cardiopulmonary stabilization by ATLS guidelines. The initial resuscitation of a patient with a head injury is of critical importance to prevent hypoxia and hypotension. Once a patient has been stabilized from the cardiopulmonary standpoint, evaluation of their neurologic status may begin. The initial GCS score provides a classification system for patients with head injuries but does not substitute for a neurologic examination. After assessment of the coma score, a neurologic examination should be performed [36]. After a thorough neurologic assessment has been performed, a CT scan of the head is obtained. CT scanning of the brain is key in the evaluation of traumatic brain injury but imaging practice varies widely around the world [37,38]. Recent work in the United Kingdom has shown that the rate of CT scanning in minor head injury increased from 14% to 20% after the Canadian CT head rules were applied [39]. Basal skull fracture is predictive of intracranial lesions and warrants immediate CT scan of the head [40]. It would be better for the patients to treat all neurological problems regardless of the results of CT scanning. The authors believe that early CT Scanning can detect potentially lethal intracranial lesions and will reduce unnecessary hospital admissions [41]. Another supportive measure used to treat patients with head injuries is elevation of the head. When the head of the bed is elevated to 20 - 30°, the venous outflow from the brain is improved, thus helping to reduce intracranial pressure (ICP) [36]. No guidelines are perfect and the present guidelines for the management of patients with head injury are the first step in changing practice based on an individual's clinical judgment to more evidence-based medicine.

Conclusion

Head injury is any injury that results in trauma to the skull or brain. It can be either closed (blunt) or open (penetrating) injury and is further classified into primary injury and secondary injury. Each year, nearly 50000 people in United States die after a head trauma that most of them experience lifelong disability associated with brain injury. The most common cause for inciting head injury is motor vehicle accident and other causes are falls from heights, physical assaults, accidents at home, offices or while playing sports, gunshot and blast injuries. The commonest symptoms of head injury recalled were persistent vomiting, dizziness and persistent headache, with the least common recalled symptom being seizures, the person may become sleepy, behave abnormally, lose consciousness, have mismatched pupil sizes and/or be unable to move certain parts of the body. Head injuries are very common, but the majority will have no consequences and need no specific treatment. However, some patients have on-going symptoms (known as the post-concussion syndrome) and a minority will require urgent intervention (such as neurosurgery). It has been recommended that all patients with acute severe head injuries are managed in a specialist neurosurgical/critical care center.

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