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Commentary

General Study on Traumatic Brain Injury (TBI)

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TRAUMATIC BRAIN INJURY

Head injuries are extremely common, accounting for more than half of all traumatic deaths. The scalp, skull, and brain are susceptible to a wide range of traumas. Primary and secondary brain damages are the two types of brain damage that can result from a head injury. The principal injuries include scalp lacerations, skull fractures, brain contusions and lacerations, diffuse axonal injury, and intracranial haemorrhages, which occur at the time of the injury. The lesions caused by increased intracranial pressure, ischemia, brain edoema, and infection are examples of secondary damages that are caused by the problems originating from the primary damages. A different way to categorise head injury pathophysiology is to divide it into focal and diffuse injuries. Focal injuries are those that can be seen with the naked eye or with imaging tests and are caused by a direct hit to the head (e.g., scalp laceration and contusion, skull fracture, epidural hemorrhage, subdural hemorrhage, brain contusion) [1].

These injuries are caused by inertial loading of the head and include inter hemispheric subdural haemorrhage and diffuse axonal injuries are those that cannot be fully appreciated with the naked eye, but some imaging techniques may provide evidence of these injuries. Traumatic Brain Injury (TBI) is a type of head injury, which has always been a significant cause of mortality and morbidity, but a variety of modern day advances have contributed to an increase in the number of TBI cases. The growth of motor vehicles, which are common causes of TBI, is one of these developments. Another feature of modern society is the on-going violence caused by Gunshot Wounds (GSWs). TBI from falling among the elderly and infirm has been exacerbated by the population's growing longevity [2].

EPIDEMIOLOGY

Head injuries account for up to half of all traumatic deaths and a considerable proportion of medical examiners' cases. Vehicle accidents, gunshot wounds, falls, assaults, and child abuse are all examples of how these injuries occur. Head injuries are most common in cities, with as many as 32 per every 100,000 people, 50% of which are caused by automobile accidents, 20% to 40% by gunshot wounds, 10% by falling, and 5% to 10% by attacks. Traumatic Brain Injury (TBI) is classified into static and dynamic injuries, depending on the amount of force that is applied to the brain. Static injuries occur over longer time periods (usually more than 200 msec) and cause crushing brain injury [3]. Crushing brain injuries are comparatively rare and are caused when an massive weight crushes the inactive brain resulting in the fragmented fractures of the calvarium, facial skeleton, and skull base with fracture contusions and fracture lacerations of the brain [4].

Dynamic brain injuries can majorly observed at any respective ages. These dynamic brain injuries occur when a force is rapidly applied to the brain usually in less than 200 msec. Dynamic brain injury is caused by impulsive loading, either by direct impact to the brain, or by an action to the body which causes movement in brain. Impuslive loading will impart some inertial movement to brain within the carnial cavity which causes the brain to rotate at some point where it joins the cervical spine. This rotational movement create some variations in the position of brain and skull due to the various rigidities of the two structures. As dura is attached to skull, the differential movement between skull and brain may strain and tear the brdiging veins to the point of failure which causes bleeding into subdural area. The inertial movement of the brain is maximum in the cortex but extends into the brain rapidly with greater forces, and this inertial movement of the brain results in traumatic diffuse axonal injury [5].

CONCLUSION

The inertial movement of the brain causes diffuse traumatic axonal damage. Impact loading has numerous impacts on the head, including contact injuries such as scalp laceration and skull fracture, pressure wave propagation into the cranial cavity, brain, and brain contusions. Inertial brain movement, which can be either translational or rotational, is also caused by impact loading. The pathologist will require additional information on the circumstances surrounding the death as well as other facts,

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such as past medical history, in order to determine the death circumstances. The autopsy findings are then weighed against all other evidence before a determination is made on the death circumstances.

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