Traumatic Brain Injury Risk Factors

Common causes include car or motorcycle crashes, falls, sports injury, and assaults.

Non-accidental head trauma (NAHT) is a common cause of traumatic brain injury in childhood [1].

Brain injury from trauma results from two distinct processes:

1. primary brain injury: occurs at the time of trauma (cortical contusions, lacerations, bone fragmentation, diffuse axonal injury, and brainstem contusion)

2. secondary brain injury: develops subsequent to the initial injury. Includes injuries from intracranial hematomas, edema, hypoxemia, ischemia (primarily due to elevated intracranial pressure (ICP) and/or shock), vasospasm

Since impact damage cannot be influenced by the treating neurosurgeon, intense interest has focused on reducing secondary injuries, which requires good general medical care and an understanding of intracranial pressure.

When a detailed history is unavailable: the loss of consciousness may have preceded (and possibly have caused) the trauma. Therefore, maintain an index of suspicion for e.g. aneurysmal subarachnoid hemorrhage, hypoglycemia, etc. in the differential diagnosis of the causes of trauma and associated coma.

Head impact direction has been identified as an influential risk factor in the risk of traumatic brain injury (TBI) from animal and anatomic research.

Increased risk of incurring a subdural hematoma exists from impacts to the frontal or occipital regions, and parenchymal contusions from impacts to the side of the head. There was no definitive link between impact direction and subarachnoid hemorrhage. In addition, the results indicate that there is a continuum of stresses and strain magnitudes between lesion types when impact location is isolated, with subdural hematoma occurring at lower magnitudes for frontal and occipital region impacts, and contusions lower for impacts to the side.

This hospital data set suggests that there is an effect that impact direction has on TBI depending on the anatomy involved for each particular lesion [2].

Traumatic brain injury following a suicide attempt

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1)

Hinojosa J, Simó M, Armero G, Becerra MV, Alamar M, Candela S, Culebras D, Muchart J, Berrueco R.

Hemophilia and non-accidental head trauma in two siblings: lessons and legal implications. Childs Nerv Syst. 2022 Oct 28. doi: 10.1007/s00381-022-05713-2. Epub ahead of print. PMID: 36303077.
2)

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