Traumatic Brain Injury

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Traumatic Brain Injury (TBI): disruption of the normal function or structure of the brain caused by a head impact or external force. TBI can be classified as mild, moderate, or severe, typically based on the Glasgow Coma Scale (GCS) score. Concussion is often referred to as mild TBI.

Causes:

- Penetrating injuries
- Blast injuries
- Being struck by or against an object (contact sports or high-risk recreational activities)
- Falls

Pathophysiology:

- Significant acceleration or deceleration of the head (primary brain injury)
- Damage may occur directly at the site of impact (coup injury) → caused when a moving object impacts the stationary head
- Damage may occur on the side opposite the impact (contrecoup injury) → caused when the moving head strikes a stationary object
- Volume of brain tissue or blood within the skull can increase due to swelling (i.e. oedema) or haemorrhage
- If left untreated, rising intracranial pressure (ICP) leads to a progressive cerebral hypopefusion, herniation of the brainstem and ultimately death (secondary bain injury)

Presentation

Physical:
Pain localised to the area of trauma, headache, tinnitus & diplopia, nausea & vomiting, difficulties with speech (e.g. slurring)

Cognitive:
Amnesia & impaired concentration, drowsiness/loss of consciousness, confusion

Emotional:
Irritability, anhedonia, tearful

Diagnosis

- Contrast CT scan/MRI - absence of contusion and haemorrhage
- Loss of consciousness for < 30 minutes
- Memory loss for < 24 hours
- GCS of 13-15
- Neuropsychological testing to assess functional impairment - Sport Concussion Assessment Tool (SCAT5)/ Standardised Assessment of Concussion (SAC)

Management

Sub-acute/chronic rehabilitation:

- Physical + cognitive rest for 1-2 days - delay return to contact sport until complete symptom resolution
- 24-hour observation period for neurological deterioration
- Neuropsychiatric symptoms such as PTSD, anxiety or clinical depression may require mental health professionals
- Urinary incontinence can be managed through Pelvic Floor Muscle Training completed 4-5x daily
- Neurobehavioural rehabilitation - includes balance re-training, repetitive gait & transfer training, neuromuscular retraining, orthotics consultations, and hydrotherapy

Medical (acute TBI): Analgesia - paracetamol + NSAIDS; Avoidance of narcotics; IV tranexamic acid for mild TBI; Antiemetics; Hypertonic saline/ mannitol to reduce ICP

Want to learn more?

With AcePhysio the learning journey doesn't stop here! Take a look at our further reading recommendations below to become an expert in Traumatic Brain Injury:

1. Oberholzer, Michael, and René M Müri. "Neurorehabilitation of Traumatic Brain Injury (TBI): A Clinical Review." Medical sciences (Basel, Switzerland) vol. 7,3 47.
2. Barman, Apurba et al. "Cognitive Impairment and Rehabilitation Strategies After Traumatic Brain Injury." Indian journal of psychological medicine vol. 38,3 (2016): 172-81.
3. National Institute for Health and Care Excellence. Appendix A: summary of evidence from surveillance. 2017 surveillance – Head injury (2014) NICE guideline CG176. 2017 [internet publication]