Blast-Related TBI

Blast-related traumatic brain injury (TBI) is a type of brain injury caused by exposure to blast overpressure.

Blast overpressure refers to a sudden change in atmospheric pressure that creates an overpressure wave (blast wave), which moves outwards from the source of an explosion at high speeds. Exposure to blast overpressure can cause significant damage to internal organs, including the brain.

Blast waves can cause TBI of all severities (subconcussive, mild, moderate, or severe). Most blast-related TBI is mild traumatic brain injury (mTBI). Other terms for blast-related mTBI include blast overpressure, military TBI or blast-induced neurotrauma.

Factors that can affect the severity of a blast injury include:

- Blast energy (i.e. the amount and type of explosives used)
- Distance from the blast wave
- Body position
- Use of body armour or helmets (these can amplify the effects of the blast wave)
- Environment (e.g. closed environments are usually worse than open spaces)
- Number of and time between blast exposures
- Individual health and susceptibility - pre-existing conditions and overall health can influence injury severity
- Blast wave duration and frequency - the length and frequency of the blast wave can affect the extent of the injury
- Secondary projectiles - debris and shrapnel propelled by the blast can cause additional injuries
- Protective measures - availability and use of protective measures other than armour, such as barriers or shields, can mitigate injury severity

Causes of blast-related TBI

Blast-related TBI is often associated with military conflicts and training but can also occur in the civilian world. This may include military and police operations that involve breaching live firing during training exercises, terrorist attacks, mining accidents, industrial accidents, or non-bomb blasts (e.g. chemical or fireworks explosions).

Signs and symptoms of blast-related TBI

Each blast-related TBI is unique, and the signs and symptoms can vary from person to person. The signs and symptoms of blast-related TBI may present immediately after the explosion occurred or may develop over the hours, days, weeks, months or even years that follow.

Symptoms of blast-related TBI can include:

- Headache
- Loss of conciousness / deteriorating state
- Seizure / convulsion
- Nausea and / or vomiting
- Dizziness
- Difficulty with balance or coordination
- Sensistivity to light or noise
- Dialated pupils or changes in vision
- Confusion or memory problems
- Slurred speech
- Restlessness, agitation or irritation
- Sleep disturbance

Individuals who have sustained a blast-related TBI may experience headaches, depression or anxiety, sleep disturbances, difficulties with memory and attention/concentration, and post-traumatic stress disorder (PTSD). While mTBI and PTSD can co-occur, having a mTBI does not necessarily mean that a person will have PTSD. They are distinct conditions, and it is possible to have one without the other.

Blast-related TBI and Chronic Traumatic Encephalopathy (CTE)

While individuals who have experienced multiple blast-related TBIs may be at risk of developing chronic traumatic encephalopathy (CTE), research suggests that the prevalence of CTE among veterans is relatively low.

Seeking help for blast-related TBI

If you think you or someone you know has experienced a blast-related TBI and/or is experiencing ongoing problems speak to your doctor or health professional. They will be able to help develop a management plan and refer you to any specialist services you may need.

Learn More

Click on the QR code to visit the 'Blast-related TBI' webpage and view the 'Low-level blast exposure and TBI' fact sheet.

More information

Connectivity Traumatic Brain Injury Australia is an Australia-wide not-for-profit organisation working to raise awareness of concussion and traumatic brain injury in the community. For more information on blast-related TBI, you can speak to your doctor, healthcare professional, or visit the Connectivity website at www.connectivity.org.au

Connectivity
Traumatic Brain Injury Australia

 Acknowledgements This flyer features some material that has been adapted from the US Department of Defense Provider Fact Sheet July 2023 Information on Low-Level Blast Exposure. With thanks to Vigil Australia.