BRAINTRUST CANADA

Resources

Factsheet: Overdose & Anoxic Brain Injury

What is Anoxic Brain Injury?

Anoxic brain injury refers to damage to the brain caused by a lack of oxygen. After a few minutes without oxygen, neurons (brain cells) will begin to die.

How does a lack of oxygen affect the brain?

- The brain needs a continuous supply of oxygen because the brain has little/no oxygen reserve.
- Cells deprived of oxygen release excess glutamate, a neurotransmitter (chemical messenger) that has an excitatory effect on cells.
- Normally, there is a balance of glutamate and other neurotransmitters in the brain that allow different brain areas to be activated as we perform tasks throughout the day.
- However, high amounts of glutamate in the brain lead to the death of cells and therefore impact how the brain functions.

Common causes of anoxic brain injury include opioid overdose, domestic abuse (i.e., strangulation), and non-fatal drowning.

Overdose

Opioids exist in both licit and illicit forms. A variety of opioid medications — such as codeine, fentanyl, morphine, oxycodone, and diacetylmorphine — are produced and used most often to treat pain. Opioids have the potential for problematic use because they can produce a feeling of well-being or euphoria — a "high."

Most opioid-related deaths occur due to a substance known as fentanyl. Fentanyl is cheaper to produce, more potent, and lethal, even in very small doses.

Compared to other opioids, fentanyl can quickly reduce breathing to a slow, shallow rate. This is called respiratory depression and means that important organs in the body (including the brain) don't receive enough oxygen to function properly. The risk of anoxic brain injury is more likely when fentanyl is consumed.

Anoxic brain injury caused by opioid overdose is underdiagnosed and undertreated. In British Columbia, anoxic brain injury is diagnosed in 3% of hospital admissions for overdose. This statistic is an underestimate of the true prevalence: Not everyone who overdoses goes to the hospital. With over 35,000 overdose calls to 911 in British Columbia in 2021, this works out to at least 1000 possible brain injuries!

And not only has the number of overdoses rapidly increased, but the number of overdoses per in individual has increased too. Each time an individual overdoses, they are at risk for sustaining an anoxic brain injury.

- Repetitive brain injury = more severe impacts
- Research has found that multiple and repeated overdoses are associated with decreasing cognitive performance, increases in depressive symptoms, and suicidal ideation.