Cannabis Intoxication

Cannabis contains two well known components, Delta-9 Tetrahydrocannabinol (Δ-9-THC) and Cannabidiol (CBD). The psychoactive properties of cannabis are typically attributed to Δ-9-THC, which is present in variable concentrations dependent on the strain, and absorbed at variable rates dependent on the mode of ingestion. Acute intoxication is rare from cannabidiol (CBD) products unless given in excess or with high THC:CBD ratio. Since Canadian legalization of cannabis for adults, there has been an increasing rate of hospitalization for cannabis exposures in children 14 years and younger.[1]

Presentation types

UNINTENTIONAL INGESTION (PREDOMINANTLY TODDLERS)

» Consider this diagnosis in any previously healthy afebrile child <12 years with acute onset of the following symptoms without another clear cause[4]:
  – Altered level of consciousness: lethargy (71%), coma (10%)
  – Neurological symptoms: hypotonia (63%), ataxia (14%), hyperactivity/irritability (11%), seizures* (9%), hypertonia (8%), tremor (5%)

    *CBD alone has some anticonvulsant activity, but in overdose can cause seizures.
  – Vital sign changes: tachycardia (15%), hypoventilation (13%, with ~ 5% requiring intubation), bradycardia (4%), hypotension (4%), hypothermia (4%)

» Delayed recognition of cannabis intoxication results in increased testing/interventions and longer ED length of stay.

INTENTIONAL AND/OR CHRONIC (PREDOMINANTLY ADOLESCENTS)

» Common presentations after high doses include delirium, panic attacks, anxiety, psychosis, myoclonic jerking, nausea, hypertension, and/or worsening asthma symptoms.

» Cannabinoid Hyperemesis Syndrome: Consider in chronic cannabis users with cyclic vomiting and abdominal pain (often relieved by hot showers) in absence of alternative diagnosis. May be associated with profound dehydration.

Formulations & Method of Delivery

Effects	Ingestion	Inhalation
Onset	30-90 minutes	Within minutes
Peak effect	2-3 hours	Within 15-30 minutes
Duration	Up to 12 hours in adults, longer in children (often 24 hours)	4 hours in adults (typically)
For more detailed information see: TREKK Cannabis Formulations & Method of Delivery and CPS Cannabis Clinical Tools		

INGESTION

» Cannabis is available in high concentration edible products which are commercially available or can be made at home; this makes the dose difficult to determine reliably. Commercially available edibles are required to state the dose of THC and/or CBD per unit or per total package.

» Edibles are more easily accessible to young children who can ingest large doses unintentionally. This results in an association with more altered level of consciousness (LOC) and respiratory compromise.

» Pharmaceutical cannabinoids have similar time to peak effects as edibles and can include nabilone and dronabinol (tablets) or Sativex® (rapid acting oral spray of THC and CBD).

INHALATION

» Inhaled dose depends on depth of inhalation and duration of puffing/breath holding. Alternative methods of inhalation of highly concentrated cannabis (i.e., vaporizing, dabbing), can lead to very rapid effects.

» Synthetic cannabinoids (e.g., “Spice”, “K2”) have similar symptoms of intoxication but are associated with more CNS depression or agitation and potentially life-threatening symptoms (eg., seizures, respiratory compromise).

Diagnostic Testing

» If no clear history for cannabis intoxication is provided, perform work up for other causes of altered LOC.

» With altered LOC strongly consider: POCT glucose, venous blood gas, lactate, and electrolytes. Depending on clinical circumstances, may also consider CBC, liver enzymes, blood cultures, ECG, and/or intracranial imaging.

» **CAUTION:** Urine drug screen for the urine metabolite of Δ-9-THC can remain positive for weeks and does not necessarily reflect acute intoxication or rule out other possible co-ingestions/causes for altered LOC. There is a risk

of false positives (due to proton-pump inhibitors, baby wash, or NSAID exposure) and the test may not be available at all centers. Results rarely change clinical management but may be helpful for child protection investigations.

» In order to rule out co-ingestions, ask patient/family what medications are in the home/accessible and check serum levels when possible (e.g., acetaminophen, salicylates).

Management

» Involve poison control/toxicology and/or Pediatric Referral Center early, especially with major derangements in neurologic or respiratory status.
» Assess ABCs, support respiratory status with oxygen, non-invasive ventilation or intubation as needed.
» THC has been shown to bind to activated charcoal; consider charcoal use with appropriate timing of presentation and clinical circumstance.

Altered LOC	Supportive care, ABCs
Nausea/Vomiting	Establish IV access and give fluid replacement. Ondansetron: oral disintegrating tablet preferred (8-15 kg: 2 mg/dose; >15-30 kg: 4 mg/dose; >30 kg: 8 mg/dose) x 1 dose PO OR 0.1 mg/kg/dose (MAX 4 mg) IV if not able to tolerate PO.
Agitation	Consider using benzodiazepines if central respiratory failure is not a concern.
Seizures	Refer to TREKK Status Epilepticus PedsPac. Avoid phenytoin/fosphenytoin in toxicologic seizures.
Cannabis Hyperemesis Syndrome (CHS) in chronic users	First line: IV fluids and haloperidol (0.05 mg/kg/dose (MAX 2.5 or 5 mg) IV as needed. **DO NOT** use if risk factors for QT interval prolongation or extrapyramidal symptoms.[5, 9] ECG monitor required. Persistent vomiting: Capsaicin 0.025-0.1% cream (if available) may be applied topically as a thin film. **AVOID** ocular/mucosal contact. Most studies describe application to abdomen, but back/back of arms may be used instead to prevent transfer from the treated area to eyes/mucosa. Trial of Ondansetron may be reasonable, but evidence favours IVF/haloperidol.[9]

» Transfer to Pediatric Referral Site/admit to hospital for monitoring if persistent altered LOC or intractable vomiting.
» If asymptomatic after 6 hours post-exposure, patient may be discharged home.
» Strongly consider involving child protection specialist at Pediatric Referral Site (and appropriate reporting to child welfare authority) if the ingestion was in a young child or if intentional exposure by a guardian is suspected.

Counselling Families About Cannabis

» With the exception of CBD for specific seizure disorders, there are very few proven indications for medical cannabis use in children, and many concerns for acute and long-term risks.
» Provide parental education on the dangers of cannabis in children and safe storage of dangerous medication and substances. For more information for parents, visit: Cannabis: what parents need to know.
» Encourage teens to abstain from cannabis use due to long-term concerns for their mental health (increased risk for psychosis), attention, concentration, memory, and executive functioning.
» Cannabis abstinence is the only long-term treatment for Cannabis Hyperemesis Syndrome.

This summary is based on:

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4. Richards JR, Smith NE, & Moulin AK. Unintentional Cannabis Ingestion in Children: A Systematic Review. *J Pediatr*. 2017;190, 142-152.
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6. Claudet et al., Marie-Jeanne Study Group for the M.J. S. Unintentional Cannabis Intoxication in Toddlers. *Pediatrics*. 2017;140(3), e20170017.
7. Heizer JW, Borgelt LM, Bashqoy F, Wang GS, Reiter PD. Marijuana Misadventures in Children: Exploration of a Dose-Response Relationship and Summary of Clinical Effects and Outcomes. *Pediatr Emerg Care*. 2018;34(7):457-462.
8. Noble MJ, Hedberg K, Hendrickson RG. Acute cannabis toxicity. Clin Toxicol (Phila). 2019;57(8),735-742.
9. Ruberto AJ, Sivilotti MLA, Forrester S, Hall AK, Crawford FM, Day AG. Intravenous Haloperidol Versus Ondansetron for Cannabis Hyperemesis Syndrome (HaVOC): A Randomized, Controlled Trial. *Ann Emerg Med*. 2020 Nov 5:S0196-0644(20)30666-1. doi: 10.1016/j.annemergmed.2020.08.021. Epub ahead of print.

This resource was made possible by the Children's Hospital Foundation of Manitoba. We are grateful for their support.