



# Marijuana (Cannabis) Intoxication: A Case Report

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## Abstract

**Background** :Cannabis or marijuana is the most commonly abused illicit substance with a high incidence of usage in adolescents. Nowadays marijuana has led to increased exposures reported to poison centres and presenting to emergency departments. **Case** :We reported the case of a 23 year old girl who was suspected with marijuana intoxication. The diagnosis is made based on history, physical examination, laboratory examination, and radiologic examination. The patient was found unconscious and immediately taken to the hospital. Earlier, she was complained of nausea, vomiting, agitating, difficult to communicate with, spoke incoherently, and seizure. Blood pressure was low, and her breathing was fast. Laboratory tests showed positive for THC (from urine test), while the other tests were negative. The management of an intoxicated patient occurs mainly in the emergency department and is aimed at stabilizing the clinical condition of the patient depending on her clinical presentation. **Conclusion** :The patient was given diazepam to treat seizures and several other supportive drugs related to the symptoms. No specific antidote was given for marijuana intoxication, and after 42 hours of observation the patient's condition improved and then later discharged from the hospital.

**KeyWords**:Marijuana Intoxication, Cannabis Intoxication, THC Poisoning

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## Introduction

Cannabis or marijuana is the most commonly abused illicit substance with a high incidence of usage in adolescents. Over 140 million people use cannabis worldwide. Nowadays marijuana has led to increased exposures reported to poison centres and presenting to emergency departments (Kelly & Nappe, 2021). Clinical manifestations of acute cannabis (marijuana) intoxication vary according to age, neurologic abnormalities, purposeless motor activity of the extremities (hyperkinesia), coordination disorders, cardiovascular disorders (hypotension), respiratory depression, seizures, decreased consciousness, and prolonged coma, which The use of marijuana with other substances can cause more severe intoxication. Simultaneous alcohol and marijuana (SAM) use, or using alcohol and marijuana can cause

may be life threatening (Wang & Post, 2019). To establish the diagnosis of marijuana intoxication a careful examination is needed, starting from the history of clinical symptoms, physical examination, and other supports to rule out differential diagnoses, especially those that provide a clinical sign that is almost similar to marijuana intoxication (Shevyrin & Morzherin, 2015). Urine test can be done, this test is easy to do and the result is fast. There is no specific antidote for marijuana intoxication, only supportive therapy. The therapy given must be adjusted to the clinical condition experienced by the patient (Shevyrin & Morzherin, 2015).

toxic effects due to the interaction of the two types of substances (McGilveray, 2005). We report a case of marijuana intoxication due to interactions with alcohol.



## Case

A 23-year-old girl, Ms. Q, was brought to the ED (March 2019) by her brother at approximately midnight because of decreased level of consciousness. The patient was found unconscious in her apartment. From the heteroanamnesis (patient's friend), the patient had only consumed 2 bottles of alcohol together with her friends and no history of used marijuana. She had complained of nausea, vomiting, and pain throughout the body. Since the afternoon the patient begins to ramble, agitated, increasingly difficult to communicate with, spoke incoherently after that she had a seizure and then began to lose consciousness. No fever, no cough, normal bowel movements, normal urination. When she arrived at DR Soetomo ED, the patient had repeated seizures, so she was immediately taken to the resuscitation room. Her past medical history was clear. No history of taking sedatives, psychotic drugs, painkillers, illegal drugs, and no history of trauma.

On physical examination, she was unconscious, with GCS 225, blood pressure 90/69 mmHg, pulse 136 bpm, breathing 26 x/minutes, body temperature 36.50C, oxygen saturation 95%. No enlargement of a lymph node, no anaemia, no icterus, and no cyanosis. Examination of heart, lung, abdomen, and extremities were normal.

Laboratory finding: haemoglobin 15,1 g/dL, haematocrit 46,5%, leucocyte  $11.32 \times 10^3/\mu\text{L}$ , thrombocyte  $150 \times 10^3/\mu\text{L}$ , sodium 137 mmol/l, potassium 3.8 mmol/l, chloride 103 mmol/l, AST 325 mg/ dl, ALT 125 mg/dl, BUN 49 mg/dl, serum creatinine 2.15 mg/dl, albumin 3.9, APTT 25.4 seconds (control 23 – 33 seconds), PTT 9.8 seconds (control 9 – 12 seconds), HBsAg non-reactive, HIV rapid non-reactive, Blood glucose 100 mg/dl, BGA Ph 7.33, PCO<sub>2</sub> 38 mmhg, PO<sub>2</sub> 84 mmhg, HCO<sub>3</sub> 19.1 meq/l, BE -2.7, sO<sub>2</sub> 95%, ECG sinus rhythm tachycardia 136 times/minute, chest X-ray was normal, CT scan of the head without contrast showed no abnormalities, and normal abdominal ultrasound. The urine test showed negative amphetamine, negative methamphetamine, positive THC, negative

opium, negative benzodiazepine, negative barbiturate, negative opiates, negative cocaine, BAC was 70 mg/dl. Neurology consultation showed no abnormalities.

Based on the history, physical examination, laboratory the patient was diagnosed with marijuana intoxication and suspected of alcohol superimposed with complications of acute renal injury, hepatitis reactive non specific. This patient was planned for Electroencephalography (EEG), and BGA evaluation. She was given a supportive therapy such as phenytoin 100 mg every eight hours to control the seizure, diazepam 10 mg iv if needed, nacl infusion 1500 ml in twenty four hours, lansoprazole 30 mg injection every eight hours, metoclopramide 10 mg injection every eight hours, oxygenation, and we placed a nasogastric tube for the nutrition. BGA evaluation showed ph 7,43, PCO<sub>2</sub> 29, PO<sub>2</sub> 196, HCO<sub>3</sub> 19,2, BE -5,3, SO<sub>2</sub> 98%, evaluation for the laboratory tests showed AST 120 mg/ dl, ALT 81 mg/ dl, BUN 24 mg/dl, creatinine 1,01 mg/dl, with the urine production is around 1450 cc / 24 hours. There are no specific antidotes for this intoxication, the therapy is depending on the clinical manifestations. After 42 hours of evaluation the patient regained her consciousness, and she was force discharged from the hospital.

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## Results and Discussion

Cannabis or better known as marijuana is a type of plant that contains many components or substances (cannabinoids) that are psychoactive. There are around 400 components or substances contained in cannabis, but the main active components that has the most powerful psychoactive effects is tetrahydrocannabinol (THC) (Kelly & Nappe, 2021). The content of THC in marijuana is around 0,4-20% and the psychoactive effect caused by THC is ten times stronger compared to other cannabinoids such as cannabinal and cannabidiol (Kelly & Nappe, 2021; Wang & Post, 2019). The pathophysiology of marijuana intoxication is related to the endocannabinoid system present in the human body, there are two



specific cannabinoid receptors in humans, CB1 (primarily in central nervous system) and CB2 (peripheral tissues) (Shevyrin & Morzherin, 2015). CB1 receptors are found in the brain, especially in the basal ganglia, substantia nigra, globus pallidus, hippocampus, cerebellum, and frontal cortex (Shevyrin & Morzherin, 2015). If cannabinoids bind to CB1 receptors, there will be inhibition of acetylcholine, noradrenaline, dopamine, serotonin, L-glutamic, and gamma-aminobutyric acid which will affect the learning process, memory cognition, movement, sensory perception, nausea, stimulation of nausea, and psychoactive properties (McGilveray, 2005; Shevyrin & Morzherin, 2015). CB2 receptors are found in the immune system, the spleen, macrophages, the peripheral nervous system and in the vas deferens. If these cannabinoids bind to the CB2 receptors they will play a role in the regulation of the inflammatory response and the immune system (McGilveray, 2005; Shevyrin & Morzherin, 2015). The toxic effects of cannabinoids result from overstimulation of the endocannabinoid system by exogenous cannabinoids (Wang & Post, 2019). This unmoderated stimulation of the endocannabinoid system leads to erratic modulation of neurotransmitters that can lead to toxicity. Severe side effects or marijuana intoxication can occur if the dose of THC consumed is more than 7 mg/m<sup>2</sup>, including cardiovascular disorders, respiratory depression, seizures, decreased consciousness, neuropsychiatric disorders, and other disorders such as ataxia, behavioral disorders, panic disorders, psychosis (Kelly & Nappe, 2021; Wang & Post, 2019). Laboratory examinations related to marijuana intoxication are not specific, laboratory examinations are carried out based on the symptoms and signs that appear (Gorelick, 2022). Urine is typically used for testing, but saliva, blood, and hair are viable alternatives. Standard urine drug screens that are available in most health care facilities consist of immunoassays that detect THC metabolites, the lower limits of detection range from 20 to 100 ng/mL depending upon the specific assay (Macdonald et al., 2010; Wang & Post, 2019).

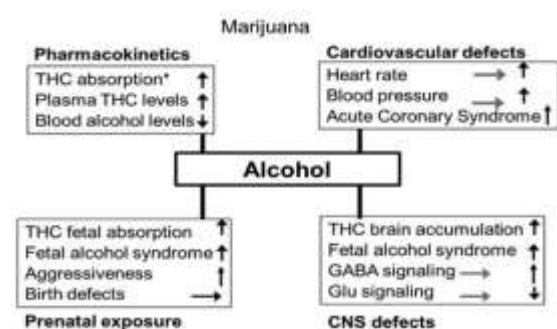
Positive urine test results can still be found 1 week after marijuana consumption and last up to 30 days (Macdonald et al., 2010). A positive screening result should be confirmed by a more specific test such as liquid or gas chromatography, sometimes combined with mass spectrometry but it won't necessary to do it (Macdonald et al., 2010). To establish the diagnosis of marijuana intoxication, a careful examination is needed. Starting from history of clinical symptoms, physical examination and other tests to rule out differential diagnoses, especially those that provide a clinical sign that is almost similar to marijuana intoxication such as amphetamine, opioids, LSD, anti-depressant drugs, BZD, alcohol (Gorelick, 2022; Wang & Post, 2019). In this case, we found that the patient was unconscious and before it happened she had a seizure, respiratory and neuropsychiatric problems. Blood test was quite good, only the liver function and renal function was impaired possibly due to complications of intoxication, the x-ray, head CT scan and other tests was normal. Urine test showed positive only for THC.

The management of cannabis (marijuana) intoxication consists of supportive care and it depends on the symptoms that appear, there is no specific antidote for marijuana intoxication (Wang & Post, 2019). The first step is maintain the airway, breathing, and circulation. Patients with lethargy and coma or unconscious should receive supplemental oxygen, assessment and support of airway and breathing, and vascular access. Patients with apnea or at risk for aspiration should undergo rapid sequence endotracheal intubation and receive assisted ventilation (Gorelick, 2022; Wang & Post, 2019). If seizures or dysphoria with agitation is present we can give doses of benzodiazepines, antiemetic can be given within the first 2 hours (Richards et al., 2017; Salomonsen-Sautel et al., 2012; Wang & Post, 2019). Antiemetic drugs should be given cautiously if the patients was unconscious, administration of activated charcoal to reduce absorption and inhibit enterohepatic circulation. Gastrointestinal decontamination is not beneficial in marijuana inhalation intoxication

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(Monte et al., 2017; Wang & Post, 2019). The recovery process due to marijuana intoxication takes approximately 1 to 3 days, if more than 3 days other possible causes must be considered (Monte et al., 2017). In this case, the patient was given 10 mg of diazepam intravenous slowly to treat the seizure and followed by phenytoin 100 mg intravenous every eight hours to control the seizure, 30 mg of lansoprazole injection every eight hours, a nasogastric tube for nutrition, nacl infusion 1500 ml in twenty four hours and oxygenation. We did observe the alcohol involvement, the BAC test result was 70 mg/dl. This level of alcohol did not cause the intoxication, so there was no alcohol intoxication (Jung & Namkoong, 2014). Simultaneous use of marijuana and alcohol is associated with more dangerous consequences or side effects than using just one type of substance (Linden-Carmichael et al., 2019; Singh, 2019). Alcohol will increase absorption from THC so that the side effects of THC will be more severe, besides alcohol can also inhibit the metabolism of THC associated with cytochrome enzymes (Singh, 2019). Alcohol and cannabis are neuro inhibitor agents, so that if these two substances are used together it will cause damage to the brain especially the hippocampus area and many more (Patrick et al., 2018; Singh, 2019).



**Figure 1.** Effects of alcohol exposure on cannabis's pharmacokinetics, cardiovascular function, CNS functions and prenatal effects (Singh, 2019)

## Conclusions

A 23 years old girl who was admitted to the hospital with decreased consciousness, she also had a seizure, low blood pressure, respiratory and neuropsychiatric problems.

The fully examinations result showed positive THC from the urine test while the other tests were negative. Later she was diagnosed with marijuana intoxication, and she was given a supportive therapy based on her symptoms. There is no specific antidote for marijuana intoxication.

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## Ethical Clearance

Not required for a case report.

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