



## Successful Treatment of Cannabis and Methadone Overdose with Hemoperfusion – A Case Report

### Abstract

Multiple drug overdose due to illicit drug abuse can be life threatening. We report the case of a middle-aged man who presented with drowsiness, hypoventilation, and intractable seizures who had acute cannabis and methadone overdose. He was treated with two sessions of hemoperfusion leading to improvement which to our knowledge is the first reported case of treatment of cannabis and methadone overdose with hemoperfusion.

**Keywords:** Hemoperfusion, Cannabis, Methadone

### Introduction

Cannabis is the most widely abused illicit substance worldwide while methadone a synthetic opioid is not freely available. Toxic doses of cannabis can cause cardiorespiratory depression, convulsions, and death. There is no specific antidote for cannabis toxicity while methadone toxicity has been treated with naloxone and benzodiazepines. In the current case, the mixed toxicity of cannabis and methadone caused intractable seizures which improved after two sessions of hemoperfusion.

### Case Report

A 58-year-old male was brought to emergency in an unconscious condition. He was comatose, with a pulse rate of 120 beats/min, blood pressure of 154/90 mmHg, shallow respiratory effort, and saturation of 92% on room air. He was febrile, and blood glucose was 153 mg/dL. His pupils were pinpoint with depressed deep tendon reflexes. There was no past medical illness, but he used to smoke daily. He had multiple generalized tonic clonic convulsions and was intubated. Loading dose of inj levetiracetam 1 g was given, and he was kept on fentanyl and midazolam infusion. The blood urea was found to be 72 mg/dl and serum creatinine was 2.1 mg/dl. The electrolytes levels, hemogram and liver function test were normal. Arterial blood gas showed high anion gap metabolic acidosis. MRI brain showed normal study. Due to unrelenting seizures, inj lacosamide and intravenous propofol infusion were added. Suspecting illicit drug overdose, urine toxin screen was sent which showed toxic levels of cannabis–261 ng/mL ( $\leq 50$  ng/mL) and methadone–719 ng/mL ( $\leq 300$  ng/mL). In view of refractory seizures with multiple anticonvulsants, the option of extracorporeal removal of the toxins was evaluated. Cannabis and methadone both have high protein binding (90% and 85%, respectively) and lipid solubility, hence hemodialysis was not possible. Resin adsorbent based hemoperfusion was a treatment option for removal of cannabis and methadone, but it was not reported to be used in past. After discussion with the patient's family, he was subjected to a first session of hemoperfusion at 42 hours after admission. Resin (Styrene divinylbenzene polymer) adsorbent-based hemoperfusion

cartridge (HA 230 – Jaffron Biomedical Co. Ltd.) was connected post pump and predialyzer (Fresenius – F6 polysulfone) after initial charging of cartridge with 25000 units of unfractionated heparin in 1 L of saline. Four hours of hemoperfusion along with hemodialysis (blood flow and dialysate flow of 150 and 300 mL/min, respectively) was done on Fresenius 4008 S machine. Patient tolerated the procedure, and there was complete cessation of the convulsions 12 hours later. The second session was done after 18 hours following which there was gradual improvement in sensorium. A repeat urine toxin screen did not show presence of any toxins. After weaning off from the ventilator, he confirmed consumption of the drugs. He was discharged on day 22 and is healthy at 1-year follow-up.

### Discussion

Cannabis and methadone are abused as illicit drugs. Cannabis can cause cardiorespiratory depression and death if consumed in high doses.<sup>1</sup> Methadone used in the treatment of opioid dependence can cause respiratory depression and cardiac arrhythmias.<sup>2</sup> Although methadone and cannabis toxicity predominantly cause CNS depression, both are known to cause seizures due to decreased seizure threshold via NMDA and  $\mu$ -opioid receptors leading to intractable seizures and myoclonus.<sup>3,4</sup>

Tetrahydrocannabinol (cannabis) and methadone have high protein binding (99% and 85–90%, respectively) and are highly lipid soluble. Due to high lipophilicity, they can persist in liver and adipose tissue with elimination half-life of 22 hours and 8–59 hours, respectively.<sup>1,2,5</sup> There is no antidote for cannabis toxicity and management is supportive. Methadone overdose may be treated with naloxone. Due to intractable seizures not responding to ongoing anticonvulsants, hemoperfusion was offered in our case. In hemoperfusion, anticoagulated blood is passed through a filter containing adsorbent particles made of activated carbon or anion exchange resin which removes drugs which are lipid soluble with high protein binding. In our patient, two sessions of hemoperfusion improved the neurological condition with documented decrease in the levels of both drugs.

To our knowledge, this is the first case of the use of hemoperfusion for the removal of cannabis and methadone in humans. Previous case reports of successful use have been reported in animals.<sup>6</sup>

## Conclusion

Hemoperfusion may be considered for the removal of cannabis and/or methadone, especially in the presence of life-threatening complications or severe neuroexcitatory symptoms.

## Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent.

## Conflicts of interest

There are no conflicts of interest.

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