CASE REPORT

Two cases of severe opiate toxicity after ingestion of poppy seed tea

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ABSTRACT

The opioid epidemic continues to grow as users expand into novel opioid agents, many of which can be purchased legally. Poppy seed tea is a popular opiate alternative, containing both morphine and codeine, and is available on the internet for legal purchase. Reports of serious toxicity and deaths from poppy seed consumption abound in the lay press and lay websites but are sparse in the medical literature. We report two cases of serious opiate toxicity following the consumption of poppy seed tea.

KEYWORDS

Opiate; poppy seed; poppy seed tea; naloxone; overdose

Introduction

The United States remains deeply mired in the opioid epidemic with almost 50,000 deaths attributed to opioids in 2017 [1]. Increased recognition of the epidemic has led the medical community to make large efforts to limit opioid prescriptions; however, opioid deaths continue to rise [2]. Many users have turned not only to street drugs such as heroin and fentanyl, but also to alternative products purchased on the internet, or available over the counter including loperamide and kratom [2, 3]. Users seek these alternative “legal” products for both recreational use and to treat symptoms of dependence and withdrawal [4].

The legal status and ease of purchase of these alternatives often imparts a false perception of safety with users [5]. Despite this perception, several opioid alternatives have been linked to serious toxicity. Abuse of loperamide, an antidiarrheal agent with central opioid effects at high doses, has resulted in cardiac dysrhythmias and deaths [3]. Kratom (Mitragyna speciosa), a plant containing the partial mu-opioid agonist mitragynine, has been linked to dependence, withdrawal and toxicity [6, 7]. In 2016, the lay press reported on the death of a teenager attributed to poppy seed tea [8, 9]. To date, however serious clinical toxicity from poppy seed tea is not well described in the medical literature.

We present two cases of severe opioid toxicity after the consumption of a tea made from poppy seeds purchased on the internet.

Case 1

A 33-year-old man purchased poppy seeds on the internet to treat symptoms of chronic anxiety. The patient was rationing his prescribed alprazolam, taking half the prescribed dose, as he was running low. He read on the internet that poppy seeds could help symptoms of withdrawal and decided to make the tea to prevent such symptoms. Other home medications, taken approximately 12 hours prior to ingestion of the tea included escitalopram and buspirone. He ingested no other substances, including other opioids.

The patient prepared a homemade tea by mixing 2 pounds of poppy seeds with 64 ounces (approximately 2 L) of water and shaking it vigorously for 10–15 minutes (Figure 1). Soon after ingestion of one half the mixture, the patient reported feeling “intoxicated” and then fell asleep. His wife later found him unresponsive and called EMS. Paramedics administered naloxone with complete reversal of sedation. He underwent approximately 4 hours of observation in the ED and discharged home. Prior to discharge, he received 1 mg alprazolam orally for symptoms of anxiety.

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One hour after arrival home, his wife found him unconscious and cyanotic. She again called EMS. He again received naloxone with complete reversal of symptoms. In the ED, he had a normal mental status and normal vital signs with an otherwise unremarkable physical exam. Urine drug screen was positive for opiates and benzodiazepines only. The patient was admitted to the ICU for observation given recurrent and severe opioid toxidrome. He did not require any further naloxone.

Analysis of the tea with LC-MS/MS (Shimadzu Prominence LC coupled to a 5600 QTOF, Sciex, Framingham, MA) followed by quantitative opiate analysis (Agilent LC coupled to a 5500 QTrap Sciex, Framingham, MA) confirmed the presence of morphine (1.09 mg/mL), codeine (62.1 mcg/mL), and thebaine (quantitative testing not done) with no additional opioids (including fentanyl, methadone, hydrocodone, and oxycodone) detected.

Four months later, he presented to the ED with symptoms of opioid withdrawal. He confirmed that the above incident was the first time he had used poppy seeds, but since that time, he used them daily. He reported ordering unwashed poppy seeds from Amazon and preparing them in the manner described above. He would strain the mixture and consume 150–175 mL daily. The day prior to presentation, he only consumed 20 mL because he had run out of poppy seeds and his expected shipment had not arrived. He consumed no poppy seeds on the day of presentation. He used no other opioids.

The patient reported feeling anxious along with nausea, abdominal cramping, and diarrhea. His exam was significant for piloerection and mydriasis with pupils ranging 6–7 mm. Vital signs were within normal limits. He received lorazepam 1 mg orally and loperamide 2 mg orally with improvement in symptoms. He was discharged home with substance abuse information and prescriptions for loperamide and clonazepam.

**Case 2**

A 17-year-old boy with a history of polysubstance abuse purchased poppy seeds and 0.1 mg etizolam tablets on the internet. He prepared a poppy seed tea by mixing 1.5 pounds of poppy seeds with water. His mother found him unresponsive and performed CPR until EMS arrived. EMS administered 2 mg IM naloxone followed by 2 mg IV naloxone. On arrival to the initial hospital, he had pulses and was breathing but was reportedly hypoxic and required another 3 mg naloxone IV in two divided doses for respiratory depression. On exam after transfer to our hospital, vital signs were temperature 37°C, heart rate 110 beats/min, blood pressure 95/48 mm Hg, respirations 12 breaths/min, oxygen saturation 98% on 60% FIO2 on high flow nasal canula. His exam revealed 3 mm reactive pupils, shallow respirations with coarse lungs sounds at the bases, and neurologic exam with normal mental status, alert and oriented to time/place/person, with no motor or sensory deficits, and normal patellar deep tendon reflexes without clonus. Immunoassay urine drug screen was positive for opiates and benzodiazepines. GC/MS testing confirmed the presence of codeine and morphine. GC/MS was negative for 6-monoacetylmorphine, oxycodone-like opioids, fentanyl, buprenorphine, norfentanyl, meperidine, tapentadol, hydromorphone, methadone, propoxyphene, tramadol, barbiturates, and benzodiazepines (etizolam not tested on GC/MS).

The patient was observed overnight and did not require further naloxone administration.

**Discussion**

Poppy seeds contain opiate alkaloids morphine and codeine [10], and occasional reports describe abuse and toxicity of poppy seed tea [10, 11], however reports of clinically severe opiate toxidromes are sparse in the medical literature. A *Lancet* report from King et al. in 1997 [10] described a case of poppy seed tea dependence and toxicity in a baker recovering from heroin addiction. In a manner similar to Case 1, King tested the poppy seed tea and found morphine concentrations of 0.14 mg/mL, compared to 1.09 mg/mL in Case 1. Notably, King found blood morphine concentrations that far surpassed those typically associated with fatal heroin overdoses. Additionally, in a post mortem case, Bailey et al described a fatality after a polysubstance overdose that included poppy seeds and the benzodiazepine...
which converts codeine into morphine [14], may promote the conclusion that the patients’ symptoms were attributable to poppy seeds. Importantly, fentanyl, a common contaminant of illicit opioids that results in a severe opioid toxidrome, was not detected in either case despite extensive opioid testing.

In Case 1, the patient did not overdose on any other drug per history or clinical exam, however he did receive a dose of alprazolam after the first presentation. In Case 2, however, the patient purchased an illicit benzodiazepine over the internet, making the dose and true etiology of the substance less reliable. Although benzodiazepines purchased on the internet have been found to contain fentanyl in previous cases, notably fentanyl was not detected in this case. It is possible, however, that the addition of a benzodiazepine could contribute to the severe toxicity that ensued, particularly in the second case.

The opioid epidemic continues to exact a toll both in the United States and abroad. Not only are the number of deaths increasing, but the variety of opioids used is rapidly diversifying. Increased regulatory and interdiction pressure may result in dependent patients seeking alternative opioid sources, including natural opiate sources such as poppy seeds.

Poppy seeds are unregulated and easily obtained through legal channels via online suppliers. Consumption of poppy seeds has the potential to cause significant, if not fatal, opiate poisoning in patients that attempt to abuse them. This danger is further complicated by inherent uncertainty involved in attempting to extract opiates from uncontrolled sources using a variety of untested methods described on the internet [13]. There is no way for a user to anticipate the effect of an unknown dose of an unknown substance. Polymorphisms in CYP 2D6 metabolism, the enzyme which converts codeine into morphine [14], may produce variation in the severity and duration of toxicity resulting from ingestion of poppy seed tea. The two cases of severe opiate toxicity described here highlight potential hazards of consuming poppy seed tea.

Disclosure statement

No potential conflict of interest was reported by the authors.

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