



CASE REPORT

Poppy Seed Tea: A Short Review and Case Study

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ABSTRACT

Unwashed poppy seeds are widely available online through private websites or via well-known sellers such as eBay and Amazon. These seeds can be used to produce a tea that contains an opioid content sufficient to produce psychoactive effects and to cause withdrawal symptoms when discontinued abruptly, yet their sale and distribution is legal in the United States. Clinicians may not be aware of poppy seed tea and some individuals may use it habitually or as an analgesic. There is a paucity of literature on this topic, although a few cases of poppy seed tea intoxication and dependence have been reported. A clinical case is presented here.

Keywords: Opioid; Opioid use disorder; Poppy seed; Unwashed poppy seed

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INTRODUCTION

Opium is the dried extract of the exudate from the seedpods of unripe poppies, *Papaver somniferum*. Opium contains a variety of substances (fats, proteins, plant wax, latex, sugars, and others) along with some key alkaloids: morphine (10–15%), codeine (1–3%), noscapine (4–8%), papaverine (1–3%) and thebaine (1–2%) [1]. Poppy seeds are used to make poppy seed tea by washing or soaking large quantities of seed to remove the residual coating of opioid and debris from the seeds [2]. A large quantity of unwashed poppy seeds is required to make the tea.

Poppy-seed-based beverages have a long history. In fact, Paracelsus, the Swiss physician, is credited with having “invented” a poppy-based beverage known as laudanum in the 16th century by mixing opium, distilled water, and alcohol. Laudanum was widely used in Europe and America up until the 19th century, at which time opium also found its way into numerous patent medicines. It was not until the early 20th century that the potential dangers of opium were discussed scientifically [3], and its manufacture was brought into laboratories under federal regulations.

In a survey taken among patients at an opioid rehabilitation center ($n = 24$), 46% of patients reported that they had tried poppy seed tea. Five of the 24 patients reported poppy seed tea as their main source of opioids. Two of the

24 patients had opioid use disorder from other opioids and used poppy seed tea to manage withdrawal symptoms. In this survey, respondents said poppy seed tea had an onset of action of about 15 min and effects could last 24 h; its main reported drawback was that it did not taste good [2]. In the United States and many other parts of the world, unwashed poppy seeds are available freely with no legal restrictions.

This paper describes a case report from the author's experience along with a summary of case reports in the literature on poppy seed tea. The case study reported here conforms to ethical standards and was conducted by scientifically qualified investigators with the informed consent of the subject. The case studies mentioned in our review of the literature on poppy seed tea were not conducted by these investigators.

DRUG CONCENTRATIONS

Poppy seeds contain negligible alkaloid content and have long been considered safe for use in baking, although they may cause a false positive on certain drug tests. The highest content of phenanthrene alkaloids in the poppy plant are found in the seed pods; the seeds themselves have much lower concentrations [4]. The opioid concentrations found in poppy seeds come primarily from the alkaloid residue retained on the seeds, which is why "unwashed" is an important marketing term for poppy seed purveyors. The opioid concentration of poppy seed tea varies widely, as it is based on the amount of alkaloid residue on the seeds, the quantity of seeds used, how the tea is prepared, and how much tea an individual consumes. Recipes for poppy seed tea call for soaking a large quantity of seeds for up to 12 h; soaking may be done in water or in lemon juice.

The morphine, codeine, and thebaine content in poppy seed tea was analyzed by liquid chromatography-tandem mass spectrometry and found a morphine concentration of $< 1\text{--}2788$ mg/kg, a codeine concentration of $< 1\text{--}247.6$ mg/kg, and a thebaine concentration of $< 1\text{--}124$ mg/kg with alkaloid yields varying depending on extraction method. This

suggests that high, potentially lethal doses of morphine can be found in poppy seed tea [5].

CASES OF POPPY SEED TEA DEPENDENCE FROM THE LITERATURE

There is a paucity of literature on poppy seed tea but the approximately dozen articles on the topic relate mainly to case studies of poppy seed tea dependence. An 82-year-old widow in India presented to a clinic with a 55-year history of opium use, starting with an opium candy used to relieve pain after the birth of her fourth child. Over the years, she learned to make a tea from dried poppy pods; she consumed 1 to 2 l of this beverage daily and her family brought her for treatment when poppy pods were no longer available to her and she underwent withdrawal symptoms, rated 26 on the Clinical Opioid Withdrawal Scale (COWS). She underwent detoxification under medical supervision and was then started on opioid maintenance therapy with 0.4 mg of buprenorphine and counseling. She was followed for 1 year and had experienced no relapse [6].

In another case report in the literature, a 43-year-old woman in Australia presented at a drug treatment center; she had been an intravenous (IV) heroin user who migrated to poppy seed tea about 10 years earlier to manage her addiction. Over the decade, she had increased her consumption to the point where she was using 5 or 6 kg of poppy seeds per week to make her tea, which she only took orally. She had tried to stop using poppy seed tea on her own, with counseling, and in residential treatments but had never been successful. Each time she discontinued poppy seed tea she experienced withdrawal symptoms of diarrhea, vomiting, sweating, anxiety, and rhinorrhea. The patient was started on buprenorphine maintenance and has been successful in maintaining this regimen [7].

A 26-year-old man presented at a drug treatment center with an extensive substance use disorder history. His IV heroin use started around the age of 22, which was sometimes punctuated with amphetamine binges, and by the next year he was using poppy seed tea to

substitute for his heroin use, which had become prohibitively expensive (about \$1000 per week). He also suffered depression and anxiety. He was drinking the solution from about 1 kg of poppy seeds per day, which he was able to purchase at a local supermarket. Over time, his use escalated to three times that amount, which he sometimes supplemented with opportunistic use of heroin, benzodiazepine, and alcohol. The patient was commenced on a methadone maintenance program that started at 30 mg but escalated over the next 12 weeks to 110 mg (at lower doses, he would “top off” with poppy seed tea). His agitation and anxiety increased when poppy seed tea was discontinued, but this was managed with venlafaxine XR 225 mg and psychological therapy [7].

A 26-year-old baker suffered a tonic-clonic seizure, which appeared to physicians to be the result of a toxic encephalopathy [8]. The baker denied using drugs, but his employer noted the bakery was ordering an unusually large amount of poppy seeds. After a urine drug screen revealed the presence of morphine, the baker admitted that he drank poppy seed tea every night at the bakery, something he had learned from the other bakers when he was still an apprentice. He admitted that he had used IV heroin for several years, which he had been able to stop with poppy seed tea. He entered a methadone maintenance treatment program, which he quit after several months and resumed poppy seed tea. His poppy seed tea consumption escalated rapidly, and he stated that if he skipped poppy seed tea for 1 day, he developed withdrawal symptoms. A sample of the tea he prepared regularly for himself tested to have a morphine concentration of 0.14 mg/ml. He was drinking up to 2 l of this tea every day, which required about 4 kg of poppy seed per day. This amount was not trivial, as it translates to daily consumption of about 280 mg of morphine a day. He requested detoxification and rehabilitation. He started on extended-release morphine 60 mg twice daily to manage withdrawal and eventually tapered to 20 mg twice daily. His blood tests show a morphine concentration of 0.1 mg/ml and he has had no further seizures and stated he no longer drinks poppy seed tea [8].

POPPY SEED AVAILABILITY

In the United States, poppy plants are considered a Schedule II controlled substance with the exception of the seeds, which are legal to purchase and have been popular for many decades in baking. Poppy seeds are also available for legal purchase in Australia, Canada, and many other countries. In New Zealand, large bags of poppy seeds can be obtained from the supermarket and are relatively inexpensive [2]. Amazon, eBay, and Etsy, major online stores serving customers within and outside of the US, offer poppy seeds for sale. A popular large health and wellness site (Mercola.com) recommends poppy seed tea for pain control and recipes appear there and on ChewTheWorld.com (neither of these sites sell poppy seeds). The website FoodtoLive.com sells different varieties of poppy seeds (identified by origin: English, Australian, Spanish) for \$9.99 to \$17.98 a pound. The website PoppySeedTeaRecipe.com advertises poppy seeds from California as a “homemade high” and offers a pound of unwashed poppy seeds for \$25.99. The website thenoddingturtle.biz sells European and Tasmanian “unwashed” poppy seeds with prices available upon e-mail request, as discounts may apply if a buyer opts for 10 lb or more. Poppy seeds are also sold on this site as an exfoliant. SincerelyNuts.com sells a variety of foodstuffs, including poppy seeds for \$11.99 lb (English), \$7.99 a pound (Dutch), or \$4.99 a pound (Spanish). This site does not discuss poppy seed tea. OpiumPoppySeeds.com sells opium seeds to grow poppies.

OTHER ROUTES OF ADMINISTRATION

Poppy seed tea is intended to be drunk, but there are two case reports of IV use of poppy seed tea [9]. Two men injected poppy seed tea IV together and developed similar and almost immediate reactions: fever, rapid heart rate (about 170 beats per minute), vomiting, and myalgia. Upon arrival to the emergency department, their temperature was about 40 °C, oxygen saturation was around 90%, respiration

was at 38/min for both men who were writhing in pain and vomiting. Patients were treated with ceftriaxone and vancomycin along with IV benzodiazepines for agitation. Both men had to be admitted to the intensive care unit (ICU); they left the ICU and at 72 h left the hospital against medical advice [9].

Eating poppy seeds in large quantities is not associated with opioid toxicity, but there is one case report in the literature where a 54-year-old woman died of a bowel obstruction after eating a very large amount of poppy seeds [10].

THE CASE

The following case comes from the clinic of Dr. Irving Haber. A 42-year-old man with a history of opioid use disorder presented voluntarily to the clinic for medication-assisted treatment (MAT). About a year earlier, he had learned that poppy seeds were legal and readily available online, so he began making and consuming poppy seed tea. Over time, he increased his consumption of poppy seed tea, but for many months he had still been able to manage his personal affairs and run his family business, a professional design company, without problem. When he reached the point that he was no longer able to manage the situation on his own without medical help, he self-referred to the clinic.

Under our clinical care, he entered detoxification and after more than 24 h of abstinence; his Clinical Opioid Withdrawal Scale (COWS) score was 23. He was titrated to 16 mg buprenorphine/naloxone, which reduced his COWS score to 8. The patient noted that he experienced unpleasant waves of nausea after each administration of buprenorphine/naloxone, which continued over the next few days. His withdrawal symptoms were typical for opioids but were more protracted, tedious, and tenacious.

The patient was titrated to the relatively high dose of 24 mg buprenorphine monotherapy, which was well tolerated. In fact, rotation to straight buprenorphine 24 mg (without naloxone) allowed him to discontinue ondansetron hydrochloride 8 mg every 6 h and reduce his use of promethazine 25 mg from four times

daily to once at night. An initial urine screen after using mass spectrometry and liquid gas chromatography about a week from induction was positive for morphine at 951 ng/l. Two weeks later (3 weeks post-induction), the test showed he was qualitatively positive for morphine, which was quantified as 23,495 ng/l. The patient denied any use of poppy seed tea and in a re-test in the next 2 weeks, morphine levels were undetectable. In 6 weeks, the patient was taking buprenorphine 20 mg, which has since been reduced to 18 mg. The patient agreed to taper to 16 mg. He has undergone counseling and he and his family were issued a naloxone auto-injector system to protect him against opioid overdose.

DISCUSSION

Opioid use disorder has become a major public health crisis in the United States, and the present legal status of unwashed poppy seeds and the popularity of poppy seed tea as a “legal high” or “pain control” is disturbing in that poppy seed tea appears to result in dependence in some users. Very few clinicians are aware of poppy seed tea and it is likely that patients may think this is a benign “natural” beverage. With no legal restrictions and apparent endorsement from reliable brands and trusted websites, patients may have little reason to think this tea is actually a version of morphine. The authors urge clinicians to better familiarize themselves with poppy seed tea and to educate patients and their families about this seemingly innocuous drink.

It is also important that our government and regulatory agencies understand the potential dangers of poppy seed tea and work to close this loophole. Poppy seeds remain an important ingredient in baking but few bakers purchase 10-pound sacks of poppy seeds every few days. There must be ways to fix the murky legal status of poppy seeds and to advise patients who may be tempted to brew poppy seed tea as a “healthful alternative” to other analgesics.

This case study demonstrates that poppy seed tea may be addictive, precipitate withdrawal symptoms, and require medical

management. Since poppy seeds are readily available and may not be illegal, people may draw the conclusion that they are relatively safe. Clinicians may not be aware that poppy seed tea may be used for its psychoactive effects or that it is so easily available.

CONCLUSIONS

Unwashed poppy seeds may contain sufficient alkaloid residue to produce tea with a substantial morphine content to the extent that regular users can develop dependence and opioid use disorder. Yet, unwashed poppy seeds in large quantities (5 or 10-pound sacks) are freely available online and with no stigma or warnings, so consumers may believe they are using a harmless substance.

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