

Coca tea consumption causes positive urine cocaine assay

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Background Coca tea, derived from the same plant that is used to synthesize cocaine, is commonly consumed in South America and easily obtained in the United States.

Objectives To determine whether consumption of coca tea would result in a positive urine toxicology screen for cocaine metabolites.

Methods Five healthy adult volunteers consumed coca tea and underwent serial quantitative urine testing for cocaine metabolites by fluorescence polarization immunoassay. The cutoff for a positive assay was chosen at 300 ng/ml, the National Institute on Drug Abuse standard.

Results Each participant's urine cocaine assay was positive (level exceeding 300 ng/ml) by 2 h after ingestion. Three out of five participants' samples remained positive at 36 h. Mean urine benzoylecgonine concentrations in all postconsumption samples was 1777 ng/ml (95% confidence interval: 1060–2495).

Introduction

Coca tea, or mate de coca, is commonly consumed in South America and is marketed as an aid to altitude adjustment. The tea, also found in restaurants in the United States, is made from the leaves of the coca plant, *Erythroxylum coca*, the same plant used to harvest cocaine. Previous studies have demonstrated that cocaine can be extracted from Health Inca tea (Enaco, Peru, South America), one brand of mate de coca [1].

Hospital toxicology screens primarily assay metabolites of a handful of parent drugs. Screens are subject to false-positive and false-negative results and require interpretation on the basis of the patient's reported history [2]. The hospital screen for cocaine measures benzoylecgonine. As coca is metabolized to benzoylecgonine, we sought to determine whether consumption of a commercially available tea made from coca leaves would result in urine benzoylecgonine concentrations high enough to result in a positive hospital screen for cocaine metabolites.

Methods

Institutional Review Board approval was obtained. Coca tea was prepared using commercially available Delisse (Enaco) mate de coca tea bags from Peru. Each tea bag

Conclusions Coca tea ingestion resulted in a positive urine assay for cocaine metabolite. Healthcare professionals should consider a history of coca tea ingestion when interpreting urine toxicology results. *European Journal of Emergency Medicine* 13:340–341 © 2006 Lippincott Williams & Wilkins.

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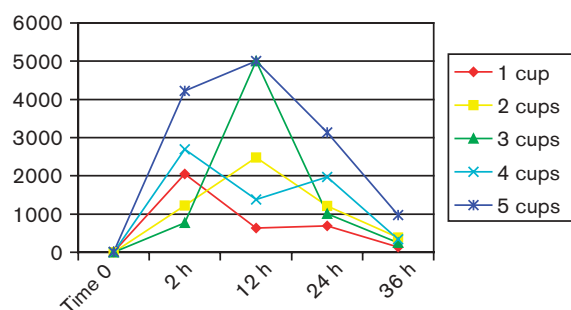
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was steeped in 8 ounces of water for 15 min. Five healthy volunteers (four men and one nonpregnant woman) consumed coca tea over 15 min. A standard serving of tea is 8 fluid ounces; participant A consumed a single 8 ounce cup of tea, participant B consumed two cups, participant C consumed three cups, participant 4 consumed four cups and participant 5 consumed five cups. All volunteers were in good health; all denied using any drugs of abuse, medications or supplements. Urine samples were collected from each participant before ingestion (control), and at 2, 12, 24 and 36 h after ingestion. Urine toxicology assays for benzoylecgonine were performed by fluorescence polarization immunoassay using Abbott AxSym system (Abbott Laboratories, Abbott Park, Illinois, USA). The cutoff for a positive assay was chosen at 300 ng/ml, the National Institute on Drug Abuse standard.

Results

Control urine benzoylecgonine concentrations ranged from 0 to 10.5 ng/ml. At 2 h after ingestion, the urine concentration of benzoylecgonine exceeded the positive reporting threshold (300 ng/ml) in 5/5 (100%) participants. Three out of five participants' samples remained positive at 36 h. Mean urine benzoylecgonine concentrations in all postconsumption samples was 1777 ng/ml

Fig. 1



Urine benzoylecgonine concentrations in ng/ml.

(95% confidence interval: 1060–2495). (see Fig. 1). None of the participants reported stimulant effects after consuming the tea.

Discussion

Prior investigators have attempted to measure the amount of cocaine in coca tea. Floren and Small [3] found 0.8 mg of benzoylecgonine per cup of tea. Jenkins *et al.* [4] demonstrated Peruvian coca teabags to contain an average of 4.8 mg cocaine. ElSohly *et al.* [5] found a tea sample to contain 2.12 mg of cocaine. For comparison, a 'line' of cocaine hydrochloride contains an estimated 20–30 mg of cocaine [3].

The Comprehensive Drug Abuse Prevention and Control Act of 1970 defines the coca leaf as a narcotic. Importing mate de coca is illegal; however, this is difficult to enforce [3]. In fact, coca tea is available for purchase in several restaurants in the United States, as well as on the Internet.

Hospital urine drug screens do not define drug use, as they are only immunoassays and are often subject to inaccurate positive and negative results. All drug screens require interpretation in the context of the patient's clinical presentation. A false-positive drug screen from foodstuffs can be problematic due to costly confirmation testing and subsequent legal ramifications. Past experience with poppy seeds has shown that the public has been subjected to unintentional positive drug tests as well as citing poppy seeds when actually abusing narcotics [6]. A recent news' article outlines the firing and subsequent reinstatement of a coca tea drinker in Illinois after her urine screened positive for cocaine [7].

Conclusions

Coca tea ingestion results in a positive urine assay for cocaine metabolite. Healthcare professionals should consider a history of coca tea ingestion when interpreting urine toxicology results.

References

- Engelke BF, Gentner WA. Determination of cocaine in 'Mate de Coca' herbal tea. *J Pharm Sci* 1991; **80**:962.
- Baden LR, Horowitz G, Jacoby H, Eliopoulos GM. Quinolones and false-positive urine screening for opiates by immunoassay technology. *JAMA* 2001; **286**:3115.
- Floren AE, Small JW. Mate de Coca equals cocaine. *J Occup Med* 1993; **35**:95–96.
- Jenkins AJ, Llosa T, Montoya I, Cone EJ. Identification and quantitation of alkaloids in coca tea. *Forensic Sci Int* 1996; **77**:179–189.
- ElSohly MA, Stanford DF, ElSohly HN. Coca tea and analysis for cocaine metabolites. *J Anal Toxicol* 1986; **10**:256.
- Narcessian EJ, Yoon HJ. False-positive urine drug screen: beware the poppy seed bagel. *J Pain Symptom Manage* 1997; **14**:261–263.
- Newsbrief: Coca tea drinker fired after drug test wins job back. <http://stopthedrugwar.org/chronicle/342/tea.shtml> [Accessed June 2004].