Adolescent Ethanol Intoxication from Vanilla Extract Ingestion: A Case Report

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Abstract

We present a case of vanilla extract ingestion in a teenager resulting in severe intoxication. A review of ethanol ingestion, vanilla ingestion and non-traditional ethanol sources is presented.

INTRODUCTION

Ethanol-containing products such as mouthwash, perfumes, cold medicines, and food flavorings are easily available to children and may cause significant intoxication when ingested accidentally or with the intention to get “high.” We describe the first reported case of clinically significant ethanol (EtOH) intoxication from vanilla extract ingestion.

CASE REPORT

A 16-year-old Asian boy ingested 12 oz. of synthetic vanilla extract (which contains 35% EtOH) at school “on a dare” from his friends. He had no prior medical or substance abuse history. The ingestion was witnessed; there were no other ingestions. On arrival to the emergency department (ED) one hour after ingestion, his temperature was 96.1° F, heart rate 168 beats per minute, respiratory rate18 per minute, and blood pressure 140/95 mmHg. His lungs were clear to auscultation, heart sounds were tachycardic but normal, abdomen was soft and non-distended, and his skin was flushed and warm. Since he was obtunded and had vomited, he was intubated for airway protection. After a normal saline fluid bolus, vital signs normalized. Electrolytes, a urine screen for drugs of abuse, and head CT were normal. A 3-hour post-ingestion EtOH level was 162 mg/dL; repeat EtOH level at 6 hours post-ingestion was 77 mg/dL. He was extubated 12 hours after intubation and discharged from the hospital the following day after substance abuse intervention was recommended.

DISCUSSION

Ethanol intoxication in children and young adults of non-legal age is commonly reported to the nation's poison center network ([1]). Ethanol-containing products such as mouthwash, perfumes, cold medicines, and food flavorings are easily available to children and may cause significant intoxication when ingested accidentally or with the intention to get “high” ([1,2,3,4,5]). Ethanol causes central nervous system depression, which can lead to respiratory compromise. Intoxication may also cause dilated pupils, flushed skin, gastrointestinal distress, hypothermia, and hypotension. Ethanol is metabolized in the liver by alcohol dehydrogenase and elimination follows zero-order kinetics ([5]).

In products containing ethanol, the ethanol concentration is expressed in volume percent. Our patient's vanilla extract contained 35% ethanol by volume, whereas the ethanol content of beer is approximately 2-6%, wine is 10-20%, and distilled liquors 40-50% ([5]). The specific gravity of 1 mL of pure ethanol is approximately equal to 0.8 g, and the volume of distribution (Vd) of ethanol is 0.6 L/kg. A 70 kg subject who ingests 12 oz of a product containing 35% ethanol is expected to have a peak ethanol level of 240mg/dL (three times the legal driving limit).

Peak Blood EtOH = Dose (mg) x 0.8/ Vd (L/kg) x wt(kg) x 10 = 240mg/dL

Treatment of ethanol intoxication is primarily supportive. Because of the rapid absorption of EtOH from the stomach and mucus membranes, attempts at inducing emesis or performing gastric lavage are likely to be ineffective. Blood EtOH concentration can be measured following ingestion, but a level is not essential as treatment is supportive and determined on clinical grounds.

Although the patient ingested the vanilla extract for its ethanol, it is becoming increasingly common to treat young

adults and children after ingesting non-traditional drugs for euphoria ([6,7]). Food flavorings like nutmeg have become a common and easily obtainable means of getting high in young adults ([8]). Information about these non-traditional recreational drugs is easily retrieved on the Internet: adolescents who are adept at navigating these Internet resources may be particularly susceptible to these influential and anonymous web-based communications ([6]).

Vanilla is the only edible plant of the orchid family, and it originally comes from Mexico, Central America, South America, and the Caribbean. Today most liquid vanilla is synthetic in origin, as was the vanilla ingested by our patient. Natural vanilla contains over 250 organic components, but synthetic vanilla contains only vanillin. Although there are no reported cases of intoxication or euphoria with vanillin itself, until recently coumarin was a common adulterant of liquid vanilla produced in Mexico ([9]). In large doses, coumarin has been shown to be hepatotoxic in animal models ([10]). Although legend has it that natural vanilla has aphrodisiac properties and traditionally was reserved for consumption by royalty, we could not find any published reports describing the euphoric or acute clinical effects of vanilla or vanillin. Thus, we cannot conclude how much of our patient's clinical presentation was a result of the vanillin contained in the bottle of vanilla extract. However, he is only 16-years old and reported being alcohol naïve, so his significant obtundation is not surprising given his EtOH level of 162 mg/dL obtained several hours of ingestion, twice the legal driving limit. Ethanol is also found in a variety of other food flavorings (i.e. lemon and almond extracts) and in colognes, perfumes, after shaves, mouthwashes, and cold preparations. Ethanol content ranges from 0.3-75% in these products ([3]). These items are easily accessible to teens, and any young adult with clinical evidence of intoxication should have an ethanol level measured and a complete history of all potential ingestions pursued. Again, information about non-traditional sources of alcohol that may be suitable for consumption by underage adults is easily obtainable on the Internet ([6]).

Upon discharge from the hospital, counseling the family regarding poison prevention in the home, including non-traditional sources of alcohol, is important.

CONCLUSION

We describe the first reported case of clinically significant ethanol (EtOH) intoxication from vanilla extract ingestion. This case illustrates that when caring for an intoxicated teen, health care providers should be vigilant for use of non-traditional sources of ethanol.

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