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## CLINICAL VIGNETTE

# A Case of Hand Sanitizer Ingestion

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### *Case Presentation*

A 30-year-old female with a history of chronic alcoholic liver disease, complicated by hepatic encephalopathy, chronic pancreatitis, thrombocytopenia, and ascites, presented with epigastric pain, nausea, and vomiting for one day. Her epigastric pain was similar in nature to her chronic pancreatitis. She usually consumed only a liquid diet due to chronic pancreatitis, but the night before admission had eaten a chicken potpie and an enchilada. In addition, she reported two episodes of non-bloody emesis.

Review of systems was negative for melena, bright red blood per rectum, diarrhea, constipation, hematemesis, fevers or chills. Her last reported alcohol intake was reportedly a beer the day prior to admission.

On admission her vitals were a temperature of 36.7 ° Celsius, blood pressure of 133/95 mmHg, pulse of 92/minute, respiratory rate of 16/minute, and oxygen saturation of 99% on room air. Her exam was remarkable for tenderness to palpation over the epigastric region, but without rebound, guarding, masses, or evidence of ascites. Her sclera were anicteric, she had no asterixis, and she was alert and oriented x 3. Labs were remarkable for a white blood count of 7.7, hemoglobin 9.2, platelets 104, sodium 136, BUN 2, creatinine 0.4, AST 103, ALT 24, and a lipase of 102. An abdominal ultrasound showed an enlarged heterogeneous liver likely reflecting diffuse fatty infiltration, as well as early cirrhosis with signs of portal hypertension and chronic pancreatitis. It was thought that her abdominal pain was from her chronic pancreatitis which was exacerbated by her dietary indiscretion.

The patient was admitted and was given 500cc of normal saline and ondansetron 4 mg intravenously. She was made NPO and put on maintenance fluids. Her nausea and vomiting resolved, and her abdominal pain improved back to her baseline.

On the planned day of discharge, the patient was found to be acutely altered, somnolent, and difficult

to arouse even to deep sternal rub. Pupils were 4 mm and slightly reactive bilaterally. A venous blood

gas was 7.35/41/81/22 and serum glucose was 113. During examination of the patient, a 1,000 cc bottle of hand sanitizer with approximately 200 cc remaining was found in her bed. Additional labs showed a blood alcohol level of 545 mg/dl and serum osmolality of 443 mosm/kg. Hand sanitizer was removed from the room. Given normal vitals and maintained ability to protect her airway, she was closely observed and returned to baseline mental status over the next 8 hours. The next morning she was discharged to her family for outpatient rehabilitation.

### *Discussion*

There has been a recent increase in reported cases of hand sanitizer ingestions. From 2005 to 2009, the National Poison Data System reported an average increase of 1,894 new cases per year each year<sup>1</sup>. Increasing prevalence was noted in children, teens, and adults, but these numbers may underestimate the actual number of cases, as many are not reported. Children most commonly have accidental ingestions, while teens and adults usually have purposeful ingestions. It is increasingly popular in teens as hand sanitizer can be purchased without being 21 years old. In teens, it is known as "hand sanitripping" or "hand sanitized." While the majority of cases of hand sanitizer ingestion do not result in permanent damage, at least one case report resulted in death<sup>2</sup>.

The hand sanitizer ingested was QUIK-CARE Foam Hand Sanitizer. It contains 62% ethyl alcohol by weight. Other ingredients include water, PEG-10 dimethicone, ethylhexylglycerin, farnesol, bisabolol, tert-butyl alcohol, and denatonium benzoate. A review of the literature suggests PEG-10 dimethicone should be harmless when ingested<sup>3</sup>. Ethylhexylglycerin is used in topical skin care, and while it has been shown to cause contact dermatitis, would probably cause only nausea and diarrhea<sup>4</sup>,<sup>5</sup> even if ingested in large amounts. Farnesol and bisabolol are sesquiterpene alcohols found in essential oils and would similarly likely only cause

nausea, vomiting and diarrhea even if ingested in large quantities<sup>6</sup>. Denatonium benzoate is the bitterest chemical known. It is used in products such as soaps, animal repellents, antifreeze, and nail biting preventions to prevent accidental ingestion. It is not thought to cause any harm when ingested in amounts commercially available<sup>7</sup>. Tert-Butyl alcohol is the simplest tertiary alcohol. It may be present naturally in liquor, as much as 0.25% by weight. The toxic effect in humans is not clearly known, but it is thought to have effects similar to ethanol. In a rat model studying the effects of over 13 weeks of ingestion, the earliest signs of toxicity were ataxia and hypoactivity<sup>8</sup>.

The classic teaching is that the lethal dose of alcohol in an adult is 5 to 8g/kg or a blood alcohol concentration (BAC) of 400mg/dl (.40%). However, this refers to the dose that would kill 50% of people, and there are multiple cases of blood alcohol levels greater than 500 mg/dl in patients who ultimately survived. In the English literature the highest recorded BAC in a patient who survived without hemodialysis was 1,127 mg/dl in a patient who attempted suicide by whisky ingestion<sup>9</sup>. In a patient who received hemodialysis, the highest recorded BAC was 1,500 mg/dl<sup>10</sup>. Patients who chronically abuse alcohol may not manifest evidence of intoxication even when the BAC is greater than 400 mg/dl. Finally, the Mellanby effect can be seen, where signs and symptoms of intoxication appear to be stronger when the BAC is increasing, rather than decreasing, despite equal BAC levels.

Because alcohol is absorbed so quickly in the GI tract, activated charcoal is generally not thought to be helpful. One study failed to show any difference in blood alcohol level after 20 gm of activated charcoal versus 20 gm of water<sup>11</sup>. Ethanol (molecular weight of 44D) is cleared by hemodialysis and can be used in cases of severe alcohol poisoning. If a patient initially presents with coma in the setting of an elevated alcohol level, IV thiamine should be given to try to prevent Wernicke's encephalopathy.

We present this case so that physicians will be aware of the recent trend of cases of hand sanitizer ingestions and misuse. Hand sanitizer ingestion should be considered in a patient with a history of alcohol or substance abuse who develops acute altered mental status while in the hospital.

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