Poisoning from alcohol based hand sanitizer in a hospitalized patient

Madhavi Katikaneni, Hugo Villanueva

ABSTRACT

Introduction: Alcohol based hand sanitizers help to decrease infection rates in hospitals. They contain isopropanol (isopropyl alcohol) or ethanol (ethyl alcohol) in high concentrations, and are easily accessible to patients and staff in health care settings.

Case Report: A 31-year-old female with history of alcohol abuse, seizure disorder and depression presented with symptoms of alcohol intoxication. Initial laboratory results were normal except an ethanol level of 311 mg/dl. She was admitted to the detoxification unit for ethyl alcohol intoxication. It was noted by the staff that she was trying to drink from the wall mounted hand sanitizers and was also seen sucking on alcohol wipes intermittently. On the third day in the detoxification unit, she was found to have lethargy, disorientation, tachycardia, hypotension, and tachypnea. She was given intravenous fluids and intubated for airway protection and transferred to intensive care unit. Laboratory tests showed normal pH, negative anion gap, normal glucose, large serum ketone, measured serum osmolality 340 mOsm/kg, osmolal gap 53 mOsm/kg, ethanol 13 mg/dl. She was treated for supraventricular arrhythmia, aspiration pneumonia. She did not require hemodialysis as acute kidney injury was mild, and osmolal gap and ketones came down with supportive care. Subsequently, she was extubated and recovered completely.

Conclusion: Alcohol based hand sanitizers should be used carefully under surveillance in detoxification and psychiatric units. Poisoning due to isopropanol can be managed effectively if recognized early. Elevated osmolal gap, absence of acidosis, and positive ketones are important clues which help in diagnosing isopropanol poisoning.

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CASE REPORT

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Keywords: Alcohol, Hand sanitizer, Isopropyl alcohol poisoning, Osmolal gap, Poisoning

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Madhavi Katikaneni¹, Hugo Villanueva¹

Affiliations: ¹M.D, Montefiore Medical center-Wakefield Campus, Attending physician, Nephrology, Bronx, New York, U.S.A.

Corresponding Author: Madhavi Katikaneni, 4141 carpenter avenue, Bronx, NY, USA, 10466, Ph: 1 718 920 9041; Fax: 1718 920 9043; Email: makatika@montefiore.org

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INTRODUCTION

Hand hygiene with alcohol based hand sanitizers helps to decrease infection rates in hospitals [1]. They are wall mounted, and easily accessible in hospital setting. The rate of intentional ingestion of hand sanitizers has been on the rise from 2005 to 2009 as per NPDS (National poison data system) [2]. Chemically, alcohol pads and hand sanitizers contain 60 to 80% isopropanol or ethanol.

CASE REPORT

A 31-year-old female with history of alcohol abuse, seizure disorder and depression presented with ataxia, confusion, disorientation. Her medications were trazadone 50 mg orally every night, quetiapine 100 mg orally twice a day, hydroxyzine dose unknown. She follows with primary physician infrequently and has previous admissions for alcohol withdrawal seizures. On admission vitals were temperature 98.6 degrees Fahrenheit, blood pressure 132/84 mmHg, pulse rate 74 per minute, respiratory rate 14 per minute, and had an unremarkable physical exam. Laboratory results showed blood urea nitrogen (BUN) 14 mg/dL, serum creatinine (SCr) 0.7 mg/dL, serum bicarbonate (co2) 28 mEq/L, anion gap (AG) 14 mEq/L, negative ketone in urine and an ethanol level of 311 mg/dL. The patient was admitted to the detoxification unit for ethyl alcohol intoxication and was given oral lorazepam to prevent alcohol withdrawal symptoms. It was noted that she was trying to drink from the wall mounted hand sanitizers (CAL STAT PLUS containing 63% isopropyl alcohol as active ingredient), and sucking on alcohol wipes intermittently in spite of staff counseling.

On the third day in the detoxification unit she was noted to be disoriented and agitated. Vital signs showed temperature 98 degrees Fahrenheit, blood pressure 90/60 mm Hg, pulse rate 124/minute, respiratory rate 20 per minute, and oxygen saturation was 90% on room air. Physical examination showed right lung base crackles, and non-focal neurological examination. She became more and more lethargic and was intubated for airway protection along with administration of intravenous fluids. Laboratory values showed BUN 11 mg/dL, SCr 1.2 mg/dL, lactate 0.7 mmol/L, AG 10 mEq/L, CO₂ 28 mEq/L, pH 7.37, PaCO₂ 43 mmHg, PaO₂ 96 mmHg, serum acetone large, urine ketone 40 mg/dL, measured serum osmolality 340 mOsm/kg, calculated osmolality 287 mOsm/kg, osmolal gap 53 mOsm/kg, serum ethanol 13 mg/dL, lactate 0.7 mmol/L, serum glucose 115 mg/dL, CPK 495 U/L.

She was later transferred to the intensive care unit (ICU), where she was treated for supraventricular arrhythmia which responded to adenosine and was later started on diltiazem drip. She was also placed on a lorazepam drip for sedation along with intravenous fluids and multivitamins. Later she developed aspiration pneumonia and received antibiotics. Her kidney function worsened with a maximum SCr of 1.4 mg/dL (day-5), serum osmolality 290 mOsm/kg (day-7), negative urine ketone (day-5). ICU stay was for 8 days. She did not require hemodialysis and recovered completely with supportive care.

DISCUSSION

The half-life of isopropanol which is usually 2.5–6 hours may be prolonged if there is combined intoxication

with ethyl alcohol, because ethyl alcohol has higher affinity to alcohol dehydrogenase. Effects of intoxication are due to isopropanol itself and include central nervous system depression, myocardial depression, arrhythmia, respiratory depression, and rhabdomyolysis [3]. Although our patient's isopropanol levels were sent to the lab, they were not available on-time to manage the patient. Hence, our diagnosis was mostly based on history and osmolal gap of 53 mOsm/kg. Other diagnostic clues were absence of acidosis and anion gap, large ketonemia [4]. Using the fact, that accumulation of low molecular substances like alcohols, propylene glycol, and diethylene glycol will raise serum osmolality above the calculated level, we can estimate the isopropyl alcohol level. The normal osmolal gap measured using freezing point depression method is 10 mOsm/kg to 20 mOsm/kg, and for every 10 mg/dL of isopropanol the change in osmolality is 1.66. Based on this the level of isopropyl alcohol in our patient, was estimated as 71.4 mg/dL to 56.4 mg/dL [5]. If the patient presents late, as isopropyl alcohol is already metabolized to acetone, osmolal gap can be normal. In that situation the only clue would be elevated acetone. Interference of acetone with Jaffe calorimetric assay leading to false elevation of creatinine can occur. For every 100 mg/dl of acetone estimated increase in serum creatinine is 1 mg/dL [6].

Unlike methanol and ethylene glycol which have toxic metabolites like formic acid and oxalic acid, isopropanol has acetone as end product. Acetone is relatively nontoxic and fomepizole which is an alcohol dehydrogenase inhibitor is not recommended [7].

Hemodialysis is needed for levels more than 400 mg/dl and if there is central nervous system depression or renal failure.

Intoxication with isopropanol from hand sanitizers happened while patient was hospitalized. Although there was no bad outcome, it is essential to recognize the problem and make changes in detoxification units. It is essential for the clinician to probe the possibility of intoxication from other kind of alcohols. Facility to check isopropanol levels is not available in all hospitals, and even if levels are sent results may not be immediately available to make clinical decisions. Checking the osmolal gap, acetone levels in blood and urine on admission and having high index of suspicion will help in early recognition of isopropanol poisoning. Some recommendations regarding the use of hand sanitizers in detoxification units include listing of the contents of hand sanitizers as isopropanol instead of isopropyl alcohol, placing hand sanitizer dispensers in locations where they can be easily monitored by staff [8], avoiding isopropanol based sanitizers in detoxification units whenever appropriate. Health care providers working in psychiatric, detoxification units should be aware of possibility of potential for misuse of hand sanitizers which are vital for infection control.

CONCLUSION

Alcohol based hand sanitizers should be used carefully under surveillance in detoxification and psychiatric units. Poisoning due to isopropanol can be managed effectively if recognized early. Elevated osmolal gap, absence of acidosis, and positive ketones are important clues which help in diagnosing isopropanol poisoning.

Author Contributions

Madhavi Katikaneni – Substantial contributions to conception and design, Acquisition of data, Analysis and interpretation of data, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Hugo Villanueva – Substantial contributions to conception and design, Drafting the article, Revising it critically for important intellectual content, Final approval of the version to be published

Guarantor

The corresponding author is the guarantor of submission.

Conflict of Interest

Authors declare no conflict of interest.

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REFERENCES

1. Hilburn J, Hammond BS, Fendler EJ, Groziak PA. Use of alcohol hand sanitizer as an infection control strategy in an acute care facility. *Am J Infect Control* 2003 Apr;31(2):109–16.
2. Gormley NJ, Bronstein AC, Rasimas JJ, et al. The rising incidence of intentional ingestion of ethanol-containing hand sanitizers. *Crit Care Med* 2012 Jan;40(1):290–4.
3. Slaughter RJ, Mason RW, Beasley DM, Vale JA, Schep LJ. Isopropanol poisoning. *Clin Toxicol (Phila)* 2014 Jun;52(5):470–8.
4. Jerrard D, Verdile V, Yealy D, Krenzelok E, Menegazzi J. Serum determinations in toxic isopropanol ingestion. *Am J Emerg Med* 1992 May;10(3):200–2.
5. Kraut JA, Kurtz I. Toxic alcohol ingestions: clinical features, diagnosis, and management. *Clin J Am Soc Nephrol* 2008 Jan;3(1):208–25.
6. Peng LW, Janga R, Lien YH. Isopropyl alcohol-induced pseudo-azotemia: taking advantage of a laboratory error. *Am J Med* 2006 Aug;119(8):e9.
7. Abramson S, Singh AK. Treatment of the alcohol intoxications: ethylene glycol, methanol and isopropanol. *Curr Opin Nephrol Hypertens* 2000 Nov;9(6):695–701.
8. Emadi A, Coberly L. Intoxication of a hospitalized patient with an isopropanol-based hand sanitizer. *N Engl J Med* 2007 Feb 1;356(5):530–1.

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