Morbidity in the COVID-19 era: Ethanol intoxication secondary to hand sanitiser ingestion

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We report on a 6-year-old child diagnosed with ethanol poisoning due to ingestion of hand sanitiser. This occurred in the midst of the COVID-19 pandemic in Australia, when public messaging had been to encourage the use of frequent handwashing or hand sanitiser to protect against infection.

Case Report

A 6-year-old girl was brought by her carer to the emergency department (ED) of a local hospital with a decreased Glasgow Coma Scale (GCS), diplopia and slurred speech. The history provided was that about 1 h and 15 min after she had been playing alone, she reported to her mother feeling dizzy and was noted to have slurred speech. Her older sister commented that her breath smelled like hand sanitiser.

On arrival to ED she vomited twice (described as ‘sweet smelling’). She had a patent airway, respiratory rate of 17 breaths/min, heart rate of 77 beats/min and blood pressure 92/59 mmHg. Her GCS was initially 13 (eye response 4, motor response 5, verbal response 4). Within 30 min, she had increased vomiting and dropped her GCS to 9 (E2, M4, V3). Her pupils were 3 mm bilaterally and responsive to light. She had widespread decreased tone, but no focal neurological deficit. There were no visible injuries on examination. The patient’s medical history included one previous seizure at 14 months of age. She had normal development, was fully immunised and was not on any regular medications.

Venous blood gas revealed a metabolic acidosis (pH 7.31, base excess −2, bicarbonate level 20 mmol/L, lactate 2.5, CO2 48); blood sugar level was 7.9 mmol/L. She was hypokalaemic with potassium of 3.3 mmol/L. Other electrolytes, full blood count examination, C-reactive protein, kidney and liver function tests, were normal. A non-contrast computed tomography scan of her brain did not reveal an acute intracranial pathology.

A toxicology screen, performed due to the non-specific and unexplained presentation, was negative for salicylates and paracetamol. However, her serum ethanol concentration was found to be 41.1 mmol/L or 0.19% (NSW legal blood ethanol limits for driving ≤ 10.9 mmol/L or 0.05%).

Considering the drop in GCS and persistent vomiting, her airway was assessed as being at risk, and she was intubated and ventilated in the ED. She was not clinically assessed to be septic or dehydrated by the treating physicians at the time; however, she was prophylactically treated with one dose of intravenous ceftriaxone and transferred to a tertiary paediatric intensive care unit. Her sedation was rapidly weaned, and she was extubated within 3 h of arriving in the intensive care unit. Subsequent serum ethanol level performed 6 h later showed a level of 14 mmol/L (0.06%). Her GCS returned to 15 and her neurological examination was normal.

Thorough history obtained from the parent confirmed that there were no alcoholic drinks in the house. Once awake, the patient disclosed that she had often tasted the hand sanitiser over the last few months and had done so the previous night. She was unable to report the volume that she consumed but the NSW Poisons Information Centre estimated it to be in the region of 50 mL. She reported liking the smell and taste of the hand sanitiser, which her mother noted had been missing for a few days. The particular brand of hand sanitiser ingested contains between 62 and 70% ethanol, which is standard for most alcohol-based hand sanitisers sold in Australia. The child remained well and was discharged home 24 h later.

Key Points

1 Alcohol-based hand sanitisers are appealing in taste and smell to young children and hence dangerous ingestion can occur.
2 Paediatric patients presenting with ethanol intoxication need to be closely monitored for potentially life-threatening hypoglycaemia.
3 Prevention of unintentional hand sanitiser ingestion in young children through appropriate product safety and enforcement strategies and increased public awareness is required.

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The NSW Poisons Centre has seen a two-fold increase in hazardous exposure to hand sanitiser over the 3 months of the pandemic (personal communication, NSW Poisons Information Centre) compared to this time last year. A published review of EMBASE and OVID Medline revealed that paediatric ingestion of household products containing ethanol is becoming an increasing occurrence worldwide. There have been two published reports of children requiring intensive care admission after ingestion of ABHS, one of whom required intubation and ventilation for airway protection. Unfortunately the dangers of ABHS in the paediatric population have not been widely disseminated considering the toxic and potentially lethal effects of this easily accessible, everyday product.

Ethanol intoxication in paediatric patients can pose a clinical challenge and be difficult to identify without an explicit history. Absorption and distribution of ethanol in children differ from adults, with the threshold for clinically significant and life-threatening intoxication far lower. Serum ethanol levels of >11 mmol/L or >0.05% can be lethal in children with ethanol-induced hypoglycaemia a key feature. Physicians also need to be mindful of any child protection issues including intentional exposures, abuse and neglect.

The paediatric population was particularly susceptible to unintentional exposures to ABHS, even prior to the pandemic. Between 2011 and 2014, 70 669 exposures to both alcohol and non-alcohol-based hand sanitisers were reported to the National Poison Data System in America. Almost all (90%) were among children aged 0–5 years, with the majority through oral ingestion. Alcohol rather than non-alcohol-based hand sanitisers accounted for 92% of exposures, and was more likely to be associated with adverse events and worse outcomes.

The epidemiology in adults highlights that it is intentional ingestion that has been rising in North America, particularly in people with a history of mental health disorders and substance abuse, with toxic and lethal effects. This is thought to be due to the accessibility and affordability of ABHS.

In an era where hand hygiene and ABHS are critically important, our case highlights that children are able to consume sufficient volume to result in toxic and potentially lethal intoxication. Prevention strategies are urgently required. These could include product safety strategies such as child-proof packaging, legislation about taste and smell being used as a deterrent, and health education campaigns to increase public and health professional awareness regarding the importance of keeping these items out of reach of children. The use of a common bittering agent, denatonium benzoate, as an additive to ethylene-based engine coolants and methanol-based windshield washer liquids has been recognised as a method to protect against accidental ingestions of these products. Public health strategies to explore similar methods with ABHS should be urgently considered whilst we increase public health campaigns to protect children from toxic ingestion.

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