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Acute Nicotine Toxicity Following Dermal Exposure to E-cigarette Liquid

Elizabeth Moore

Banner - University Medical Center Phoenix, Phoenix, AZ, USA

Background: Electric cigarettes are gaining popularity and liquid nicotine preparations or "vape juice" have been sold in formulations as high as 100 mg/ml of nicotine. There have been increased reports of liquid nicotine exposures reported to poison centers, and multiple case reports of death associated with vape liquid ingestion. Time to onset of symptoms after oral exposure to nicotine is usually short. We present a case of delayed onset of nicotine toxicity in a pediatric patient following dermal exposure.

Hypothesis: Dermal exposure to liquid nicotine products without adequate decontamination can cause acute systemic toxicity.

Methods: This is a case report of a 15 month old girl who developed delayed symptoms of nicotine toxicity after exposure to a 3% nicotine liquid solution. The patient was found playing with several bottles of "vape juice" and had the liquid on her hands, face and chest. She was initially asymptomatic at home, but presented to an outside emergency department upon recommendation from the poison control center. Three hours after initial exposure, and 2 hours after her arrival to the ED she developed multiple episodes of non-bilious, non-bloody vomiting, followed by excessive salivation, diaphoresis and labile mood. Initial laboratory studies were negative. Toxicology was contacted and recommended transfer and decontamination. She was decontaminated with soap and water, and symptoms slowly improved. Upon her arrival to the tertiary care hospital five hours after initial exposure, she was tachycardic (HR 145-186 bpm) and hypertensive (128/75 mm/Hg). Vomiting, diaphoresis and salivation had resolved. She did have a faint erythematous rash over exposed skin and labile mood. Her symptoms continued to improve and she was discharged home the day after initial exposure.

Discussion: Acute nicotine toxicity often presents with nausea, vomiting, excessive salivation and can include lethargy, respiratory depression, seizures, and dysrhythmias. Previous cases reports have described systemic toxicity after exposure to nicotine patches. This case is similar, and suggests that there may be significant and potentially delayed onset of toxicity associated with dermal exposure to liquid nicotine products.

Conclusion: Dermal exposure to liquid nicotine products may produce significant systemic toxicity with delayed onset.