PSNet
PATIENT SAFETY NETWORK

The Hidden Harms of Hand Sanitizer

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The Case

A 57-year-old woman with a history of alcohol abuse and severe depression was admitted to the hospital for community-acquired pneumonia. After 2 days on the medical ward, she was found unconscious. Oxygen was administered, and the patient was intubated and placed on a ventilator. As part of the workup for her altered mental status, a toxicology panel was drawn, and her blood alcohol level returned elevated at 530 mg/dL. A search of the ward revealed several empty containers of alcoholic foam hand sanitizer. The patient required mechanical ventilatory support for over 12 hours, after which she was successfully extubated. Upon interview, the patient confessed to ingesting the alcoholic foam hand sanitizer on the ward to satisfy her strong alcohol craving.

The Commentary

by Stephen Stewart, MBChB, PhD

Alcohol addiction is common and a frequent cause for hospital admission, both for complications related to long-term use (e.g., cirrhosis) and for medical problems arising from ongoing heavy drinking, including withdrawal, pancreatitis, and alcoholic hepatitis. The United Kingdom Statistics Authority has estimated that during 2014 and 2015 there were 1.1 million hospital admissions in England for which an alcohol-related disease, injury, or condition was either the primary reason for admission or a secondary diagnosis.(1) In the United States, the number of admissions with a diagnosis of alcohol dependence rose from 855,000 in 2006 to more than 1 million in 2010.(2) To assess for underlying alcohol use disorder, a careful history is essential. While an admission for alcoholic hepatitis or pancreatitis may naturally lead the provider to perform a detailed history of alcohol ingestion, presentation for fractures or certain cancers may be strongly associated with alcohol use but may not lead to the same level of inquiry. A systematic approach to obtaining a patient's history of alcohol use is necessary because missing this vital information places the patient at risk for withdrawal, which if untreated can lead to significant patient harm. In addition, because patients with known alcohol use disorder may present to the hospital confused, providers must do a thorough history, physical, and diagnostic workup to ensure that coexisting conditions requiring acute

intervention are not missed. Patients with substance abuse disorders are often stigmatized, and their psychosocial needs may be complex. If there is concern for intentional self-harm behavior, a psychiatrist should be engaged immediately. The patient's physical environment should be carefully assessed for risks. In the hospital, such assessment must include alcohol-containing products, such as hand sanitizer.

Hand sanitizers containing high concentrations of ethanol (60%–95%) are very effective antibacterial agents, significantly more effective than lower ethanol or nonethanol based sanitizers. Ethanol-based sanitizers are also popular in schools, where they have been associated with a reduction in days missed by elementary school students (3), and in the community, particularly with mothers of young children.

Unfortunately, the widespread availability of alcohol-based hand sanitizers has led to both abuse and accidental ingestion. One study found a significant increase in the ingestion of alcohol containing hand sanitizers between 2005 and 2009 (4), while another found that ingestion of alcohol containing sanitizer led to worse outcomes than ingestion of nonalcohol containing sanitizers.(5) The vast majority of ingestions are accidental, and around 80% occur in the pediatric population.(4) Cases detailed in the literature describe patients with suicidal ideation, and there have been fatalities.(4,6) These cases are not limited to hospitalized patients and several have involved patients in psychiatric units and students in school.(4,7) It is likely that many cases go undiagnosed, and patients may be ingesting hand sanitizer more frequently than is recognized. Patients admitted to the hospital with alcohol use disorders are sometimes found with alcoholic beverages among their personal belongs. Although the need to find and remove such products is obvious, providers also need to consider a patient's ability to access alcohol containing sanitizer.

How do we prevent serious harm or death from ingestion of these sanitizers in the health care setting? The first step is to take a detailed alcohol history when admitting patients to the hospital. The history should focus not just on alcohol consumption, but also on features of dependence. Standard questionnaires can be useful when taking a thorough alcohol history. The Alcohol Use Disorders Identification Test (AUDIT) questionnaire (8) and Severity of Alcohol Dependence Questionnaire (SADQ) are appropriate for this purpose. The patient in this case may have a more severe alcohol addiction than the admitting doctor initially appreciated. An SADQ may have elucidated this at the time of admission. When alcohol dependence is diagnosed or suspected, it is important to manage the patient with appropriate pharmacotherapy in a symptom-triggered manner. Those patients admitted to the hospital with potential for severe withdrawal may require pharmacologic therapy such as benzodiazepines prior to the development of symptoms. If withdrawal symptoms are managed appropriately, patients will be significantly less likely to seek alcohol on the wards and may be at lower risk from ingesting hand sanitizer.

Once we are aware of the at-risk patient, it is reasonable to subsequently limit their access to ethanol-containing hand sanitizers. The dispensers can be removed from certain rooms or clinical areas where at-risk patients are located. However, there may situations in which numerous patients are admitted with alcohol use disorders, and removing sanitizing solutions entirely is not possible. Nonalcohol containing sanitizer is an option, but they are known to be less effective. Dispensers that yield a small dose with a refractory period between doses may be a viable solution, as may dispensers that alarm when used multiple times in a short period. These machines are likely to be expensive and thus impractical.

Finally, it is important for medical staff caring for confused inpatients with signs of intoxication to consider ethanol sanitizer ingestion, to check an ethanol level, and to start appropriate therapy. Given the high concentration of ethanol in the sanitizing solution, patients can become obtunded before they are able to provide an accurate clinical history. If not diagnosed early, ethanol poisoning may be serious enough to become life threatening and may require dialysis.

Take-Home Points

- If alcohol misuse is suspected when admitting a patient to the hospital, providers should take a thorough alcohol history, including an assessment of the severity of dependence, to predict in-hospital cravings and the subsequent risk of withdrawal.
- Manage alcohol-dependent patients proactively by instituting alcohol withdrawal protocols, which involve the administration of pharmacotherapy in a symptom-triggered manner.
- Limit access to ethanol hand sanitizer in patients deemed to be high risk for ingestion. Such patients include some psychiatric and pediatric patients, as well as alcohol-dependent patients.

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