

CASE REPORTS**AN UNUSUAL CAUSE OF HYPOTHERMIA IN A SMALL CHILD: A CASE OF NAPHAZOLINE EXPOSURE**April Oertle¹, Justin Assioun^{2,3}, Audrey Martin⁴, Mylinh Nguyen^{2,3}.¹University of Illinois College of Medicine, Rockford, Illinois,²Division of Emergency Medicine, Rady Children's Hospital San Diego, San Diego, California,³Department of Pediatrics, University of California, San Diego School of Medicine, La Jolla, California,⁴Rocky Vista University College of Osteopathic Medicine, Billings, Montana.**ABSTRACT**

Unintentional ingestions are a leading cause of emergency department visits in young children, often presenting with nonspecific and potentially misleading clinical findings.

We report the case of a previously healthy 2-year-old female presenting with altered mental status, bradycardia, and hypothermia without a clear history of ingestion or environmental stressors. Initial evaluation for infectious, metabolic, and endocrine etiologies was unrevealing. Subsequent history identified possible access to a naphazoline-containing nasal decongestant obtained internationally. The patient was managed with supportive care, including active rewarming and cardiorespiratory monitoring, with complete clinical recovery within 24 hours.

This case highlights the importance of maintaining a broad toxicologic differential in pediatric patients with hypothermia and altered mental status, even without a witnessed exposure. Imidazoline toxicity should be considered in the appropriate clinical context, as early recognition can guide management, limit unnecessary interventions, and support favorable outcomes. Internationally sourced medications may vary significantly in formulation and labeling, complicating identification of toxic exposures. Awareness of this growing factor is critical for timely recognition, diagnosis, and appropriate management.

Introduction

Unintentional ingestions are common in early childhood and are often exploratory in nature as children interact with their environment through oral investigation.¹ Although toxic exposures occur frequently in this population, fatalities among young children remain relatively rare² and are typically associated with high-risk substances such as laundry detergent pods, button batteries, opioid analgesics, acetaminophen, and benzodiazepines.¹

Young children, particularly those under six years of age, are disproportionately affected.¹ The American Association of Poison Control Centers' 2004 Report illustrates the scale of this issue, documenting over 1.25 million cases in children younger than six.³ Nearly 939,000 of these exposures occurred in children two years or younger.³ This high burden in early childhood demonstrates the need for continued surveillance, prevention efforts, and clinician awareness of toxicologic presentations in pediatric patients.

Imidazoline-derived decongestants are over-the-counter medications commonly used for topical relief of nasal and ocular congestion.⁴ These agents are typically formulated as 0.05–1% solutions intended for local application.⁵ In therapeutic doses they act primarily through α -adrenergic receptor stimulation,

producing vasoconstriction of mucosal arterioles and thereby reducing edema and congestion.⁴

Imidazoline compounds can cause significant toxicity when ingested in excessive amounts or accidentally consumed.⁵ Systemic absorption may lead to central nervous system depression ranging from somnolence to coma, along with autonomic and cardiovascular effects including bradycardia, hypothermia, diaphoresis, and respiratory depression.⁵ Young children are especially vulnerable to these effects due to their lower body mass and increased sensitivity to centrally acting α -adrenergic agents.⁵

In a case series from the Kantrida Pediatric Clinic in Croatia, eleven children were hospitalized for naphazoline nasal drop intoxication between 1990 and 19925. All presented with central nervous system depression including marked somnolence, with some exhibiting pallor, bradycardia, bradypnea, and hypothermia⁵. Despite the significant initial symptoms, all cases resolved within 24 hours with supportive care⁵. Patient age appeared to be the most significant risk factor, as all hospitalized children were younger than six years.

Case Report

A previously healthy, fully immunized 2-year-old female was brought to the pediatric emergency department (PED) by her parents for evaluation of progressive drowsiness and hypothermia over approximately 12 hours. The patient had been in her usual state of health

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the day before.

On the morning of presentation, she was noted to be mildly irritable but continued to tolerate oral intake and had normal urine and stool output. Later that afternoon, she took an unusually prolonged nap lasting approximately four hours. Upon attempted awakening, she was difficult to arouse and appeared markedly lethargic. Her parents measured an axillary temperature of 94°F (34.4°C) at home and brought her to the PED. Initial history obtained from the parents did not reveal any known ingestions or toxic exposures.

Review of systems was notable for decreased activity, fatigue, chills, and diaphoresis.

On arrival, the patient weighed 14 kg. Vital signs were notable for bradycardia (heart rate 62 beats per minute) and hypothermia (temporal temperature 95.4°F [35.2°C]); blood pressure, respiratory rate, and oxygen saturation were within normal limits. She appeared somnolent but was arousable to stimulation. Physical examination was otherwise unremarkable.

A broad diagnostic evaluation was initiated to assess for metabolic, infectious, and toxicologic causes. Point-of-care glucose was 98 mg/dL. Complete blood count, comprehensive metabolic panel, and thyroid-stimulating hormone were within normal limits. Urine drug screen and serum toxicology studies, including acetaminophen, salicylate, and ethanol levels, were negative. Chest radiograph and electrocardiogram were unremarkable. Viral testing was positive for rhinovirus; however, inflammatory markers were normal and the patient lacked clinical features suggestive of systemic infection.

The patient was placed on continuous cardiorespiratory monitoring and treated with active external rewarming using a forced-air warming blanket.

Upon further questioning during the PED evaluation, the parents reported that a naphazoline-containing nasal decongestant, imported from Brazil (Figure 1), was kept accessible near a bathroom sink. The child had previously been observed playing with the bottle and may have had access to it within the preceding 24 hours, although no ingestion was witnessed. The parents did notice a difference in the remaining volume of liquid. The remaining bottle contents were not assessed, and the ingested amount could not be determined. Poison Control was consulted and recommended supportive management with close monitoring for central nervous system depression, bradycardia, and hypothermia, as well as hospital observation for approximately 24 hours.

During the observation period, she returned fully to her baseline per parental report. She was observed to be alert, interactive, and appropriately engaged in play. Vital signs normalized, including resolution of diaphoresis and stabilization of heart rate to 108 beats per minute, with a temperature of 97.2°F (36.2°C).

After Poison Control clearance and confirmation of sustained clinical stability, the patient was discharged with return precautions and caregiver education regarding safe medication storage.

Discussion

Hypothermia, defined as a core body temperature below 35°C, can affect all organ systems and cause significant

morbidity if not promptly recognized. Its differential diagnosis is broad and multifactorial, encompassing central, metabolic, endocrine, environmental, and toxicologic etiologies as outlined in Table 1. A study by Ahmed et al. (2021), evaluated acute pediatric ingestions (n = 88), and found that the mean age at presentation was approximately 2 years.⁶ This finding is consistent with the present case and reinforces that toddlers represent a particularly vulnerable group for accidental toxic exposures.

Cardiac monitoring is essential in patients presenting with hypothermia due to the increased risk of dysrhythmias.⁷ An electrocardiogram should be obtained early in the evaluation, as characteristic findings such as an elevated J point, may serve as an important diagnostic clue.⁷

Figure 1: Nasal Decongestant Child Seen Playing With



Table 1: Differential Diagnosis of Hypothermia by Pathophysiologic Mechanism from Duong & Patel, 2024

Category	Etiologies
Central Failure	Cerebrovascular accident; Central nervous system trauma; Hypothalamic dysfunction
Metabolic Failure	Toxins; Pharmacologic effects
Peripheral Failure	Acute spinal cord transection; Neuropathy
Endocrinologic Failure	Alcoholic ketoacidosis; Diabetic ketoacidosis; Hypoadrenalism; Hypopituitarism; Lactic acidosis
Insufficient Energy	Hypoglycemia; Malnutrition

Neuromuscular Compromise	Extreme ages with inactivity; Impaired shivering
Dermatologic Causes	Burns
Medications and Toxins	Drug-induced hypothermia; Toxic exposures
Iatrogenic Causes	Emergency childbirth; Cold infusion; Heat-stroke treatment
Miscellaneous	Carcinomatosis; Cardiopulmonary disease; Major infection; Multisystem trauma; Shock

Conclusion

This case highlights the importance of maintaining a broad toxicologic differential in pediatric patients presenting with hypothermia and altered mental status, including imidazoline exposures such as naphazoline. Although uncommon, these agents can produce a characteristic toxidrome of central nervous system depression with pronounced effects in young children. Management is primarily supportive, with close monitoring and active rewarming. Outcomes are typically favorable. A lethal oral dose of naphazoline in humans has not been established. This case also demonstrates the challenge of internationally sourced medications, which may differ in formulation and labeling, complicating identification. Increased clinician awareness and caregiver education on

safe medication storage are essential to improving diagnosis, reducing unnecessary interventions, and preventing unintentional pediatric exposures.

Compliance with Ethical Standards

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