

Systemic Lidocaine Toxicity Secondary to Topical Application in a Pediatric Patient

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Background

- Lidocaine is a commonly used topical anesthetic. Traditionally, over-the-counter lidocaine spray preparations consist of 4% lidocaine.
- Under physiologic conditions, routine topical lidocaine administration does not result in systemic toxicity. However, when utilized on highly vascularized areas or areas with violated dermal integrity, lidocaine may be excessively absorbed and cause severe systemic toxicity.
- We present a rarely encountered case of topical lidocaine administration resulting in severe systemic toxicity, including altered mental status and multiple seizures.

Methods

- A 4-year-old female with no prior seizure history presented to the hospital with new onset seizures shortly after sustaining multiple burns.
- Prior to hospital arrival, the patient had been inadvertently placed in a shower with scalding water and subsequently sustained burns to her face, chest, abdomen, and right upper extremity (approximately 15% total body surface area). Immediately after noting the burns, her mother applied aloe vera ointment. Approximately three hours later, the patient was in extreme pain and her mother wiped off the ointment and noticed skin erythema, peeling and areas of bleeding.
- Topical burn cream containing lidocaine and lidocaine spray were applied to help with the pain. A few minutes after lidocaine application, the patient became lethargic and apneic. Chest compressions were started, and she then developed multiple generalized tonic-clonic seizures.
- EMS arrived, administered midazolam, and the seizures abated.
- The patient arrived at the hospital, gradually returned to baseline, and was placed on a dexmedetomidine infusion and given ketamine and midazolam for sedation and burn dressing changes.
- The patient's laboratory studies, including the basic metabolic panel, were within normal limits. Telemetry showed no abnormalities.
- The patient was transferred to the Pediatric Intensive Care Unit for airway management, burn debridement, and further medical workup.
- Continuous EEG monitoring was performed and no further seizures were noted. Neurology evaluated the patient and felt her seizures were provoked by lidocaine toxicity after ruling out other causes. She had no further seizures during her hospitalization.
- A comprehensive toxicology panel was ordered and returned with a serum lidocaine level of 0.11mg/L.



Discussion

- This case represents an uncommonly seen scenario of systemic lidocaine toxicity secondary to topical lidocaine administration to an injured dermis.
- The likelihood of systemic toxicity may be higher in pediatric patients compared to adults for several reasons, including increased relative body surface area and dermal anatomy. Although significant neurologic effects were noted from the lidocaine toxicity, fortunately no cardiac effects were noted.
- The patient did not receive fat emulsion therapy as systemic lidocaine toxicity was not considered until later in the patient's hospitalization course.
- Her elevated serum lidocaine level and absence of subsequent seizures since the event suggest systemic lidocaine toxicity as the source of her symptoms.

Conclusion

- The application of topical lidocaine to an impaired dermis may cause systemic lidocaine toxicity, particularly in pediatric patients.
- This should be considered in an undifferentiated patient with altered mentation and seizures who is receiving topical lidocaine with an impaired integumentary system.



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