

Oxymetazoline-Induced Respiratory Arrest Due To Nasal Decongestants

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Abstract

Imidazoline drops are widely used as a nasal decongestant. Special formulations with reduced drug concentrations are available for infants and children. Most preparations are available over-the-counter and are prescribed without parent education about possible side effects. Here we report a case of a neonate with oxymetazoline-induced coma. We speculate that some neonates may suffer increased susceptibility toward side effects in the central nervous system because of these substances. Parent education and counseling about possible adverse effects along with prescription should be emphasized.

Key Words: Decongestant, imidazoline, intensive care, neonate, parent education, respiratory arrest

Case Report

A 21-day-old, term, male neonate was admitted to our hospital in view of refusal of feeds, decreased activity, shrill cry, an episode of a staring look, and respiratory distress.

He was born by cesarean section in view of pregnancy-induced hypertension, with a birth weight of 3.2 kg.

He cried immediately after birth and was exclusively breastfed. However, on day 19 of life, he developed cold and cough, for which medicines were prescribed in an outpatient department. On day 21 of life, he was noticed to have decreased activity, refusal of feeds, shrill cry, and an episode of a staring look for a few seconds. He was referred to our hospital for further management.

At admission, he was euglycemic, lethargic, and had respiratory distress with room air saturation of 70%. His peripheries were cold with prolonged capillary refill time. His systemic examination was unremarkable. He was commenced on supplemental oxygen through nasal prongs and received a normal saline bolus as well. His clinical status was rapidly deteriorating in the emergency room with shallow breathing progressing to apnea requiring bag and mask ventilation. He continued to have poor respiratory efforts with intermittent apneic episodes, and as he went into respiratory arrest, emergency endotracheal intubation was performed. He was shifted to the NICU on bag and endotracheal tube ventilation and was commenced on ventilatory support. Ventilatory settings were adjusted to meet adequate oxygenation. Possibilities considered were transient metabolic abnormalities, late-onset sepsis, viral pneumonia, congenital heart disease, or any metabolic disorder.

He was started on IV fluids and IV antibiotics (cefotaxime) after performing workup for sepsis. His complete blood count and C-reactive protein were normal. His blood culture remained sterile. His cerebrospinal fluid analysis was not suggestive of meningitis. He received IV cefotaxime for 48 hours.

His serum ammonia and lactate levels were normal. His metabolic parameters (blood glucose level, serum electrolytes, and serum total and ionic calcium and magnesium level) were normal. His chest skiagram was unremarkable. His 2D echocardiogram, neurosonogram, electrocardiogram, and electroencephalogram were also normal. His respiratory viral panel was negative.

He required mechanical ventilatory support for 48 hours. He could be weaned to nasal bubble continuous positive airway pressure on day 3 of admission and could be weaned to room air on day 4 of admission. Orogastric tube feeds were commenced after 4 hours of admission. Oral feeds were introduced on day 4 of admission. He was discharged home on day 6. At discharge, his clinical physical examination was within normal limits. He was on regular follow-up and doing well with normal growth parameters and development.

Discussion

Our index case was a term, healthy, exclusively breast-fed neonate, with no features suggestive of any infective, intracranial, or metabolic disorder; yet he developed sudden-onset respiratory arrest for a short duration with complete recovery without any specific treatment. Reappraisal of history revealed that he was prescribed oxymetazoline 0.01% nasal decongestant drops by a local pediatrician 2 days prior to hospitalization. Hence, the neonate was diagnosed with oxymetazoline-induced coma.

Nasal decongestants are vasoconstricting substances from the imidazoline group. They are suitable for topical use on the nasal mucus membrane and the eye, primarily because of their local α -adrenergic effect. Oxymetazoline and xylometazoline are the commonly used drugs.

After oral administration of these drugs in older children, several adverse effects such as bradycardias, somnolence, and arterial hypotension at higher doses are observed,¹⁻³ whereas neurologic effects such as visual hallucinations and states of anxiety and excitement have been observed even at the prescribed dosage.^{4,5} The spectrum of neurologic effects differs in neonates, and the effects described after nasal instillation include bradycardia/tachycardia, hypothermia, gasping respiration, and impaired sensorium.^{6,7}

The possible mechanism behind these effects is the stimulation of central α_2 -adrenoreceptors in the locus coeruleus and group-specific imidazoline receptors in the rostral ventrolateral medulla.^{8,9} By virtue of an immature blood-brain barrier, neonates are possibly more sensitive to the central side effects of the imidazolines.¹⁰

In 1 of the case series of 3 neonates in the literature, a similar condition was treated with the prescribed dosages of nasal decongestant drops.¹¹ The rapid disappearance of the initial symptoms without specific treatment and the negative workup for other possible etiologies strengthened our possibility of diagnosing oxymetazoline-induced coma. As the prescribed dosage was recorded retrospectively and no tests were available to measure plasma imidazoline levels, the possibility of overdosage cannot be excluded with

certainty. Also, a causal association between the symptoms observed and the drug doses administered cannot be stated with any certainty.

Conclusion

Medication errors are an important cause of preventable morbidity in neonates.¹² This case highlights the risks of inadvertent medication use in the newborns. Decongestant drops have been associated with several undesirable and sometimes life-threatening adverse effects in children aged < 6 years, still they are widely used by pediatricians.

Educating and counseling parents about the possible adverse effects along with prescription should be emphasized. In view of the threatening symptoms, which in the patient described here resulted in intensive care intervention, we think that further prospective studies are needed to prove the association.

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