*Cardiology in the Young* (2009), **19**, 633–634
doi:10.1017/S1047951109990722


*Brief Report*

# Are nasal decongestants safer than rhinitis? A case of oxymetazoline-induced syncope

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**Abstract** Derivatives of Imidazoline usually act to stimulate peripheral alpha2 receptors causing vasoconstriction. In young children, however, they can also stimulate alpha2receptors in the cardiovascular and central nervous systems, possibly causing cardiovascular, neurological, and respiratory depression. These medications do not require medical prescriptions, so often parents use them, bypassing paediatricians. We report here a case of cardiovascular and neurological depression induced by oxymetalzoline in a toddler.

Keywords: Imidazoline derivates; side effect; children

Received: 4 September 2008; Accepted: 3 March 2009; First published online: 23 September 2009

TOPIC NASAL SYMPATHOMIMETIC AMINES, AND imidazoline, are thought to be safe in providing relief of the symptoms of nasal congestion, being considered to have only minor side effects, such as reactive hyperaemia and atrophic rhinitis.[1–5] These drugs, nonetheless, may concentrate rapidly in the plasma if used in very young children, with potential serious side effects, and no real evidence-based data establishing their efficacy in such patients.[1,2] We describe here an instance of syncope with severe hypotension and bradycardia associated with the use of oxymetazoline in a toddler.

## Case report

A 23-month-old boy was admitted to our paediatric cardiology unit because of severe hypotension, with systolic pressures of 50 mmHg, and diastolic values being non-detectable, and bradycardia, his heart rate being 60 beats per minute. He was lethargic and pale, without evident signs for sepsis or meningitis at physical examination. The electrocardiogram showed sinus bradycardia without atrioventricular block (Fig. 1). Cross-sectional echocardiography showed moderate left ventricular dysfunction, with an ejection fraction of 45%, but without any structural heart disease. Having established an intravenous line, dopamine and dobutamine were promptly infused, producing a progressive increase in systemic blood pressure and heart rate. Arterial femoral pulses became progressively more appreciable, while the heart rate stabilized at 130 beats per minute in sinus rythm. Within 2 hours, there was a striking normalization of the systolic ventricular function, along with stabilisation of arterial pressure and cardiac rhythm (Fig. 2), allowing for progressive discontinuation of the inotropic support. Examination of blood proved normal, with no signs of infection. Over the following 6 hours, the mental state recovered spontaneously, and his cardio-vascular parameters were normal, permitting his discharge after 48 hours of observation.

When asked, the mother explained that, shortly before the onset of symptoms, the child was given a generous amount of inhaled oxymetazoline clorhydrate, at a concentration of 0.05%, to relieve symptoms of rhinorrhea. The patient became lethargic after few minutes and, after 3 hours, she

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**Figure 1.**
*The precordial leads of the electrocardiogram taken shortly after admission, and prior to the start of inotropic intravenous support. Sinus bradycardia with high T-waves are recognizable.*

decided to take him to the nearest hospital. She denied administering any medications other than oxymetazoline, and also denied ingestion by the toddler of any other medication.

## Discussion

Benzylimidazolines, such as oxymetazoline, are commonly used as topical nasal decongestants, acting as vasoconstrictor by stimulating peripheral alpha2 receptors in the vessels of the nasal mucosa. Hypertension, tachycardia, and generalized peripheral vasoconstrictor are the usual signs of systemic toxicity, but in some patients, toxicity may produce a strong hypotensive-bradycardic reaction due to stimulation of centrally located alpha2 receptors.

Dosing errors, especially in children younger than 2 years, may need hospitalisation and symptomatic treatment, with even instances of death reported in the literature.[1,2] Toddlers are at major risk due to the relatively high dose absorbed.

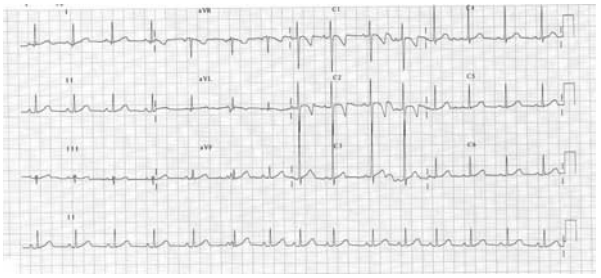

**Figure 2.**
*The electrocardiogram 48 hours after recovery, showing normal sinus rhythm.*

Moreover, the extent of dosing has been extrapolated from experience with adults, so at present there are no clear guidelines which may help avoiding toxic levels in small children. Both parents and physicians, therefore, should be aware that uncontrolled administration of benzylimidazolines in children younger than 2 years of age may have serious adverse cardiovascular effects.

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https://doi.org/10.1017/S1047951109990722 Published online by Cambridge University Press