

## Naphazoline intoxication in children

Julio Alvarez-Pitti · Ana Rodríguez-Varela ·  
Cristina Morales-Carpi · Empar Lurbe · Luis Estañ

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Inappropriate use or unintentional ingestion of naphazoline, especially in children, can quickly cause severe central nervous system depression and cardiovascular adverse effects [2, 6].

A five-year-old boy arrived at the Emergency Room 90 min after the ingestion of approximately 10 ml of Euboral Oftálmico solution (9.7 g of sodium-tetraborate, 0.1 g of naphazoline-chlorhydrate and 0.2 g of methylparaben for 1 l dilution, for topical use), prepared in a bottle without a label in a 0.02% concentration, which was twice that of the manufacturer's recommendation. During the physical examination, bradycardia (heart rate 45–50 bpm), hypothermia (35.5°C) and a blood pressure of 100/70 mmHg (blood pressure percentile 75th/90th) were observed. Gastric lavage and activated carbon administration were performed. A few minutes later, the patient presented somnolence, sweating, persistence of the bradycardia and hypothermia. Blood pressure and oxygen saturation were normal. At the EKG (electrocardiogram), sinus bradycardia of 48 bpm was observed and laboratory parameters showed no abnormalities. Blood analysis of

standard toxicological drugs was performed with negative results.

Infusion therapy was started to force diuresis and the patient was admitted to the hospital in order to monitor vital parameters. Bradycardia lowest value (47 bpm) was observed 3 h after the ingestion. Somnolence and hypothermia (35.2°C) were maximum 7 h after the ingestion and sweating persisted until 12 h later. Blood pressure also returned to normal during this period without treatment; its highest value was 130/80 mmHg (blood pressure percentile >99th/99th) with no subsequent hypotension. The patient was discharged 20 h later.

Naphazoline has a narrow therapeutic to toxic window and intoxication may occur at a dose of 0.05 mg/kg body weight [2]. Systemic side effects are observed rarely, despite frequent and uncontrolled use because of partial availability without doctor's prescription. They can progress potentially up to intoxication with vitally threatening cardiovascular symptoms (arterial hypertension with reflex bradycardia defined as a heart rate under 60 bpm and possible ischaemia of vital functions), pulmonary and central nervous symptoms. The central nervous system effects concern the reduction of vigilance ranging from drowsiness to coma, persisting cardiovascular hypotension and reduced respiration rate up to the Cheyne-Stokes breathing and possible pulmonary edema, hypothermia, mydriasis, hyperhidrosis and transient excitation hyperreflexia [1]. Our patient presented a large number of the symptoms described above, especially those affecting cardiovascular and central nervous systems. Blood analysis of standard toxicological drugs excluded alternative causes of intoxication.

Because of rapid absorption, we wonder whether gastric lavage and carbon-activated administration are the suitable

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J. Alvarez-Pitti · A. Rodríguez-Varela · C. Morales-Carpi ·  
E. Lurbe  
Servicio de Pediatría,  
Consorcio Hospital General Universitario de Valencia,  
Valencia, Spain

L. Estañ (✉)  
Departamento de Farmacología,  
Facultad de Medicina y Odontología, Universidad de Valencia,  
Avda Blasco Ibáñez n° 15,  
46010 Valencia, Spain  
e-mail: estan@uv.es

choices, especially after more than an hour post-ingestion [2, 3, 6]. In our case, despite the time elapsed, the patient was conscious, so we decided to follow the usual recommendations.

There is controversy about the general treatment. At the TOXNET database [7], atropine is recommended to treat bradycardia; however, other reviews disagree and they recommend phentolamine [1, 4, 5]. This drug is not available in Spain. It has also been suggested that naloxone could be useful, but there are no controlled assays about its effectiveness. We only found one case using clonidine and it was unsuccessful [2].

Surprisingly, in the Euboral Oftálmico summary of product characteristics (SmPc), there is no mention about the toxicity of naphazoline and the manufacturer only indicates the toxicity of sodium tetraborate, a substance mainly involved in chronic intoxications and at very high doses.

Our patient's evolution was favourable. He was monitored during follow-up and his pulmonary and haemodynamic functions remained stable without needing any treatment but he needed hypothermia treatment with physical methods and infusion therapy to increase diuresis.

We emphasise the danger of this kind of drug in children and we do not recommend its use in non-adults. Instead, its substitution with other less dangerous imidazoline molecules should be as other authors recommend [1]. The

decongestive effect of all imidazoline preparations is similar, but, in contrast, the potency of naphazoline is higher than other imidazoline derivatives.

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