Tropicamide and anaphylaxis: A case report

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Abstract:

A 6-month-old boy was brought to the ophthalmology outpatient clinic of our hospital by his parents with the suspicion of esotropia of his left eye. He was able to follow the objects, pupillary light reactions were normal, orthophoric in primary position with corneal light reflex (Hirschberg) test, ductions and versions were normal in all gaze positions. One drop of tropicamide (1%) was instilled in both eyes of the infant for cycloplegic retinoscopy and fundus examinations. After 10 min, anaphylaxis, respiratory and circulatory failure developed. He was immediately examined by the pediatrician, and emergency code was announced. At the 5th min of treatment, he regained consciousness, his respiratory and circulatory symptoms started to improve, and blood pressure returned to normal. In this case report, we aim to point out that tropicamide may rarely lead to life-threatening complications

Keywords:

Tropicamide, cycloplegia, anaphylaxis

Introduction

Anticholinergic-parasympathicolytic agents cause accommodation paralysis and pupillary dilatation through ciliary muscle paralysis along with sphincter pupillae effect. Cyclopentolate 0.5%–1% and tropicamide 0.5%–1% are the most commonly used agents for that purpose. These eye drops may pass to the systemic circulation through conjunctiva and nasolacrimal canal, and eventually toxic effects may occur.[1] Anaphylactic reaction, psychosis, hallucination, paralytic ileus, circulatory and respiratory failure are the main adverse effects reported so far.[1-5] In this case report, we aim to point out that tropicamide (1%) instilled for cycloplegic refraction and fundus examination may rarely lead to life-threatening complications.

Case Report

A 6-month-old boy was brought to the ophthalmology outpatient clinic of our hospital by his parents for a control examination due to suspected esotropia of the left eye. He had orthophoria in primary position in the corneal light reflex (Hirschberg) test, ductions and versions were normal in all gaze positions. He could follow objects and had pupillary light reactions normal. One drop of tropicamide (1%) in standard volume was instilled in both eyes of the infant without punctual occlusion to perform cycloplegic retinoscopy, optical media, and fundus examination. After 10 min, the baby displayed a serious distress along with cries. He was immediately examined by the pediatrician on urticaria that appeared on the face and spread to the neck and trunk, persistent nausea and retching, respectively. He was observed to have cardiac pulse: 120/R and respiration rate: 30/min, and administered intramuscular injection of 0.6 mg/kg dexamethasone and ½ ampoule pheniramine maleate due to drug allergy.

Emergency code was announced in the observation room, due to hypotension, deterioration of the peripheral circulation, prolongation of capillary refill time, along with cyanosis and clouding of consciousness. Anaphylaxis was considered and 0.01 mg/kg adrenaline was administered intramuscularly. Oxygen was delivered through a mask at a rate of 5 ml/min. Vascular access was established and 20 ml/kg bolus infusion of saline was initiated. At the 5th min of treatment, he regained consciousness, circulatory symptoms improved, and blood pressure returned to normal. Urticaria plaques regressed within 1 h. He was monitored for 24 h with regard to biphasic

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anaphylaxis and discharged with full recovery. Further control was recommended in outpatient settings.

Discussion

Cyclopentolate and tropicamide used to provide cycloplegia and pupillary dilatation in the assessment of refractive errors and fundus examination, are synthetic anticholinergic agents. Undesirable side effects of these agents may appear at a rate of 10%, as a result of their systemic absorption from transconjunctival or nasolacrimal tract following their instillation into the eye.[1] In their prospective study, comparing double dose of cyclopentolate (1%) and one dose of cyclopentolate (1%) followed by one dose of tropicamide (1%) in the pediatric population, van Minderhout *et al*.[2] determined that side effects related to anticholinergic agents were more common in children using a double dose of cyclopentolate. Their observations also suggested a possible correlation with younger age and/or lower body mass index. Similarly, Pooniya and Pandey[3] reported that overdose use of topical cyclopentolate can lead to systemic toxicity such as behavioral alterations, visual hallucinations, and difficulty in walking. Adverse effects may occur during infancy and childhood as a result of prolonged half-lives of the drugs, due to the immaturity of their metabolic systems and organs. For this reason, it is recommended that ocular examinations requiring cyclopentolate (1%), a single dose should be performed in hospital setting or at least in the environments where vital functions can be monitored and if necessary, combined with tropicamide in small children with a low body mass index.[2]

Among mydriatic eye drops, tropicamide is reported as one of the safest agents in infants.[6] However, Wahl[7] reported a child with an anaphylactic shock reaction following instillation of 0.5% tropicamide. Similarly, in the study comparing micro-drops with standard-volume drops, Elibol *et al*.[4] showed that even tropicamide (0.5%) used in the standard volumes leads to a serious increase in systemic blood pressure as in cyclopentolate and phenylephrine. They suggest that adverse effects can be prevented by reducing the volume. Agrawal *et al*.[5] also observed cardiopulmonary arrest developed in a 6-week-old infant after using standard volume of tropicamide (1%) and phenylephrine (2.5%), and where vital functions improved after resuscitation. Alpay *et al*.[8] recommended 0.5% dose of tropicamide combine with phenylephrine (2.5%) in infants.

Supportive treatment is primarily applied when side effects of topical anticholinergic agents occur. Physostigmine, which is the specific antidote of anticholinergic drugs and an anticholinesterase inhibitor, can be used in those cases with no response. Our patient recovered in a short time, responding to supportive treatment.

In conclusion, it should be kept in mind that there may be side effects related to topical drug use in pediatric cases. Smaller-volume drops (microdrop) should be used to reduce side effects, the dose and the number of drops should be clearly explained to the health workers, and pressure should be applied to the puncta and canaliculi to reduce the passage through nasolacrimal channels. It is also appropriate to obtain written informed consent forms from patients' parents, explaining the likelihood of side effects.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient (s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initial s will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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