Case Report

A case report on cyclopentolate-induced psychosis

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ABSTRACT

Cyclopentolate is a cycloplegic drug of choice for children that rarely causes central anticholinergic syndrome when it reaches systemic circulation. The lower body weight is one of the etiological factors. The manifestations could be behavioral and psychotic. We report a case of a 6-year-old child who developed acute psychosis following cyclopentolate instillation.

Key words: Acute psychosis, Central anticholinergic syndrome, Cyclopentolate

Cyclopentolate is an anticholinergic agent whose instillation produces dilation of the pupil (mydriasis) and paralysis of accommodative ciliary muscles (cycloplegia). There could be possible adverse reaction development when taken in either clinical or overdoses. The drug reaches the systemic circulation in two ways, that is, either transconjunctival or through the nasolacrimal duct which has high vascularity [1]. The onset of action is about 25–75 min and 30–60 min for the drug to show cycloplegia and mydriasis, respectively. The available dosages for topical ophthalmic administration include 0.5%, 1%, and 2% [2]. The anticholinergic drugs have a tendency to cause central anticholinergic syndrome, comprising behavioral and psychotic manifestations such as restlessness, agitation, hallucination, psychosis, hyperactivity, seizures, incoherent speech, and ataxia. The only antidote preferred for cyclopentolate toxicity is physostigmine as other anticholinesterase drugs fail to cross the blood–brain barrier [3-5].

We report a case of a 6-year-old child, who presented to the outpatient block of the ophthalmology department with a complaint of visual difficulty for a month.

CASE REPORT

A 6-year-old child presented to the outpatient department of the ophthalmology department with a complaint of visual difficulty for a month. She had no history of allergies. She was instilled with 2 drops of 0.5% cyclopentolate to examine refractive errors. There was no mydriatic response, hence, two more rounds of cyclopentolate administration were done at the same dose. Around 6–7 drops were instilled in each eye which made the child irritable and restless, also refused to sit in the chair. Further, in an attempt to control her, she became aggressive and began to hurt people around her. She was moving her hands in her saying chocolate and ice cream. She had visual hallucinations and her speeches were irrelevant. She also held her mother's hand and asked why it was not coming. All these symptoms concluded temporary and reversible central nervous system impairment.

The causality assessment was done using the World Health Organization [6] and Naranjo *et al*. [7] scales which proved that the drug was the probable cause of this adverse event. Later, she was sent to pediatric causality and was admitted to the pediatric intensive care unit for detailed evaluation.

About 4–5 h post-instillation and pediatric evaluation, the child was referred to the psychiatry department. On examination, the patient was still irritable; speech and thought perceptions were normal but the visual hallucinations subsided. Since the child's father claimed that her aggressive behavior still persists, she was prescribed risperidone syrup 0.25 mg and was advised to follow up after 3 days and a week. The patient was noticed to be fine without any psychiatric manifestations during both follow-ups.

DISCUSSION

The cyclopentolate has an anticholinergic and antimuscarinic action similar to atropine. The side effects are uncommon and are generally dose-dependent. The systemic toxicity can be due to the low body mass of children, causing central anticholinergic syndrome, a condition that can affect both the central and peripheral nervous systems. The autonomic symptoms include ataxia and jerky movements of limbs as reported by Rajeev *et al*. [8]. Havener has proved that only two in 50 patients have developed acute psychosis reactions [9].

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The cause of hallucinations could be the similarity of cyclopentolate's amino-dimethyl group to the amino-methyl group found in lysergic acid diethylamide (a hallucinogenic agent). Inappropriate laughing, drowsiness, nausea, and dizziness are common adverse effects. Adverse reactions such as visual and tactile hallucinations, severe memory loss, and incoherent speech are infrequent but require immediate attention [10-12]. The cardiovascular effects include tachycardia, ventricular arrhythmias, and hypertension. A midbrain hemorrhage was reported as a rare complication of cyclopentolate toxicity [13].

Although there is a specific antidote physostigmine to reverse the anticholinergic effects, the patient usually becomes stable with supportive care alone. Diazepam or midazolam are given primarily if the patient is not severely agitated. The systemic absorption has to be interrupted to avoid toxicity and this can be achieved when micro drops (one drop contains 5.6 mL) are preferred over standard drops (a single drop is equivalent to 35.4 mL) [8].

CONCLUSION

Topical cyclopentolate-induced systemic toxicity can be dose-dependent. Most of the case reports have shown reversible damage and symptoms disappeared after 4–6 h of administration. The treatment is usually symptomatic but on severe toxicity, physostigmine is given as an antidote. Identifying this drug toxicity immediately can prevent the incidence of hemorrhage and coma. The alternate and safer choice of mydriatic drug for pediatrics is tropicamide 1%. Adhering to dosing guidelines and following proper instillation procedures is essential.

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