

BILATERAL DILATED AND FIXED PUPIL DUE TO IPRATROPIUM BROMIDE INHALER: A CASE REPORT

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ABSTRACT

Bilaterally dilated and fixed pupils point towards neurological diseases like intracranial tumors compressing third cranial nerve, intracranial hypertension with impending uncal herniation, intracranial hemorrhage or expanding intracranial aneurysm, trauma, congenital malformations and drug induced mydriasis. We report a case having bilaterally dilated and fixed pupil due to ipratropium bromide inhalation which was prescribed for breathing difficulties. Although anisocoria due to ipratropium bromide has been reported in pediatric and critically ill patients due to lose fitting face mask, bilateral involvement due to ipratropium bromide inhaler on opd basis is not reported to best of our knowledge.

Keywords: Dilated and Fixed Pupil, Ipratropium Bromide, Drug induced Mydriasis

INTRODUCTION

Bilaterally dilated and fixed pupils may be alarming sign of neurological diseases like intracranial tumors, intracranial hypertension, intracranial hemorrhage or expanding intracranial aneurysm. Trauma, congenital malformations and drug induced mydriasis can also lead to such condition. We report a case having bilaterally dilated and fixed pupil due to ipratropium bromide inhalation which was prescribed for breathing difficulties. Although anisocoria due to ipratropium bromide has been reported in paediatric and critically ill patients due to leaking face mask, bilateral involvement due to ipratropium bromide inhaler is not reported.

CASES

A 40 year old male reported to ophthalmology OPD with complains of photophobia and blurring of vision for both near and distance for last one week. There was no history of trauma. Visual acuity (unaided) was 6/9 & N10 and best corrected visual acuity was 6/6 with +0.50 DS and N6 with +2.50 DS both eyes. On examination bilateral pupils were dilated and fixed measuring 8 mm. Pupils were nonreactive to both light and near reflex. There were no abnormal features affecting iris, crystalline lens, optic nerve head and macula. Intraocular pressure was 11 and 12 mmHg in right and left eye respectively on Goldmann applanation tonometry. On slit lamp examination there was no evidence of sphincter damage or any other sign of ocular trauma. Uniocular and binocular movements were within normal range ruling out nerve palsy.

On systemic examination patient was well oriented, pulse was 84/min, and blood pressure was 140/70 mm Hg. There was no neurological deficit, deep tendon reflexes were normal. MRI brain done outside, revealed normal study.

There was history of breathing difficulty for which patient was prescribed some inhalers few days back. The inhaler constituted of ipratropium bromide.



Figure 1: Bilateral dilated and fixed pupil in a 40 year old male

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The differential diagnosis was partial or complete third nerve palsy, Adie's pupil or pharmacological mydriasis. 0.1% of pilocarpine eyedrop was administered bilaterally to rule out Adie's pupil, but pupils did not constrict. Again 1% pilocarpine eyedrop was instilled into both eyes of the patient but without any response. This ruled out third nerve palsy and only one possibility left was pharmacological mydriasis. Then patient was asked to stop inhaler containing ipratropium bromide since patient was not taking any other medication except inhaler. Pupils returned to 4mm size in next 24 hours.



Figure 2: Pupils returned to 4mm size on withdrawal of ipratropium bromide containing inhaler

DISCUSSION

Anisocoria due to ipratropium bromide was first documented in 1986 (Samaniego and Newman, 1986). Most reported cases occurred in paediatric and critically ill patients due to poor fitting face masks or direct exposure to the eyes. Ipratropium bromide is an anticholinergic drug used in patients of respiratory problems for due to its bronchodilatory & antisecretory properties. If locally or systemically absorbed it can lead to various anticholinergic side effects like mydriasis, cycloplegia, blurring of vision, acute attack of angle closure glaucoma, dry mouth, dry eyes, tachycardia, decreased gastric emptying and urinary retention. Anisocoria due to ipratropium bromide has been reported in paediatric and critically ill patients due to poor fitting face mask (Cabana *et al.*, 1998; Goldstien *et al.*, 1997), but bilateral dilated and fixed pupil in an adult patient taking ipratropium bromide inhaler on OPD basis is still not reported in literature. Other causes of bilateral dilated and fixed pupils are third cranial nerve compression by increased intracranial pressure from tumor, thrombus, edema, aneurysm, or hemorrhage (Goldstien *et al.*, 1997; Jannun and Mickel, 1986). Although brain imaging is the most effective method to rule out neurological causes, 1% pilocarpine eye drops may be used to differentiate drug induced mydriasis from other causes (Cabana *et al.*, 1998; Farrow and Fancourt, 1986). In ipratropium induced mydriasis, the affected eye will be unresponsive to 1% pilocarpine (Goldstien *et al.*, 1997; Jannun and Mickel, 1986). Increased intraocular pressure or post traumatic damage to the sphincter muscle may also cause the pupil to be nonreactive to 1% pilocarpine (Jannun and Mickel, 1986). In mydriasis caused by third cranial nerve lesion, the pupil will still constrict with 1% pilocarpine, since the sphincter muscle is intact and responsive to cholinergic stimulation (Farrow and Fancourt, 1986). The Adie pupil may present as a dilated pupil that slowly reacts to light. The aetiology of this condition is unknown. Initially, it is unilateral in 80% of patients. In this case patients have compromised deep tendon reflexes and the pupil will constrict in response to pilocarpine 0.1% eye drops (Rosen *et al.*, 1998). In our case pupil did not constrict to both 0.1% and 1% pilocarpine drops thus ruling out Adie's pupil and third nerve palsy. On withdrawal of ipratropium bromide inhaler pupils returned to normal size suggesting pharmacological mydriasis due to the above mentioned drug. Bilaterally dilated and fixed pupils are not serious side effect of ipratropium bromide but it can be misinterpreted as neurological emergency. Proper history and instillation of pilocarpine eyedrops should be tried before jumping to costly brain imaging. 0.1% pilocarpine will construct a tonic pupil dilated due to Adie's syndrome. 1% pilocarpine will construct a normal pupil and pupil dilated due to third nerve palsy, but will be ineffective in post traumatic and drug induced mydriasis including ipratropium bromide induced mydriasis. Thus ipratropium bromide should be considered in the differential diagnosis in patients having bilateral dilated and fixed pupil when there is apparently normal brain imaging.

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