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Case Report

Case report on Ipratropium Bromide induced Anisocoria

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ABSTRACT

Anisocoria or unequal pupil size is an alarming sign of a neurologic emergency, especially when the patient is in a critical care setting. It is important to identify the aetiology of anisocoria and consider drug-induced anisocoria as a possible aetiology after ruling out underlying pathology if any. Ipratropium bromide, an anticholinergic drug, can cause anisocoria. This case report emphasises Ipratropium bromide-induced anisocoria.

1. Introduction

Anisocoria or unequal pupil size may be an early sign of the neurological condition and it is often difficult to identify the underlying aetiology in a critical care setting. Drugs can cause anisocoria and one among them is an anticholinergic drug, Ipratropium bromide. It can be misinterpreted as a severe neurologic emergency in patients with altered consciousness. Thorough neurologic and ophthalmic examinations and detailed evaluation of medical and medication history help to differentiate neurological and drug-induced anisocoria.

2. Case Report

A 69-year-old male patient came with a known complaint of COPD and had an exacerbation of dyspnea for 2 weeks. Dyspnea was not resolving with the inhaler. He developed chest pain and sweating 2 days back, diagnosed with Acute infective COPD, Type II Respiratory failure, Coronary artery disease, Acute Coronary Syndrome, and Pre-renal Acute kidney injury. The patient was initially maintained on NIV, however, he developed bronchospasm and was not tolerating NIV. Repeat ABG showed severe respiratory acidosis and the patient was re-intubated. The patient was treated with appropriate antibiotics and other supportive measures. On administration of Nebulization Ipratropium bromide, the patient developed anisocoria. The adverse reaction was probable according to WHO UMC Causality Assessment System. And resolved after the withdrawal of the offending agent.

3. Discussion

Anisocoria refers to the unequal size of the pupils. It is usually considered as an alarming signal of an impending neurologic emergency in any patient. It is considered a sign of uncal herniation due to either acute intracranial pressure or other intracranial problems. It is often difficult to identify the aetiology behind the development of anisocoria in a critical care unit because patients may be either sedated or intubated and most of them have altered consciousness. It is important to differentiate neurological causes of anisocoria from other possible causes. It is important to exclude intracranial pathology, neurological and vascular

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disorders. Brain imaging studies help with the same.[1] It is prudent to consider other possible reasons such as drug-induced anisocoria in those without underlying pathological conditions, which helps to spare the patient's unnecessary expenses.[2]

Ipratropium Bromide is one of the drugs which can cause anisocoria. Ipratropium bromide is an anticholinergic drug, which is available in aerosol form. It is commonly given in critical care units for those patients with respiratory insufficiency, asthma, COPD etc.[3] It is a quaternary ammonium derivative of Atropine sulphate that blocks the muscarinic receptors on the airway smooth muscles and submucosal gland cells. Also it causes a decrease in the broncho-motor tone and thereby resulting in bronchodilation.[4] Aerosol inhalation of ipratropium bromide has maximum action within 30 to 60 minutes and the duration of action lasts up to 6 hours.[2] The most likely cause of these systemic symptoms are atropine and hyoscyamine, as scopolamine via contact with the eye has been shown to not affect heart rate.[5]

Ipratropium bromide-induced anisocoria may be due to the frequent use of aerosolized anticholinergics and non-invasive positive pressure ventilation.[1] When inhaled, there is minimal systemic absorption of the drug; but can cause mydriasis, if it is administered topically or if it is applied accidentally from a broken nebulizer circuit or poorly fitted mask.[3] Potential systemic absorption of inhaled ipratropium bromide leads to anisocoria.[4] A cholinergic agonist, Pilocarpine acts on the muscarinic receptors of the iris sphincter and ciliary muscles to cause pupil constriction. It helps to confirm Ipratropium bromide-induced anisocoria. In Ipratropium bromide-induced anisocoria; the affected eye will be unresponsive to pilocarpine, whereas the unaffected eye remains constricted. ADR may be encountered with pilocarpine hence should be judicious with the use of pilocarpine.[3] Here the patient develops anisocoria probably due to ipratropium bromide and after withdrawal of the offending agent, anisocoria disappeared.

It is important to rule out the neurological causes of anisocoria and drug-induced anisocoria. The neurological and ophthalmic examination helps the same.[6] Although anisocoria is not a dangerous adverse event, the condition can be misinterpreted as a severe neurologic emergency in patients with altered consciousness and also in the differential diagnosis of patients with anisocoria when no structural explanation can be found with a brain CT.[7] Clinicians should carry out a thorough examination of the medical and medication history, and help to suspect drugs as possible causes of anisocoria.[4] Properly placing the mask during nebulization, administering with drugs closed, conducting ophthalmologic examination as necessary helps to reduce the incidence of Ipratropium induced Anisocoria.[8]

4. Conclusion

Anisocoria is a concerning and alarming condition when a patient is in the critical care setting with multiple issues. It can be misinterpreted as a severe neurologic emergency in patients with altered consciousness. It is important to differentiate between neurological anisocoria and drug-induced anisocoria. It is prudent to consider drug-induced anisocoria in those without underlying pathological conditions. Clinicians should carry out a thorough examination of the medical and medication history, and it helps to suspect drugs as possible causes of anisocoria and withdrawal of the offending drug to help in the resolution of the same.

5. Abbreviations

1. COPD - Chronic Obstructive Pulmonary Disease
2. ADR - Adverse Drug Reaction
3. ABG - Arterial Blood Gases
4. NIV - Non Invasive Ventilation
5. WHO - World Health Organization
6. UMC - Uppsala Monitoring Centre

6. Source of Funding

None.

7. Conflicts Of Interest

The authors declare that they have no conflicts of interest.

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