

## Bilateral Acute Angle-Closure Glaucoma Following Acute Poisoning with Organophosphate

Amir Masoud Hashemian<sup>1</sup>, Mohsen Ebrahimi<sup>1</sup>, Elnaz Vafadar<sup>1</sup>, Mohsen Salarirad<sup>1</sup> and Hassan Fadavi<sup>2\*</sup>

<sup>1</sup>Emergency department, Emam Reza hospital, faculty of medicine, Mashhad University of medical sciences, Mashhad, Iran

<sup>2</sup>Centre for Endocrinology and Diabetes, Institute of Human Development, University of Manchester, UK

\*Corresponding Author: Hassan Fadavi, Centre for Endocrinology and Diabetes, Institute of Human Development, University of Manchester, Core Technology Facility (3rd floor), 46 Grafton Street, Manchester, M13 9NT, UK, Tel: 004401612751229; E-mail: [Hassan.fadavi@manchester.ac.uk](mailto:Hassan.fadavi@manchester.ac.uk)

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### Abstract

**Background:** A case is reported of acute headache and vomiting which was started from day before hospital admission in a 49 year old man. This is the first known reported case of organophosphate induced bilateral angle closure glaucoma.

**Case presentation:** This case presents a 49 year old who had admitted to A&E department with headache and blurred vision and vomiting. Intra ocular pressure (IOP) of the right eye of the patient was 22 mm Hg and the left eye was 34 mm Hg. Visual acuity of the right eye was reported 3/10 and the left eye was reported 4/10. Patient was treated by peripheral iridotomy with the diagnosis of acute bilateral angle-closure glaucoma and the patient's symptoms were completely resolved one hour after treatment.

**Conclusion:** Acute bilateral angle closure glaucoma is reported as side effect of many drugs but this shows it was occurred after injection of atropine for poisoning with organophosphate pesticide.

**Keywords:** Toxicology; Intra-ocular pressure; Acute angle closure glaucoma

### Background

In developing countries, organophosphate poisoning is one of the most common substance to commit suicide. Hence the mortality and morbidity arising from this poisoning are a medical problem [1,2]. The poisoning can cause three syndromes which are acute cholinergic, intermediate and delay polyneuropathy [3] as well as being responsible for multi-organ dysfunction [4].

Glaucoma is a leading cause of irreversible blindness in the world. Angle-closure glaucoma describes one of the mechanisms which leads to glaucoma. In angle-closure, the "angles" that act as drains for the aqueous in the eye are closed which leads to increase eye pressure. Treatment is aimed at opening the drainage system and lowering the pressure in the eye with medical or surgical treatment or both [5].

Glaucoma is one of the complications of organophosphate poisoning which could result during treatment with atropine. Here we present a case report of bilateral acute glaucoma following poisoning with organophosphate and injection of Atropine.

There are no accurate figures about the incidence of Organophosphate poisoning. This Organophosphate is used as pesticide and it inhibits acetylcholine-esterase. Therefore, acetylcholine accumulates at nerve synapses and neuromuscular junctions, stimulating muscarinic and nicotinic receptors and the central nervous system. The risk to humans can be controlled by following the recommended precautions. Patient did not show any cognitive disorder or neuropsychological performance.

### Case presentation

#### History of present illness and review of system

A 49 year old man presented to the emergency ward complaining of headache and vomiting that had started the day before of admission. The headache was in the frontal and retro-orbital region and it was continuous. Neurologic examination of the patient was normal and neck stiffness was not present. The patients vital signs were as follows: oral temperature 37.2°C, blood pressure=130/85 mmHg, pulse rate=95, respiratory rate=11. Sub-conjunctival haemorrhage was present and pupils were mid-dilated. Eye movements were normal with no photophobia or ptosis. He had no history of migraine or recent head trauma. He took paracetamol on the day before for his headache. The patient had no past medical history of illness. He did not take any regular medications. He was admitted in emergency department with Organophosphate poisoning. He took Organophosphate to commit suicide. He suffered from depression but was not on medical treatment for his depression. Diagnosis usually is made on the basis of clinical suspicion, the characteristic clinical signs, smell of pesticides or solvents, or acetylcholinesterase activity in the blood [1]. However, in this case, it was confirmed with his family members and they brought sample of Organophosphate which patient used to commit suicide to A&E. On arrival at the emergency ward, he had a loss of consciousness with GCS =11/15 (The Glasgow Coma Scale) in combination with cholinergic symptoms. He was initially treated with a total of 30 mg Atropine intravenous injection which he received on the ward. The patient was subsequently discharged from the poisoning ward with stable clinical symptoms and a full recovery. The next day he is admitted to emergency department with vomiting. One hour after admission, his vomiting worsened and he became

agitated and complained of bilateral blurred vision. Blood tests and brain CT scan of the patient was normal. Urgent ophthalmology consultation was requested for the patient due to retro-orbital pain, blurred vision and bilateral conjunctivitis. Intra-ocular pressure (IOP) of the right eye of the patient was 22mm Hg and the left eye was 34 mm Hg. Visual Acuity (VA) of the right eye was reported as 3/10 and the left eye was 4/10. Patient was treated by peripheral iridotomy with the diagnosis of acute bilateral angle-closure glaucoma and the patients symptoms completely resolved one hour after treatment. It needs to be noted that the normal eye pressure ranges from 10 to 21 mmHg. Ocular hypertension is an eye pressure of greater than 21 mmHg.

## Discussion

Acute glaucoma is one of the most important emergencies of ophthalmology that occurs due to an increase of intraocular pressure more than 22 mm Hg [6]. There are a large number of systemic diseases and topical ocular and systemic medications that can cause acute bilateral angle closure glaucoma. The most common of these drugs are anticholinergic [7]. Although unilateral angle closure glaucoma is common but bilateral glaucoma appears to follow disorders like AIDS, Herpes Zoster, congenital anomalies and side effects of drugs [8]. Some of sulfa-based drugs such as Acetazolamide and Cotrimoxazol, Topiramate can cause acute closure angle glaucoma through ciliary body edema and most of these attacks occur when the patient has a narrow iridocorneal angle [8]. In one case of bilateral closure angle glaucoma is reported following the oral use of Topiramate and the mechanism is though a side effect of ciliochoroidal detachment which occurs in both eyes [9]. Acute bilateral closure angle glaucoma is rare and there is usually an external cause. One report identifies general anaesthesia is known as a contributing factor [8] and has also been reported following a snake bite and muscle paralysis [10].

In this case study we report high-dose atropine which is used in the treatment of Organophosphate poisoning, causing glaucoma in susceptible individuals. This may occur from prolonged mydriasis and it has previously been reported that prolonged mydriasis following topical amlodipine also causes acute angle closure glaucoma [11] as well as anaesthesia, atropine and muscle relaxant [11]. Another possible mechanism in the development of glaucoma in our patient is probably side effects with the mechanism of edema and lens thickening, ciliochoroidal detachment [12] and also ciliochoroidal effusion [12].

## Conclusion

The treatment for glaucoma depends upon the nature and severity of each case. In general, glaucoma cannot be cured, but it can be controlled. Eye drops, pills, laser procedures, and surgical operations are used to prevent or slow further damage from occurring. Argon laser iridotomy and Nd:YAG (Neodymium: Yttrium-Aluminium-Garnet) iridotomy are the two established techniques of laser iridotomies. The first showed higher rates of failure and the second one had higher rate of single treatment success and lower risk of subsequent closure [13].

Laser iridotomy works by eliminating pupillary block and widens the anterior chamber angle in the majority of patients with closed angle glaucoma however if it fails to open the anterior chamber angle, laser peripheral iridoplasty may be recommended as one of the options in current standard treatment for angle-closure.

In acute forms of glaucoma, optic nerve damage and permanent vision loss can occur within hours if the eye's drainage angle is not opened to allow the excess aqueous to exit the eye, thereby reducing the intraocular pressure. Therefore, it may still be crucial in cases admitted to emergency department with complains of headache, vomiting, and history of drug use where there is a clinical suspicion of an increase of intraocular pressure and emergency ophthalmology consultation is necessary to examine for glaucoma in addition to other therapeutic measures.

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