

Anticholinergic visual hallucinosis from atropine eye drops

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ABSTRACT: A 37-year-old man with type I diabetes mellitus and chronic renal failure presented to the emergency department complaining of hallucinations. He was 5 days postoperative for left pars plana vitrectomy and intra-ocular lens implantation and had been taking ophthalmic atropine, tobramycin and prednisolone. He had presented 5 months earlier, on the same ophthalmic medications, with postoperative hallucinations after a right pars plana vitrectomy. Visual hallucinations are a major side effect of anticholinergic poisoning. Ophthalmic instillation of atropine has been documented to cause many central nervous system symptoms, including hallucinations.

RÉSUMÉ ANALYTIQUE : Un homme âgé de 37 ans atteint de diabète sucré type I et d'insuffisance rénale chronique se présente à l'urgence pour des hallucinations. Cinq jours plus tôt, il a subi l'ablation de la zone postérieure du corps vitré gauche et reçu un implant cristallinien. Il est traité à l'atropine ophtalmique, à la tobramycine et à la prednisolone. Cinq mois auparavant, il avait ressenti les mêmes symptômes après une vitrectomie à l'oeil droit. Les hallucinations visuelles sont un effet indésirable important associé à l'intoxication aux anticholinergiques. On a documenté plusieurs symptômes au niveau du système nerveux central découlant de l'instillation ophtalmique d'atropine, dont les hallucinations.

Key words: anticholinergic, atropine, psychosis, ophthalmology, renal failure

Introduction

Atropine is a competitive antagonist of acetylcholine at muscarinic receptors.¹ Ophthalmic atropine sulfate blocks the cholinergic response of the iris sphincter and ciliary muscle, causing mydriasis and cycloplegia (paralysis of accommodation). It is often used as a mydriatic postoperatively to limit the formation of adhesions between the lens and the iris.² Most atropine is destroyed by hydrolysis in the liver, but 13% to 50% is excreted unchanged in the urine.¹ For this reason, renal failure may increase circulating atropine levels after administration. Anticholinergic visual hallucinations and overt psychosis, although rare, have been reported in adults taking ophthalmic atropine drops.³ We describe a patient with chronic renal failure who presented to our emergency department (ED) on two separate occasions with hallucinations after the administration of atropine eye drops.

Case report

A 37-year-old man with poorly controlled type I diabetes mellitus and chronic renal failure presented to the ED complaining of visual hallucinations. He reported seeing spruce trees, and stated that his legs were present despite bilateral below-knee amputations. His mother noted that he had become increasingly irritable and aggressive, but there were no other hallucinations or manifestations of psychosis. Five days previously he had undergone left pars plana vitrectomy and intraocular lens implantation for diabetic vitreous hemorrhage. After surgery, he was discharged on prednisolone acetate (one drop 4 times daily), tobramycin (one drop 4 times daily), and 1% atropine (one drop twice daily). He had done well until developing visual hallucinations on the day of his ED visit.

Five months earlier, 8 days after surgery on his other eye, he presented to our ED on the same medications, again with

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visual hallucinations (seeing snakes). These symptoms resolved 1 to 2 days after his eye drops were discontinued. His past medical history was also significant for bilateral below-knee amputations, long-standing, poorly controlled diabetes mellitus and chronic renal failure, for which he was on ambulatory peritoneal dialysis. There was no history of psychiatric illness or alcohol abuse.

Medications at the time of the index visit included insulin, fluoxetine, folic acid, domperidone, omeprazole, cisapride, and hydromorphone, a regimen he had been on for 2 years without complications. His blood sugars were well controlled on both occasions when he developed hallucinations.

On examination he was agitated but in no distress. Blood pressure was 120/80 mm Hg, pulse was 100 beats/min, respiratory rate was 18 breaths/min, temperature was 36.8°C, and oxygen saturation was 98% on room air. Head and neck, cardiac, respiratory, abdominal and neurological exams were normal. He was noted to have bilateral below-knee amputations.

Laboratory investigation revealed: white blood cell count, $11.5 \times 10.9/L$; hemoglobin, 100 g/L (normochromic, normocytic); hematocrit, 0.305; platelet count, $302 \times 10.9/L$; sodium, 135 mmol/L; creatinine, 644 $\mu\text{mol/L}$ (previous creatinine on first visit to ED, 508 $\mu\text{mol/L}$; ethanol, 1 mmol/L; salicylates, 0.3 mmol/L; and acetaminophen, 54 $\mu\text{mol/L}$ (therapeutic range 16–42 $\mu\text{mol/L}$).

Five mg of oral diazepam was administered. The patient's visual hallucinations continued, but his agitation improved. The absence of other explanatory etiologies and the temporal relationship, on 2 occasions, with atropine eye drops, led to a diagnosis of anticholinergic visual hallucinosis, probably exacerbated by chronic renal failure. After consultation with the ophthalmology service, the atropine eye drops were discontinued and the patient was discharged from the ED in fair condition. All symptoms resolved within 48 hours.

Discussion

This patient presented on two occasions, after eye surgery, with visual hallucinations. On both occasions he had been placed on atropine, tobramycin, and prednisolone eye drops. Given the temporal relationship of his symptoms to eye drops, and the lack of evidence that tobramycin or prednisolone cause visual hallucinations, the most likely diagnosis in this case is visual hallucinosis secondary to the central anticholinergic effects of atropine.

Visual hallucinations have been reported following systemic and ophthalmic administration of atropine. Following ophthalmic administration, systemic absorption occurs

directly through conjunctival capillaries and via the nasal mucosa or gastrointestinal tract following passage through the lacrimal drainage system. Symptoms include hallucinations, insomnia, restlessness and confusion, which have also been described with other anticholinergics including scopolamine and homatropine.³ Hallucinations are usually visual, and patients often report seeing snakes, trees or insects.

Visual hallucinations have also been reported following the intravenous administration of atropine, but these were present only when the patient's eyes were closed.⁴ Two case reports describe the onset of acute psychosis following the ingestion of tea made from atropine-rich thorn apple leaves.^{5,6}

Kimura⁷ reports the case of a patient who developed apathy and visual hallucinations after 2 months of oral prednisolone administration (15 mg daily) for relapsing poly-chondritis. No cases of tobramycin-induced psychosis have been reported in the medical literature.

Conclusion

Visual hallucinosis following ophthalmologic atropine drops is uncommon. In this case, chronic renal failure was likely a predisposing factor. In such cases, symptomatic treatment with benzodiazepines is appropriate, and anticholinergic toxicity is likely to resolve within days of discontinuing the offending agent. Ophthalmology consultants should be notified so that they can address the need for other mydriatic agents.

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