that such any intervention was unnecessary since she was largely asymptomatic.

Footnotes and Disclosure:

The authors have no proprietary or commercial interest in any materials discussed in this article.

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Reversible anisocoria due to inadvertent ocular exposure to topical anticholinergic treatment for primary axillary hyperhidrosis

Anisocoria is a common clinical challenge and can be due to benign (e.g., pharmacologic anisocoria, iris damage, tonic pupil) or potentially dangerous (e.g., aneurysm, syphilis, tumour) etiologies. Although pharmacologic dilation and anisocoria from topical, dermatologic, nebulized, and systemic mydriatics is well-known, pharmacologically induced mydriasis from topical treatments for primary axillary hyperhidrosis is less well-described. Two relatively new anticholinergic topical agents, sofpironium bromide (currently in phase 3 clinical trials [Argyle Study]) and glycopyrronium (Qbrexza), are now available. Although pharmacologic pupillary mydriasis from anticholinergic agent exposure has been reported previously, to our knowledge, this is the first clinical report of reversible anisocoria due to inadvertent ocular exposure to topical anticholinergic treatments for primary axillary hyperhidrosis in the English-language ophthalmic literature.

A 25-year-old woman (case 1) presented to the emergency department with acute, painless mydriasis in her left eye (OS) upon awakening. The patient had idiopathic recurrent hyperhidrosis. Ocular, medical, surgical, and family history were otherwise noncontributory. Her medications included lisdexamfetamine and sofpironium bromide. She had used topical sofpironium bromide gel in her axillary area before going to bed, followed by application of facial cream without any interval hand washing between applications before falling asleep.

Visual acuity measured 20/20 in both eyes (OU). There was anisocoria (Fig. 1), with the pupil measuring 3 mm in the right eye (OD) in the dark and 7 mm OD in the light and measuring 8 mm in the dark (OS) and 7.5 mm in the light OS (Fig. 1A). There was no relative afferent pupillary defect. Ocular motility examination was full and there was no ptosis. Slit-lamp biomicroscopy and dilated fundus examination were normal OU. Computed tomography (CT) and CT angiography of the head with and without contrast were normal and there was no posterior communicating artery aneurysm. The diagnosis of pharmacologic mydriasis was made and the patient was reassured. Follow-up communication with the patient revealed complete resolution of her anisocoria 48 hours later (Fig. 1B).

A 39-year-old man (case 2) developed blurred vision and dilation of the left pupil over several hours. On evaluation in the ED, he denied headache, eye pain, diplopia, urinary retention, or other neurologic or systemic symptoms aside from dry mouth. He had a longstanding slight upper eyelid asymmetry. He had used topical glycopyrronium (Qbrexza) several hours before his complaint, which was applied to both underarms after his work out at the

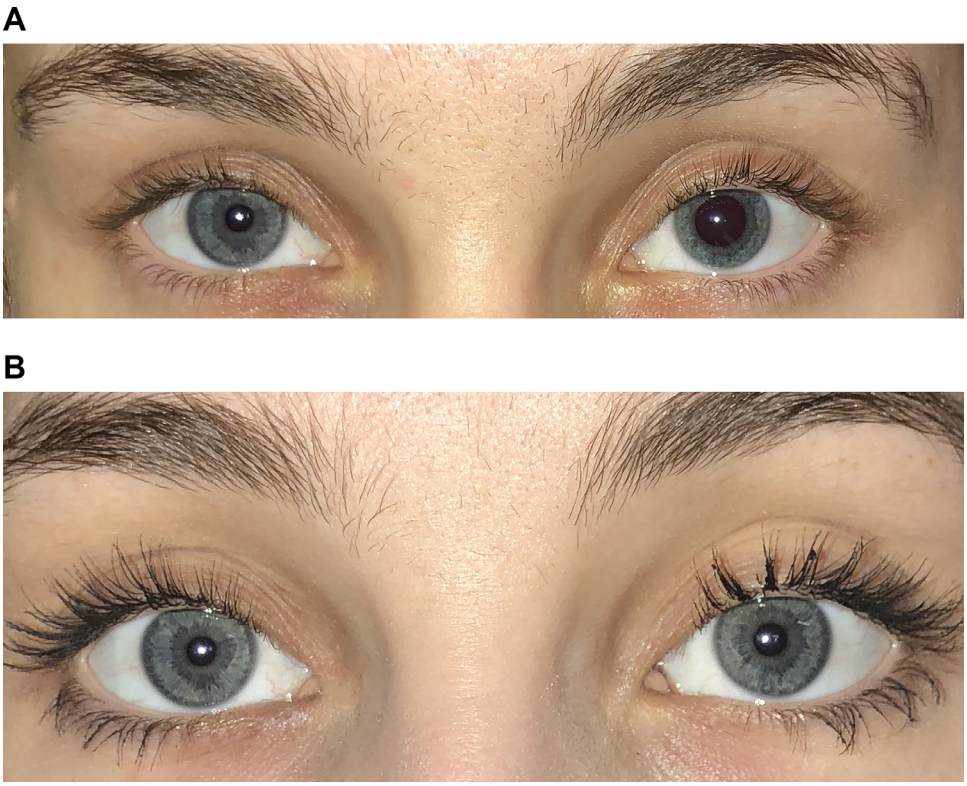

Fig. 1—Anisocoria. Patient anisocoria induced by accidental sofpironium bromide exposure as seen in emergency department (A) and after resolution (B) 48 hours later.

gym. He used no other medications aside from diphenhydramine for allergy. He was unaware of finger-to-eye contact.

General examination showed evidence of facial flushing and tachycardia at 105 bpm. Ophthalmic evaluation revealed visual acuity of 20/20 OU. External and anterior segment examinations were unremarkable. Eyelid asymmetry was noted, with the right eye lower (Fig. 2A). Pupillary diameters measured 5 mm OD and 8 mm OS (Fig. 2A,B), with mildly sluggish reactivity OU. The near pupillary response was mildly decreased OD and markedly decreased OS. The diameter of the right pupil increased to 6 mm during emergency department evaluation. Eye movements were normal (Fig. 2). Findings of fundus examination were normal. CT scan of the head showed no intracranial hemorrhage. Over the next 2 days, pupillary diameters and light reactivity returned to normal, as did additional skin and cardiac findings.

Glycopyrronium bromide is a muscarinic anticholinergic medication that has been used in various forms, for secretion control in anaesthesia and for treatment of chronic obstructive pulmonary disease and peptic ulcer disease. In mid-2018, glycopyrronium tosylate was approved by the U.S. Food and Drug Administration for topical use in a cloth towelette applied to the underarms to reduce excess axillary perspiration (primary axillary hyperhidrosis). Guidelines for drug use emphasize limiting treatment to one application across each underarm followed by hand washing. The use of topical anticholinergics as a treatment for hyperhidrosis recently received U.S. Food and Drug Administration approval in 2018 (Qbrexza cloth, glycopyrronium tosylate 2.4%) for use in the United States. Topically applied glycopyrrolate derivatives for hyperhidrosis treatment have

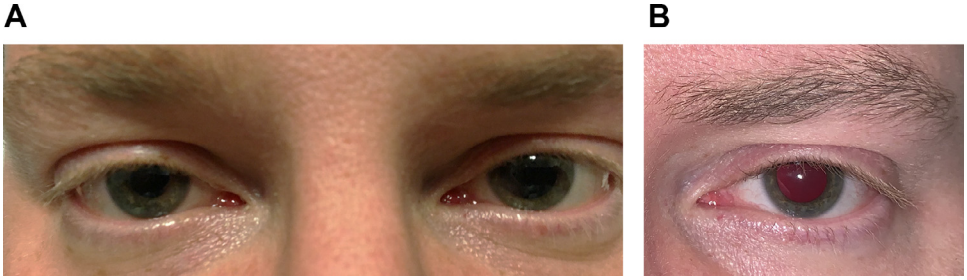

Fig. 2—Anisocoria. Patient anisocoria induced by accidental glycopyrronium bromide exposure as seen in emergency department with (A) acute anisocoria and overlying chronic right eye ptosis. (B) Mydriatic left pupil close-up.

previously been approved in Canada and are marketed under the trade name Secure wipes, which can be found on the web site pharmacy.ca (PurePharm Inc). Its antihyperhidrosis topical use has also been studied in the United Kingdom as early as 1998 and in South Korea as early as 2003.[1]

Mydriasis is a well-known, common (>5% occurrence) adverse event that can occur with treatment using topical anticholinergic medication.[2–4] Adverse events during the pooled phase 3 trial (ATMOS I and ATMOS II) for topical glycopyrronium tosylate used in the treatment of primary axillary hyperhidrosis showed that 6.8% (n = 459) of participants experienced unilateral mydriasis.[5,6] Interestingly, the majority of mydriasis events occurred in the first 2 weeks of starting treatment. Other anticholinergic side effects were reported from both the glycopyrronium tosylate trials and the sofpironium bromide phase 2 trials, including dry mouth, headache, urinary hesitation and retention, local skin reactions, and constipation.[2,3] It was proposed in these studies that unilateral mydriasis and blurred vision were likely due to local exposure, and the urinary and gastrointestinal symptoms were due to systemic exposure. Likewise, topical sofpironium bromide gel, another anticholinergic agent, has been introduced as a therapy for symptomatic hyperhidrosis.

Pupillary mydriasis without ptosis or ocular movement abnormalities is unlikely to be a third nerve palsy. The most common causes of a neurologically isolated mydriasis are benign, including tonic pupil syndrome, iris damage (e.g., trauma or intraocular surgery), or exposure to pharmacologic agents, most often anticholinergics.[2] Isolated pupillary mydriasis has been reported with inadvertent exposure to topical ophthalmic mydriatic agents (anticholinergics, sympathomimetics), antinausea dermatologic agents (e.g., scopolamine patches),[3] aerosolized bronchodilators (e.g., ipratropium), dietary supplements,[4] and nonpharmacologic exposure to plants (e.g., jimson weed, belladonna alkaloids).

Although a dilated, poorly reactive pupil may be a sign of a posterior communicating artery aneurysm compressing the oculomotor nerve, this scenario is almost invariably associated with some degree of ptosis or eye movement limitation. Likewise, although an expanding intracranial mass may result in uncal herniation with pupillary mydriasis as its first sign, this occurs in the setting of worsening mental status and eventual obtundation, rather than in an ambulatory patient with no other neurologic findings.

The recent introduction of topical hyperhidrosis agents provides for an additional route to incur pharmacologic pupillary mydriasis. Clinicians should be aware of this possible benign etiology for pharmacologic mydriasis in order to reduce patient and physician concern for and inappropriate testing or possible interventions for dangerous etiologies like intracranial aneurysm.

Footnotes and Disclosure:

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Assessment of posterior capsular integrity on optical coherence tomography

The integrity of posterior capsule is of paramount importance to cataract surgeon. Careful preoperative assessment is routinely performed to avoid undesirable intraoperative complications. Routine slit-lamp-based assessment provides a detailed understanding of the posterior capsule, provided that lens matter is optically clear to an acceptable extent. However, the presence of opacity along the posterior capsule with a hidden defect such as posterior polar cataract may pose a challenge to decipher the intactness of the capsule.[1] Under such circumstances, noninvasive imaging modalities, such as anterior segment optical coherence tomography (OCT), is at surgeons rescue during the