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Grand Rounds

A 15-year-old girl with variable anisocoria

Michael J. Coleman, MD, and **Robert L. Tomsak, MD, PhD**
Author affiliations: Department of Ophthalmology, Kresge Eye Institute, Wayne State University

History

A 15-year-old young woman presented with a 4-month history of variable anisocoria and fluctuating blurred vision. Past medical history was significant for migraines, which were well controlled by amlotriptan. She denied a history of trauma, use of topical medications, or a worsening or change in her headaches. She also denied having visual phenomenon associated with her previous headaches.

Examination

On examination, her uncorrected near visual acuity was J1+ and her best-corrected visual acuity was 20/20 at distance and J1+ at near. Her glasses measured −4.50 +0.50 × 98 in the right eye and −4.75 D in the left eye. Ocular motility was full, and the pupils were equal, round, and reactive to light and accommodation. Her pupils measured 5 mm to 3 mm with direct pupillary light reflex and 5 mm to 2.5 mm to near stimulus. Her near point of convergence was approximately 4 cm from the nose, and her accommodative amplitude was assumed normal given her ease of accommodation and excellent near visual acuity through her full myopic correction. Slit-lamp examination demonstrated normal pupils without iris atrophy, sectoral palsy of the iris sphincter, or vermiform movements.

The patient provided several photographs that illustrate fluctuating symptoms. Figure 1 shows inappropriate dilation on a bright sunny day compared to other pictures of her on similar days; there is also subtle anisocoria greater in the right eye than in the left and either pupil could be involved during symptomatic episodes.

Figure 1. Photographs demonstrating the variable anisocoria. A, Bilateral mydriasis on a sunny day; compare pupils of patient (right) to classmate. B, Right-sided mydriasis. C, Left-sided mydriasis.

Treatment

We elected to proceed with pharmacologic testing with 0.125% pilocarpine. This demonstrated bilateral pupillary constriction suggestive of cholinergic receptor suprasensitivity in both eyes. She was diagnosed with a variant of Adie's tonic pupil in each eye, and she was reassured.

Three weeks later she was reexamined because of a worsening of her symptoms. On follow-up examination, her pupils were 8 mm and nonreactive to light, accommodation, or 1% pilocarpine. Distance visual acuity was 20/20 with correction and near acuity was J7 with correction and J2 without correction.

Differential Diagnosis

Evaluation of unilateral mydriasis can be a diagnostic dilemma and could be a medical emergency in the set-

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Correspondence: Michael J. Coleman, MD, 600 North Wolfe St. Woods 375, Baltimore, MD 21287 (email: mcolem28@jhmi.edu).

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ting of compressive oculomotor nerve palsy. In the clinical setting, evaluation of extraocular movements is essential to determine whether an oculomotor nerve palsy is causing an acute unilateral mydriasis. Once this has been ruled out, Adie's tonic pupil must be considered. Other causes of mydriasis and accommodative failure include temporal lobe epilepsy,[1] migraine,[2,3] use of topical and systemic medications,[4–6] or exposure to plant toxins.[7,8]

Diagnosis and Discussion

Further probing revealed that she suffered from hyperhidrosis and that she used topical glycopyrrolate cream, a direct acetylcholine receptor antagonist, on her palms and axilla before bed daily. Furthermore, she occasionally handled her contact lenses and lens case after using the glycopyrrolate ointment. She would subsequently put the contact lens in her eyes before school the next morning. She was educated about all pertinent issues and has not had subsequent pupillary or visual symptoms.

This case is remarkable in that the patient had variable and fluctuating pupillary dilation and accommodative failure. The initial hypersensitivity response to 0.125% pilocarpine was consistent with Adie's tonic pupil but in the absence of other signs of this condition. Although we do not know the exact mechanism of the suprasensitivity response to 0.125% pilocarpine, it is tempting to consider that it was related to repeated, variable receptor blockade of the cholinergic receptor by glycopyrrolate.

Primary hyperhidrosis (axillary or palmar) is a disease of excessive sweating. Hyperhidrosis affects about 2.8% of the American population (7.8 million people), with axillary hyperhidrosis being the most prevalent manifestation.[9] The treatment options for hyperhidrosis include antiperspirants, oral or topical anticholinergics, and surgical or chemical (ie, botox injection) sympathecotomy.[10–13]

This case demonstrates the value of a careful history in dealing with patients with anisocoria and the need to ask specifically about hyperhidrosis and the use of glycopyrrolate whenever pharmacologic mydriasis is suspected.

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