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Neurosyphilis Masquerading as an Acute Adie's Tonic Pupil: Report of a Case

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Key Words

Neurosyphilis · Adie's tonic pupil · Anisocoria

Abstract

We describe the case of a male patient who presented with anisocoria, and was initially diagnosed with an acute Adie's tonic pupil. On subsequent laboratory testing, he was found to have neurosyphilis. Magnetic resonance imaging demonstrated enhancement of the right oculomotor nerve. This case underscores the importance of considering this diagnosis in patients with acute onset internal ophthalmoplegia and hypersensitivity to dilute pilocarpine, even in the absence of other oculomotor nerve findings.

Case Report

A 39-year-old man presented to our clinic with complaints of an enlarged right pupil of onset 10 days prior. He initially noted a difference in the pupil size while looking at his eyes in the mirror, and complained of progressively worsening light sensitivity in the right eye. In addition, he described blurred vision with reading and near work, which improved on covering his right eye. He denied a recent history of headaches, diplopia, ptosis or blurred vision at distance. He also denied a previous history of ocular trauma, use of scopolamine patches or recent upper respiratory infection symptoms. His past medical history was significant only for genital herpes.

On examination, the best-corrected visual acuity was 20/20⁺² in the right eye and 20/15⁻² in the left eye. Ocular motility was full bilaterally, and the patient was orthophoric in primary gaze. The visual fields were full to confrontation, but on frequency doubling technology (FDT) visual field testing, he was noted to have an inferior altitudinal defect in the left eye ([fig. 1a](#)). The intraocular pressures were 14 mm Hg in both eyes. Anisocoria was present, with the right pupil measuring 7.5 mm and the left pupil 4 mm in the light. In the dark, the right and left pupils measured 8 and 7.5 mm, respectively. Pupils were also tested on convergence, and measured 6 mm in the right and 3 mm in the left. A sluggish response was noted on redilation of the right pupil in going from near to distance vision. The patient also had a small left relative afferent pupillary defect (RAPD) by the reverse RAPD technique. Slit lamp examination of the anterior segment was within normal limits in both eyes. The anterior chamber was

deep and quiet bilaterally, and no iris sphincter tears or other signs of previous ocular trauma were noted in the right eye. No vermiform movements were seen, but an atonic segment was present inferotemporally in the iris collarette.

Given the clinical picture of anisocoria worse in the light and the tonicity noted in the right pupil on distance fixation after convergence, pharmacological testing was undertaken with dilute pilocarpine (fig. 2). A drop of dilute pilocarpine (0.125%) was instilled in each eye, and the pupil sizes were measured at the same illumination at 5, 15, and 30 min intervals. Reversal of the anisocoria was noted after 30 min, with the pupils measuring 2.5 and 4 mm in the right and left eyes, respectively. This was consistent with denervation hypersensitivity of the right pupil and a diagnosis of an acute right Adie's tonic pupil. Homes-Adie's syndrome was ruled out on testing of the peripheral reflexes, which were within normal limits bilaterally.

On dilated fundus examination, superior optic disc pallor was noted in the left eye (fig. 1b). There was slight cup-to-disc ratio asymmetry (0.3 mm in the right eye and 0.45 mm in the left eye), but the pallor was out of proportion to the cupping. The disc margins were clear. Associated with this sectoral disc pallor in the left eye, there was slight attenuation of the superior arcades. The vitreous, macula, vessels, and periphery were within normal limits in the right eye. On red saturation test, the patient volunteered having noticed decreased color intensity in the left eye for the last 2 years. However, on Ishihara pseudoisochromatic plate testing, he was able to correctly identify all plates in both eyes. Based on these findings in the left eye, an enhanced magnetic resonance imaging (MRI) brain and orbits study was obtained, which revealed enhancement of the right oculomotor nerve, along its cisternal segment into the oculomotor cistern of the superior right cavernous sinus (fig. 3). No orbital or intracranial mass was seen, and there was no evidence of previous demyelinating disease.

Considering the unlikelihood of an Adie's tonic pupil in a male patient, his previous history of genital herpes, and the lack of a viral prodrome or any other cause to justify this diagnosis of exclusion, rapid plasmin reagent (RPR), venereal disease research laboratory (VDRL), and fluorescent treponemal antibody (FTA-Abs) tests were ordered. These tests were all positive and the patient was diagnosed with probable neurosyphilis per Hooshmand's criteria [1]. He was referred to the care of an infectious disease specialist for treatment. A peripherally inserted central catheter was placed, and the patient was treated with a 3-week course of procaine penicillin G.

Discussion

Our patient's presentation was initially consistent with that of an acute Adie's tonic pupil given the decreased light and convergence responses, tonicity after accommodation, hypersensitivity to dilute pilocarpine, and the inferotemporal atonic iris segment noted in the right eye. In light of this unusual presentation, the patient's right internal ophthalmoplegia and left optic neuropathy were further investigated. Positive syphilis serologies clinched the diagnosis, which was confirmed by enhancement of the right preganglionic oculomotor nerve on MRI. Unfortunately, a lumbar puncture was not done to confirm cerebrospinal fluid involvement. This was omitted by the infectious disease specialist as it would not have altered the treatment of the patient. The differential diagnosis of unilateral internal ophthalmoplegia in a young patient includes ocular or orbital trauma, uveitis, acute viral illness, cycloplegic medication use, aneurysm (early posterior communicating artery or internal carotid artery), direct or indirect (i.e. uncal herniation) compressive oculomotor neuropathy secondary to an orbital or intracranial mass, Nothnagel syndrome, Miller-Fisher syndrome, leptomenigeal disease, and Adie's tonic pupil. On physical examination, there were no signs of previous trauma or uveitis. The patient had a left optic neuropathy, but denied a history of previous head trauma, and no signs of optic nerve atrophy or healed fractures were seen on MRI. He was also asked about a viral prodrome or history of previous eye infection, which he denied as well. There was no corneal scarring to suggest previous herpetic ocular involvement. There was

likewise no history of mydriatic medication use, and this was ruled out on pupil examination. Compression of the oculomotor nerve by an early aneurysm usually results in subtle ocular motility deficits and/or ptosis, and the presence of an aneurysm was also effectively ruled out on MRI. Fascicular involvement was not seen clinically or on MRI, and on neurologic testing the patient did not exhibit ataxia or areflexia. Finally, the patient did not have a history of malignancy and the right oculomotor nerve enhancement on MRI was not typical of leptomeningeal disease.

True to its epithet as ‘the great imitator’, syphilis may affect almost any part of the eye and present as an interstitial keratitis, scleritis, uveitis (anterior, intermediate, posterior or panuveitis), retinal vasculitis, chorioretinitis, optic neuropathy or as a new-onset cranial nerve palsy [2, 3]. In our case, the only positive findings were a right internal ophthalmoplegia simulating an acute Adie’s tonic pupil and a chronic, subacute left optic neuropathy. On review of the literature, there are several case reports of Adie’s tonic pupils on patients with neurosyphilis, in most of which bilateral pupillary involvement has been described [4–7]. To our knowledge, this is the second report of unilateral internal ophthalmoplegia as a presenting sign of neurosyphilis [8]. We believe that only one pupil was involved due to an early presentation of the disease, as our patient manifested no other neurological symptoms aside from a mild visual disturbance associated with a previous left optic neuropathy.

The patient’s left optic neuropathy may have been related to a self-limited treponemal infection of the optic nerve or to another process. While retinal arteriolar attenuation has been associated with syphilitic optic neuropathy, this usually results in a fast decline in visual acuity [9]. However, other causes are less likely in this young patient, including glaucoma (degree of cupping was out of proportion to the pallor and the extent of visual field loss), previous optic neuritis (usually presents with a central or cecentral scotoma, and the patient did not have optic nerve enhancement or signs of demyelinating disease on MRI), nutritional and/or toxic optic neuropathy (a bilateral, albeit asymmetrical central or cecentral visual field defect would have been expected), and Leber’s hereditary optic neuropathy (usually results in a fast decline in visual acuity in both eyes, and diffuse optic disc pallor would have been expected). The patient’s left inferior altitudinal visual field defect may have resulted from treponema-induced vasculitis of the superior branch retinal arteries with subsequent atrophy of the nerve fiber layer in their distribution.

This case underscores the importance of keeping neurosyphilis in the differential of patients with unilateral ophthalmoplegia, particularly male patients in which a diagnosis of an Adie’s tonic pupil is three times less likely. A thorough sexual history in these cases is helpful, but this may not be readily elicited. In these cases, a complete ophthalmic and neurologic examination should be conducted to rule out other subtle coexisting pathologies as in the case of our patient. In early cases of neurosyphilis, prompt diagnosis affords the possibility of a cure, before the onset of the severe vascular, neurologic, and psychiatric complications that may result in death [1].

Acknowledgements

The authors thank Rick Triebwasser (Gimbel Eye Centre, Calgary, Alta., Canada) and Jocelyn Miskey (Rockyview Hospital Eye Clinic, Calgary, Alta., Canada) for providing the photographs.

Disclosure Statement

The authors have no proprietary or financial interest concerning products or instruments described.

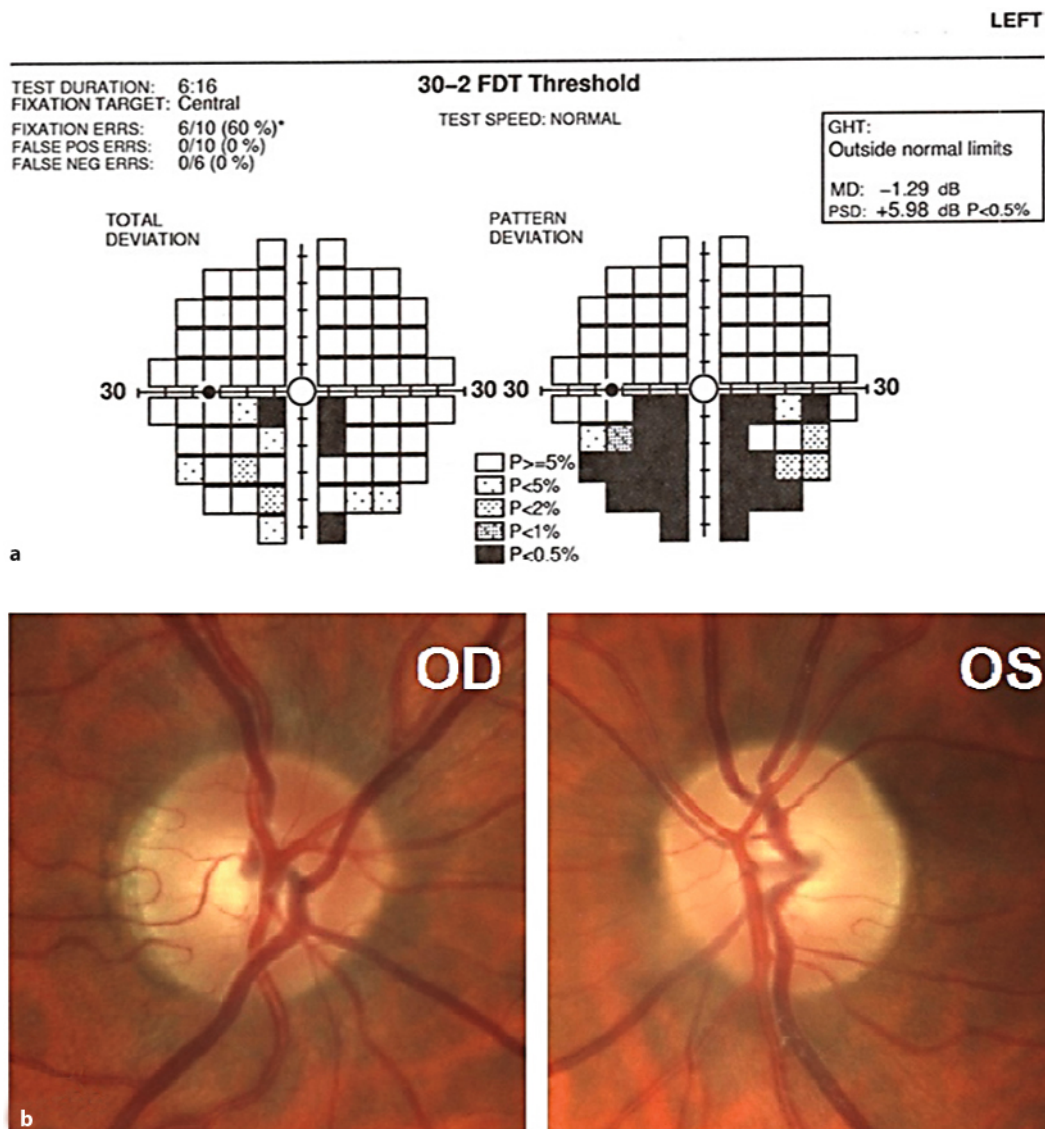


Fig. 1. Initial FDT visual field and optic disc photographs. **a** FDT visual field at initial visit shows a left inferior altitudinal defect. **b** Superior optic disc pallor in the left eye consistent with the visual field defect.

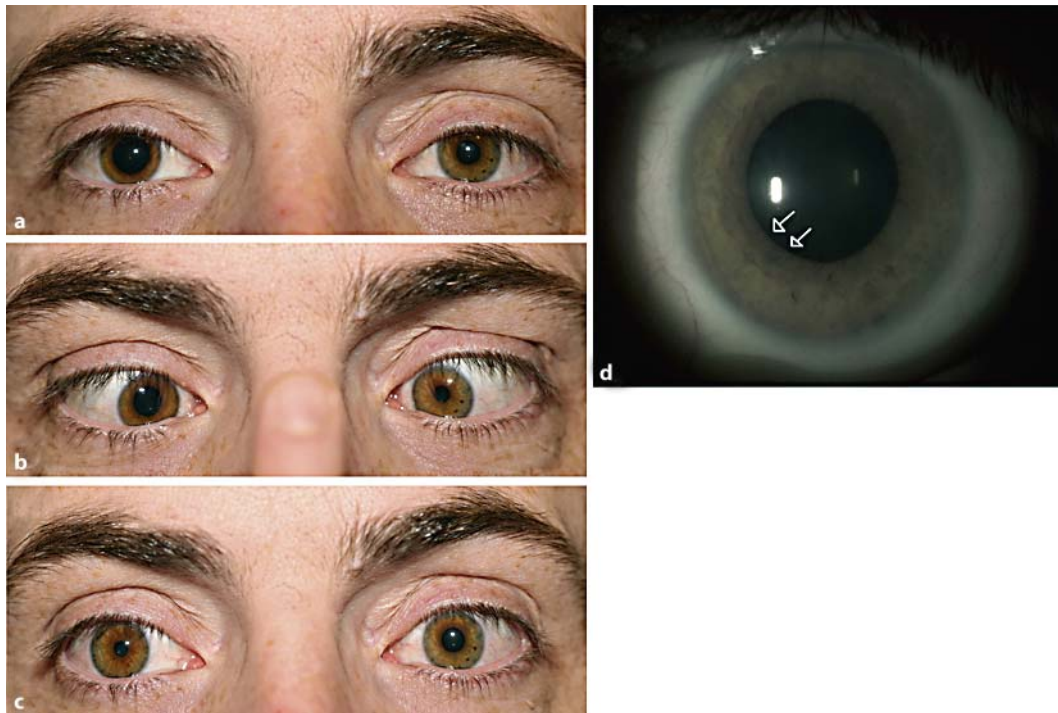


Fig. 2. Anisocoria workup repeated 2 weeks after the initial diagnosis of an acute right Adie's tonic pupil. **a** Pupils in the light. **b** Pupils on convergence. **c** Reversal of anisocoria 30 min after instillation of one drop of dilute pilocarpine (0.125%) in each eye. **d** Atonic inferotemporal segment of iris in the right eye (arrows).

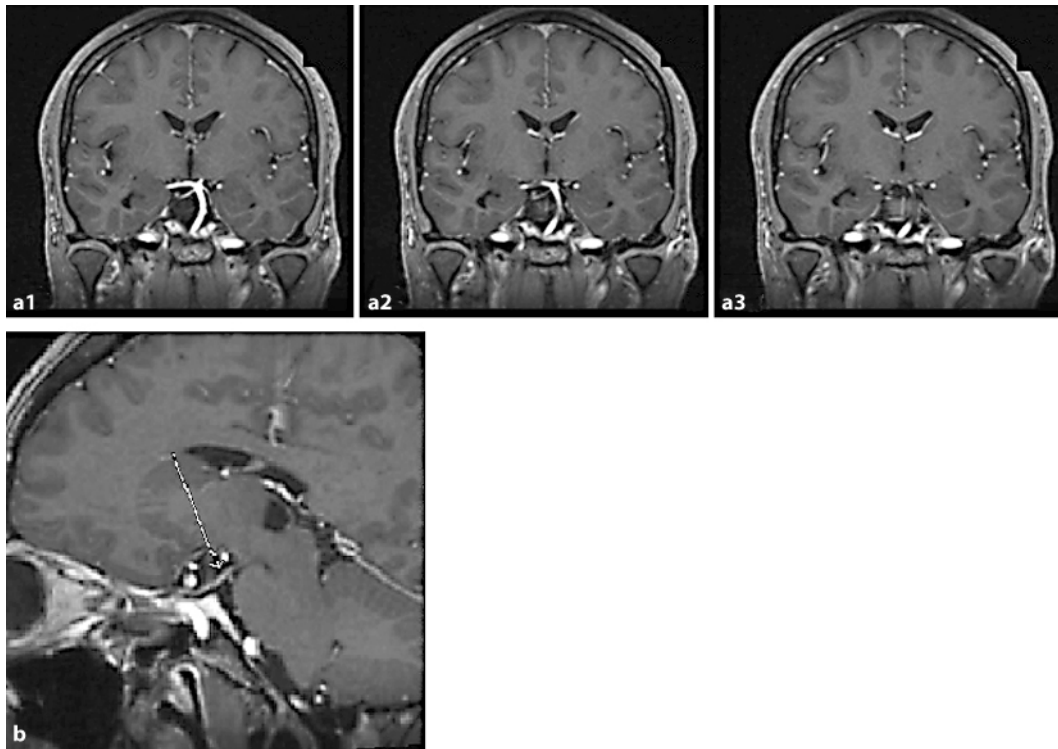


Fig. 3. MRI of the brain and orbits. **a1–a3** Three coronal post-gadolinium magnetization prepared – rapid acquisition gradient echo (MP-RAGE) sequence MR images reveal the abnormal enhancing right oculomotor nerve between the right superior cerebellar artery and the P1 segment of the right posterior cerebral artery. **b** Oblique sagittal view of the enhancing right oculomotor nerve.

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