

Adie´s Pupil and Migraine: an Overlooked Association?

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RESUMO

Introdução: A pupila de Adie resulta de um distúrbio neurooftalmológico caracterizado por lesão das fibras parassimpáticas pós-ganglionares, e define-se como uma pupila midriática não reativa ao estímulo luminoso e moderadamente reativa à acomodação. Na maioria dos casos é idiopática, embora tenham sido descritos casos raros de pupila de Adie associada a outras patologias, incluindo enxaqueca.

Métodos: Descreve-se o caso clínico de uma doente de 48 anos, observada por midríase pupilar direita associada a crise de enxaqueca. A assimetria pupilar persistiu após melhoria das cefaleias.

Resultados: O exame oftalmológico e o teste com pilocarpina 0,125%, foram consistentes com o diagnóstico de pupila de Adie. O estudo analítico e a imagiologia cerebral excluíram outras causas de anisocoria.

Conclusões: A cronologia dos eventos e ausência de outras possíveis etiologias favorece a associação entre pupila de Adie e enxaqueca. É possível que a pupila de Adie ocorra em virtude da isquemia das fibras pós-ganglionares parassimpáticas secundária ao vasoespasmio severo ou prolongado que pode ocorrer durante um episódio de enxaqueca. Esta condição deve ser distinguida da midríase episódica benigna.

Palavras-chave: Pupila de Adie; Pupila tónica; Enxaqueca

ABSTRACT

Introduction: Adie´s pupil is a neuro-ophthalmological disorder caused by injury of postganglionic parasympathetic nerve fibers of the eye and is defined as a dilated pupil, which is unresponsive to light and moderately responsive to accommodation. Although the aetiology remains unknown in most cases, there are rare reports of Adie´s pupil associated with migraine.

Methods: A 48-year-old woman presented with right pupil dilatation and headache. The pupillary asymmetry persisted after the headache had subsided.

Results: Ophthalmological examination and pilocarpine test results were consistent with Adie's pupil. Work-up including neuroimaging showed no abnormalities.

Conclusions: The chronology of events and the exclusion of other possible aetiologies favor the association between Adie's pupil and migraine. It is possible that severe or prolonged vasospasm occur during a migraine attack leading to ischemia of parasympathetic fibers resulting in Adie's pupil. This condition should be distinguished from benign episodic unilateral mydriasis.

Keywords: Adie's pupil; Tonic pupil; Migraine.

INTRODUCTION

Adie's pupil is a neuro-ophthalmological disorder characterized by a dilated pupil, which is unresponsive to light and moderately responsive to accommodation. The prevalence of Adie's pupil is approximately of 2 cases per 1000 population.¹ The disorder is more common in women (ratio F/M: 2.6:1) with a mean age of 32 years.¹ The mydriatic pupil is unilateral in 80% of cases, although the contralateral pupil may later become involved (rate is about 4% per year).¹ This condition is caused by damage of postganglionic parasympathetic fibers and the diagnosis is confirmed with rapid miotic response of the affected pupil to 0.125% pilocarpine drops. Although the aetiology remains unknown, there are some conditions associated with Adie's pupil. Herein we describe a patient who developed an Adie's pupil during a migraine episode.

CASE REPORT

A 48-year-old woman presented with right pupil dilatation and headache. She reported a severe right frontal headache accompanied by nausea. The patient had a 26-year history of chronic migraine for which she has been taking topiramate 50 mg daily for the last 6 years. The current headache has been lasting for ten hours and was more intense than her previous headaches. During the headache episode, her son noticed anisocoria. The pupillary asymmetry persisted after the headache had subsided. She had no other complaints and had no history of ocular surgery or trauma. Her past medical history was significant

for anxiety disorder treated with fluoxetine and alprazolam. The patient had one family member, a sister, with migraine.

On examination, she had anisocoria with a 4 mm right pupil and a 2.5 mm left pupil under photopic conditions. The right pupil was unresponsive to light with little response to near reflex. Biomicroscopy revealed vermiform movements of the right iris. Her left eye examination was normal. There was no ptosis and extra-ocular movements were intact bilaterally. Visual acuity, fundus examination and intraocular pressure were normal. Her deep tendon reflexes were normal.

Brain computed tomography scan showed no abnormality. Serologic tests for syphilis were negative. Hemogram, sedimentation rate and routine blood chemistries were also unremarkable.

Following instillation of 0.125% pilocarpine there was a strong contraction of the right pupil, whereas the left pupil remained unchanged. Hence, a diagnosis of Adie's pupil was confirmed.

At 3-month follow-up, reexamination showed similar findings with persistent Adie's pupil.

DISCUSSION

Anisocoria is frequent and represents a considerable diagnostic challenge as it can be caused by a wide variety of disorders ranging in severity from a normal, physiological condition to one that is potentially life-threatening, such as an intracranial aneurysm. In the absence of other neurological findings, anisocoria is usually due to benign disorders, including Adie's pupil.

Adie's tonic pupil is characterized by a dilated pupil with poor response to light, tonic response to near stimuli,

vermiform movements of the iris on slit-lamp examination, and cholinergic supersensitivity.¹

The occurrence of Adie's pupil is not uncommon, and the condition results from injury of postganglionic parasympathetic nerve fibers with subsequent denervation of the sphincter pupillae and ciliary muscles. Major complaints are blurred vision and photophobia, although most patients are asymptomatic and anisocoria is accidentally noticed.

Adie's pupil is usually benign and most patients do not require treatment. Accommodative symptoms usually resolve spontaneously during the first two years, and there is a general tendency for the Adie's pupil to become smaller over time.¹

The association of Adie's pupil and absent or reduced tendon reflexes is known as Adie's syndrome.

Most cases of Adie's pupil are idiopathic and commonly it affects young women. A tonic pupil can also be due to local disorders such as orbital trauma, including surgical procedures, inflammation, tumors, ischemia or infection. Tonic pupils can also be part of systemic diseases such as Sjögren syndrome, malignancies, diabetes mellitus, amyloidosis, giant cell arteritis and systemic sclerosis, among others.^{2,3,4,5}

There are few reports in the literature documenting the association of Adie's pupil and migraine^{6,7,8,9,10}. Massey⁶ was the first to consider a causally relationship between these two entities. Among 22 patients presenting with Adie's pupil, he identified eight patients with a migraine personal history and nine had a family history of migraine. Both pathologies share an autonomic dysfunction and although migraine is extremely common and Adie's pupil is not uncommon, Massey suggested that the relation between these two disorders is not a random association. A careful history undertaken in patients with Adie's pupil may reveal a personal or family history of migraine.

Years later, Purvin⁷ described the first patient having the onset of the tonic pupil during a migraine episode and the causality of Adie's pupil was attributed to migraine. The chronology of events and the exclusion of other possible aetiologies favored the association.

The exact mechanism underlying this association is still unknown. Purvin⁷ and Tafakhori *et al*⁸ hypothesised that a severe or prolonged vasospasm, affecting the posterior lateral ciliary artery and the lateral muscular arterial trunk which supply the ciliary ganglion, can occur during a

migraine attack leading to ischemia of parasympathetic fibers resulting in Adie's pupil.

Due to the fact that most patients with Adie's pupil present no symptoms, it is possible that in some patients the pupillary asymmetry may go unnoticed during a migraine episode, and therefore, the link between Adie's pupil and migraine is difficult to establish.

Our patient presented with an Adie's tonic pupil during a migraine attack, and this condition should be distinguished from benign episodic mydriasis. The last one is an isolated cause of intermittent pupil asymmetry and has also been described in patients with migraine.¹¹

Having excluded all other possible aetiological factors of Adie's pupil in our patient, the description of the present case report adds to the literature and supports the association between Adie's pupil and migraine. This association should be known in order to avoid unnecessary examinations.

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