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Case Report

Bilateral tonic pupil during a migraine attack: a case report

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Abstract

Introduction

Tonic pupil or Adie's pupil occurs due to parasympathetic denervation, and it is characterized by mydriasis with little or no response to light, with pupillary contraction to accommodation. It is caused by eye pathologies, such as infections, trauma, neoplasms, inflammatory diseases, and systemic diseases with autonomic dysfunction. Few cases have been reported of bilateral tonic pupils associated with migraine attacks.

Case report

Our aimed to describe the case of a young female patient with a history of chronic migraine without aura, who presented acutely with bilateral pupillary mydriasis during a migraine attack, characterized as tonic pupil, and to discuss the possible causes of mydriasis during a migraine attack.

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Introduction

Tonic pupil or Adie's pupil occurs due to parasympathetic denervation and is characterized by mydriasis with little or no pupillary response to light, with pupillary contraction to accommodation. It is often unilateral but bilateral involvement is observed in up to 20% of patients. It occurs predominantly in young women (1). It is caused by eye pathologies, such as infections, including syphilis (2), trauma, neoplasms, inflammatory diseases (3) and may be associated with systemic diseases with autonomic dysfunction.

Cases of tonic pupil during migraine attacks have been previously described (4-10).

In 2003, Mylius et al. (11) evaluated the pupillary function of 42 patients with migraine versus 42 controls and showed a reduction in the speed and amplitude of pupillary constriction up to two days after the migraine attack, thus suggesting post-ganglionic parasympathetic dysfunction during the migraine attack.

Barriga et al. (12) proposed the term ciliary ganglioplegic migraine in 2011 to describe persistent mydriasis that can occur ipsilateral to pain during a migraine attack.

Case report

We report a case of a 30-year-old woman, without comorbidities, with chronic migraine without aura for 1 year, according to the criteria of the International Classification of Headache Disorders (ICHD-III) (13). The patient sought care at the emergency room of the "Santa Casa de Misericórdia de São Paulo" during a migraine attack. During this crisis she had sudden, bilateral visual blurring. She did not have eye pain, diplopia, ophthalmoparesis, or eyelid ptosis.

The neurological examination revealed regular pupils, with bilateral mydriasis, absent direct and consensual photomotor reflex and preserved miosis at convergence. No other abnormality was found the neurological examination. A 0.125% pilocarpine test was performed, which was positive, showing bilateral postganglionic parasympathetic denervation.

The patient underwent investigation with neuroimaging, cerebrospinal fluid, and laboratory tests, ruling out structural, infectious, including syphilis, and metabolic causes of pupillary abnormalities. The pupillary abnormality was attributed to parasympathetic dysfunction related to migraine.

The patient was reassessed two months after hospital discharge, when she reported no visual blurring since a few days after hospital discharge. The neuro-ophthalmological examination showed reactive to light and accommodation pupils.

Discussion

Cranial autonomic symptoms (CAS) are common in migraine, including pupillary abnormalities, ptosis, eye redness, tearing, lid edema, nasal congestion and rhinorrhea - ocular CAS are the most common. Migraineurs with CAS present with higher headache intensity and frequency and chronic migraine is more frequent in these subjects (14-16).

Anisocoria may occur in migraine because of either abnormal miosis or mydriasis, indicating an autonomic imbalance between parasympathetic constriction and sympathetic dilation of the pupil. Miosis is the most reported pupillary abnormality, frequently associated to other CAS such as ptosis, due to oculosympathetic hypofunction (17, 18).

Mydriasis during a migraine attack can represent different situations: a comorbid concurrence of Adie's pupil and migraine, an ophthalmoplegic migraine (with a predominance of parasympathetic paresis), headache as a painful manifestation of ganglionitis and ganglioplegic migraine. In the present case the first possibility was more likely, considering the lack of other neuro-ophthalmologic abnormalities and the fact that it seemed to be an isolated episode.

The frequency of Adie's pupil during migraine attacks is still unknow. Its relationship with other pathophysiological elements, including other autonomic nervous system abnormalities (19) in migraine, is not yet clear. Therefore, more studies are needed to evaluate the relationship between parasympathetic dysfunction of the ciliary ganglion and migraine.

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