

A pupil That Won't Constrict : A Case of Adie's Tonic Pupil

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ABSTRACT

Adie's tonic pupil, the round unilateral tonic pupil, is a neuro-ophthalmologic disorder with dilation and no light response. Although usually idiopathic, it may be associated with infection, inflammation, and postganglionic paraneoplastic nerve damage. The diagnosis is made by observing a miotic response after dilated pilocarpine instillation. Spontaneous recovery depends on etiological factors.

Keywords:

Adie pupil,
Pilocarpine, headache

INTRODUCTION

Pupil is a structure of eye that allows light to pass and fall on retina to create image. But there are so many abnormalities that can involve pupil. Adie pupil is one of them. Adie's tonic pupil (Holmes-Adie syndrome) is usually characterized by unilateral some cases can be bilateral involvement presented as pupillary dilatation and decreased light reflex. It may be accompanied by a decrease in deep tendon reflexes^[1]. Its annual incidence is 4-7/100,000, and it is more common among females in their thirties^[2, 3]. It related to ocular infections and inflammations, peripheral and autonomic neuropathies, paraneoplastic syndromes, toxicity, tumors, and trauma and some cases remain idiopathic. The tonic response seen during convergence is more distinct than seen during light reflex and the diagnosis is based on tonic constriction after pilocarpine instillation^[4].

It is believed that Adie's tonic pupil occurs due to damage in the postganglionic parasympathetic nerves of the eye^[3, 4]. Symptoms may include blurring of vision for near due to defective accommodation and photophobia due to dilated pupil.^[5,6,7] It can be presented with headache, anisocoria, where the larger pupil is abnormal, poorly or does not react to light but reacts to near reflex with an absent reverse afferent pupillary defect.

Denervational hypersensitivity to a direct-acting cholinergic drug i.e. instillation of one drop of diluted 0.125% or 1% pilocarpine in both eyes and assessment of the pupillary response after 20-30 minutes can differentiate Adie's tonic pupil from other pupillary disorders.^[7] In Adie's syndrome, the affected pupil does not contract in reaction to light but constricts response to dilute pilocarpine with 0.125%, as opposed to a normal pupil.

CASE PRESENTATION

Case -1

A 34-year-old female patient visited our ophthalmology outpatient clinic in the past month with the complaint of blurred vision, especially when try to see near object. She faces difficulty to focus near object, ocular pain during reading, photophobia and headache. She took pain killer to relief headache but symptoms not improve. She noticed left pupil is more larger than right eye. She has no history of double vision, trauma, tumor, drooping of lids, deviation of eyes or any other abnormalities. There was no known systemic disease.

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On ocular examination, her best corrected visual acuity was 20/20 in both the eyes for distance. A cover test showed orthophoria for distance and near. Color vision was normal in both eyes. Extraocular motility, visual field were normal. Pupillary Examination revealed normal right eye and anisocoria (unequal pupil) in left eye, pupillary diameter measuring in right eye 3 mm and left eye measuring 4.5 mm (mesopic condition), direct light reflex was normal in the right eye while a slow tonic response to light and a relatively brisk response to near in the left eye was noted. There was absence of reverse relative afferent pupillary defect in left eye and dilated and unresponsive to direct and indirect light stimuli. The left pupil did constrict slowly on near fixation and slowly re-dilated on distance fixation again. Slit-lamp examination, as well as gonioscopy, was within normal limits. Fundus examination finding within normal limits.



Fig A: dilated pupil(left eye)-anisocoria

Ocular trauma, inflammation, migraine, benign episodic pupillary mydriasis, Adie's tonic pupil, oculomotor nerve paralysis, pharmacological agent use, and paraneoplastic conditions were considered as the preliminary diagnoses in the patient with anisocoria. But she has no history of trauma or any other complaints except facing difficulty to focus near object and headache, photophobia.

A 0.125% drop prepared by diluting 2% pilocarpine (Pilosed®) drop with ringer lactate was instilled in both eyes equally, after 30 mins, right pupil remained unchanged, but significant shrinkage was observed on the left.



Fig B: after installing 0.125% pilocarpine in left eye(miosis of pupil)

Hence, the patient was diagnosed with Adie's tonic pupil. Clinical signs and symptoms of the patient were completely improved within one month with using drop pilocarpine 0.125%. Her photophobia and blurred vision immediately resolved. Patient was advised for neurological evaluation which was normal with normal deep tendon reflexes. Diagnosis of Adie's pupil was made. The patient was advised to use photochromatic glasses along with topical diluted pilocarpine 0.125% was prescribed thrice daily. Side effects of pilocarpine like brow-ache, blurring of distant vision was not reported

DISCUSSION

Adie's tonic pupil results from the damage to the ciliary ganglion.^[3] Ciliary ganglion innervates the ciliary muscle much more than the iris sphincter. In Adie's pupil, as damage to the ciliary ganglion, increased probability of survival of the fibers to the ciliary muscle. This results in pupillary constriction with accommodation (light–near dissociation).^[1] Adie's pupil usually present with unilateral anisocoria. The main differential diagnosis to consider are 3rd nerve palsy, pharmacological mydriasis, and iris sphincter tears from trauma. A third nerve palsy essentially always has associated limitation of eye movements or ptosis^[4]. If these are not present, the differential diagnosis is narrowed down to tonic pupil or pharmacological mydriasis. Response to a near target and pharmacologic testing can help distinguish the differentials. Adie tonic pupil is a benign condition. However, patients may experience photophobia and blurry vision. Accommodative paresis may resolve with time, ranging from months to years. However, patients may experience increased light-near dissociation over time since the pupil's reaction to light does not typically recover^[1]. Patients with symptoms such as photophobia and blurring of vision can be treated with dilute pilocarpine topically^[2]. Short course with diluted pilocarpine 0.125% and photochromatic glasses can alleviate the symptoms.

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