

**Case Report**

Tonic Pupil after Chickenpox - A Clinical Case

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Abstract

A number of ocular complications following varicella have been described in the literature, but a quite uncommon one is tonic pupil. We report a clinical case and a short discussion of the argument.

Keywords: Child; Ocular complications; Tonic pupil; Varicella

Clinical Case

A previously healthy 4-year-old girl was led to our Pediatric Emergency Departments for scarlet-shaped dermatitis. On clinical examination, her left pupil was large and reacted negatively to light. Vital tract signs were all within normal limits. Anisocoria appeared 30 days before, not presented in previous photos. The child also suffered from worsening photophobia without other symptoms. The anamnesis was negative for trauma or complaints of any kind. Topic or aerosolic drugs were not used. No abnormalities in the eye movement were detected and neurological examination revealed no abnormality. A third nerve palsy was considered but cerebral MRI was normal. Ophthalmological examination confirmed irregular shape of left pupil with low reaction to light and normal reaction to direct and consensual reflex. In the pilocarpine test there was a significant response in the left pupil with remarkable reduction in its size. The positivity of pilocarpine test using drugs both at 0.1 and 1%, oriented toward the diagnosis of Adie's tonic pupil.

On further investigation, the mother of the girl told us that the patient's brother had chickenpox 30 days before; after about 15 days she left eyes became hyperemic and filled with periocular vesicles.

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Considering the time gap, we think that chickenpox is the infectious cause of Adie's tonic pupil. The ophthalmological follow up during five months after hospitalization shows persistent anisocoria.

Discussion

Chickenpox is a common childhood disease. Benign ocular manifestations, such as eyelid or conjunctival vesicles, papillary conjunctivitis, or superficial keratitis, could be observed during the eruptive phase [1]. Uveitis or chorioretinitis are less common complications. But chickenpox could be responsible for neurological or neuro-ophthalmological complications, including optic neuritis, cranial nerves palsy, or vertical gaze palsy [2]. Internal ophthalmoplegia, also called "tonic pupil," is infrequently reported in this context and usually follows the cutaneous manifestations by one or two weeks [3].

A tonic pupil is described as one larger than its fellow pupil. The reaction to light, direct or consensual, is usually completely or nearly completely abolished; reaction to mydriatics, however, is normal. The highest incidence is in women between 20 and 30 years of age, with bilateral cases being reported [4]. A clinical approach appreciating the mechanism regulating the pupil size, permits prompt recognition of true emergencies and often obviates the need for invasive and costly testing. Pupil size is governed by the balance of actions of two opposing muscle groups of the iris: the dilator and sphincter pupil.

A larger pupil demonstrates a poor pupillary constriction: this indicates an abnormality of the parasympathetic system with consequence midriasis. The efferent alterations of the parasympathetic pathway may be secondary to the involvement of the efferent routes from mesencephalo to the pupil, resulting in paralysis of the pupil's muscular muscle. In this disease state, other symptoms such as headache or altered mental state are variably present. Focal neurological deficits such as papilledema, ptosis, and impairment of eye movement are apparent to the clinician.

For this kind of injury, it is essential to perform neuroimaging and fundus oculi examination to exclude tumors, intracranial aneurysms, cerebral hemorrhages and meningitis irritations. In these cases midriasis is more often associated with other neurological signs such as diplopia, ptosis, and impaired extraocular movements.

Another cause of mydriasis is the pharmacological mydriasis and Adie's tonic pupil. Adie's tonic pupil is a particular type of pupillary dysfunction caused by the damage of parasympathetic postganglionic fibers usually by a viral or bacterial infection or inflammation [5].

Adie's tonic pupil is a neuro-ophthalmologic disorder characterized by dynamic anomaly that causes tonic dilated pupil. In adults, the prevalence is about two cases per 1000 population, the age on onset is 32 years and there is a female predominance but not enough epidemiological data is available for pediatric age [6]. It's caused by damage to postganglionic fibers of the parasympathetic innervation of the eye; trauma is the most common cause of a tonic pupil, other cause includes viral illness such as herpes zoster infection, viral hepatitis, Guillain-Barre syndrome, autonomic neuropathies, migraine, sarcoidosis

and arteritis. When the etiology cannot be identified, particularly in young females, the condition is idiopathic. The pathophysiology of unilateral mydriasis and attack of migraine or between spells, has not yet been defined, maybe there is a parasympathetic dysfunction associated with migraine. In this case the patient's symptom resolved over a period of 3-4 weeks with no intervention [7]. Symptoms of Adie's tonic pupil are accommodative symptoms and patients commonly say that anisocoria was noticed by a friend or relative. Diagnostic features of tonic pupil are minimal and amount to no reaction to light, slow constriction to convergence and slow redilatation. For diagnosis, it's important the difference between paralytic and pharmacologic mydriasis that can be demonstrated using a 1% pilocarpine eye drops test. Dilated pupils do not constrict in response to pilocarpine 1% in pharmacologic mydriasis, but do in paralytic mydriasis. The pupillary condition is unilateral in 80% of cases and sometimes it may be a part of the Holmes-Adie's syndrome, in which tonic pupil is associated with absent or reduced deep tendon reflexes but the eye and reflex symptoms may not appear at the same time [8]. In literature for pediatric age, there are reports of pupillary disorder following varicella infections but it is a rare consequence and few cases have been described. The first detailed descriptions of clinical cases were made by Bonamour in 1952 and Ross in 1961 [9,10] and then by Heger and Orssaud [3,11]. It's probable that a varicella virus infection of the short ciliary nerves and the ciliary ganglion caused a postganglionic parasympathetic nerve lesion, clinically presenting as a tonic pupil. In these cases the nerve damage is irreversible [2].

References

1. Hodgkins P, Luff AJ, Absolon MJ (1993) Internal ophthalmoplegia-a complication of ocular varicella. Aust N Z J Ophthalmol 21: 53-54.
2. Kertes PJ, Baker JD, Noel LP (1998) Neuro-ophthalmic complications of acute varicella. Can J Ophthalmol 33: 324-328.
3. Orssaud C, Roche O, El Dirani H, Dufier JL (2006) Delayed internal ophthalmoplegia and amblyopia following chickenpox. Dufier Eur J Pediatr 165: 728-729.
4. Goldsmith MO (1968) Tonic pupil following varicella. Am J of Ophthal 66: 551-554.
5. Siddiqui AA, Clarke JC, Grzybowski A (2014) William John Adie: the man behind the syndrome. Clin Exp Ophthalmol 42: 778-784.
6. Karadžić J, Jaković N, Kovačević I (2015) Unilateral Adie's Tonic Pupil and Viral Hepatitis - Report of Two Cases. Srp Arh Celok Lek 143: 451-454.
7. Millar E, Habib M, Gnanaraj L (2010) Bilateral tonic pupil secondary to migraine in a child. J Pediatr Ophthalmol Strabismus. 47: 1-2.
8. Adie WJ (1932) Tonic pupils and absent tendon reflexes: a benign disorders sui generis; its complete and incomplete forms. Brain 55: 98-113.
9. Bonamour G (1952) Complications neuro-ophtalmologiques de la Varicelle: Un cas de pupille tonique. Bull Soc Ophtal Fr 65: 67.
10. Ross JVM (1961) Ocular varicella: with an unusual complication. Am J Ophth 51: 1307-1308.
11. Heger T, Kolling GH, Dithmar S (2003) Atypical tonic pupil as a complication of chickenpox infection. Ophthalmologe 100: 330-333.



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