

A Rare Cause of Transient Anisocoria; Ocular Surface Contact with Rabies Vaccine

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Abstract

Rabies is a disease that affects the entire body, especially the nervous system and is transmitted by rabies virus. The rabies vaccine is a live or inactivated virus-containing vaccine. The virus affects muscarinic receptors and the finding of the rabies can be seen after vaccination even by topical contact. Therefore, it is one of the reasons that should be considered in etiology and differential diagnosis in patients with pupil dilatation and/or anisocoria.

Keywords: Anisocoria; Ocular Surface; Rabies Vaccine

Introduction

Rabies is a multisystemic infectious disease that spreads from animals to human beings with rabies virus and affects primarily the entire nervous system. This virus infection might spread from the nervous system to the entire body, especially the salivary glands, muscles [1]. Fortunately, the vaccine has been developed for the disease and the disease can be prevented with early intervention. In this case report, we are presenting a patient with anisocoria secondary to rabies vaccine contact with the ocular surface.

Case Presentation

A 9-year-old male patient was admitted to the emergency room with complaints of blurred near vision on the right eye for 4 hours. In his history there was an accidentally direct contact of rabies vaccine into his eye at a veterinary clinic. In the next hour following this incident the vision of his right eye has got blurry. His best corrected visual acuity was 20/20 at his right eye and 20/20 at his left eye. His spherical equivalent (SE) was +1.25 right, +0.25 on his left eye. Biomicroscopic examination revealed fixed and dilated pupil on his right eye and both direct and indirect pupillary light reflexes were found defective (Figure 1), left pupil size and light reflexes was normal. Pupil size was 9 mm on the right eye and 3.5 mm on the left eye. At his fundoscopy, there was no pathological findings in both eyes. His color vision was bilaterally unaffected.



Figure 1: Right pupil of the patient was fixed dilated; direct and indirect reflexes were defective.

We suspected a transient medical anisocoria and followed up the patient on a daily basis without any treatment. On the first day right pupillary light reflex was flask and the pupil was mid-dilated. After two days following the incident direct and indirect pupillary light reflexes were bilaterally normal (Figure 2) and the patient had no visual complaint, his right eye SE turned to +0.50.



Figure 2: Right pupil size of patient and light reflexes returned to normal levels at day three.

Discussion

Rabies virus is an enveloped RNA virus of the Rhabdovirus family which binds to acetylcholine receptors at the neuromuscular junction and migrates to central nervous system [2]. The virus affects the muscarinic acetylcholine receptors besides the sodium-potassium ion channels and neurotransmitters such as GABA or serotonin and causes neuronal dysfunction [3]. Hypersalivation, piloerection, cardiac arrhythmias, pupillary dilation, anisocoria and priapism are common autonomic dysfunction's symptoms [4].

Historically, several vaccines have been developed against rabies for both human and veterinary medicine. The current vaccines are containing either modified live or inactive rabies viruses [5]. In this particular case the vaccine was Raksharab® (Indial Immunologicals, Hyderabad, India) which contains a low concentration of inactive rabies virus (potency > 1.0 International unit in one dose) [6].

There are two antagonist muscles that determine the size of the humane pupil; the sphincter and dilator pupil. The sphincter pupil is controlled by parasympathetic innervation and the dilator pupil by sympathetic innervation [7]. We believe that muscarinic M3 receptors of the sphincter pupil were temporarily blocked by the inactive rabies virus leading to a parasympathetic inactivation and pupillary dilatation in this particular case. In the literature, there is a case report where facial paralysis and mydriasis are reported secondary to ipsilateral rabid dog bite in a boy [8]. To our best knowledge; this is the only case reporting the local side effect of the rabies vaccine.

Conclusion

As a result, we can say that even with the topical contact of rabies vaccine, inactive rabies viruses can cause parasympathetic inactivation and pupil dilation, but this effect is temporary. Publications about autonomic dysfunction for rabies are insufficient and we think that our publication may offer an additional perspective on the pathophysiology of rabies. Additionally, it can be one of the reasons that should be considered in etiology and differential diagnosis in patients with pupil dilatation and/or anisocoria.

Bibliography

1. Zhu S and Guo C. "Rabies Control and Treatment: From Prophylaxis to Strategies with Curative Potential". *Viruses* 8.11 (2016): 279.
2. Lentz TL, *et al.* "The acetylcholine receptor as a cellular receptor for rabies virus". *Yale Journal of Biology and Medicine* 56.4 (1983): 315-322.
3. Rajendra S, *et al.* "Rabies-epidemiology, pathogenesis, public health concerns and advances in diagnosis and control: a comprehensive review". *Veterinary Quarterly* 37.1 (2017): 212-251.
4. Bennett JE, *et al.* "Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases". 8th edition (2015): 1989.
5. Yang DK, *et al.* "The present and future of rabies vaccine in animals". *Clinical and Experimental Vaccine Research* 2.1 (2013): 19-25.
6. Basheer AM, *et al.* "Evaluation of post-exposure vaccination against rabies in cattle". *New Microbiologica* 20.3 (1997): 289-294.
7. McDougal DH and Gamlin PD. "Autonomic control of eye". *Comprehensive Physiology* 5.1 (2015): 439-473.
8. Arguello DM and Melita AM. "Alteraciones que la rabia y su tratamiento provocan en el ojo y anexos". *Arch Oftal B Aires* 24 (1949): 116-122.

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