

CYCLIC ESOTROPIA IN THE BLIND EYE.

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Abstract

Purpose: The purpose of this study is to report, describe a rare form of esotropia, namely cyclic esotropia and analyse the possible causes of both cyclic and isolated esotropia.

Methods: This study included anterior segment assessment using a slit lamp, assessment of strabismus, fundus examination and relevant literature review.

Results: Consideration of the etiology and pathogenesis of cyclic esotropia.

Conclusion: One of the causes of cyclic esotropia is binocular vision impairment caused by eye injury or retinal disease. Another reason lies in factors not directly related to vision organs or anatomical structures. It can be due to a violation of the central nervous system and other general diseases of the body (diseases of the gastrointestinal and urinary tract).

Keywords: Cyclic esotropia, strabismus.

Introduction

Cyclic esotropia is a rare form of esotropia that occurs in humans. It is characterized by alternating intervals of esotropia and orthotropy. Sometimes it is associated with decreased vision, trauma, a history of strabismus surgery, or central nervous system disease (1, 2, 3, 4, 5, 6, 7).





Figure 1. Esotropia on squinting period.

The cause of this pathology is unknown and is the subject of discussion by many ophthalmologists. Of interest is the fact that determining the cause of the occurrence of cyclic esotropia can provide an answer to the question of why common esotropia also occurs. We present a clinical case of cyclic esotropia and, based on this case and literature data, analyse the possible causes of both cyclic and isolated esotropia.

Case report

A 17-year-old woman developed detachment of the right eye retina after suffering from chronic posterior uveitis. Several operations (vitrectomies) were performed. Visual acuity was 0.08. Subsequently, the right blind eye began to deviate outward by 10°. Two years later, cataract extraction was performed on the right eye. Postoperatively, the eye periodically deviated inward, where 2-3 days of esotropia were followed by 2-3 days of orthotopia. A year later, the right eye became completely blind.

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Then, for the last 2 years, the eye squinted for 4 months, and for the next two months, the eyes were in a relatively orthophoric position (Figure 1,2). The patient once noticed that after having 2 glasses of wine, the eye position straightened. However, this continued for only several months. The patient has a history of hepatitis B infection and uterine fibroids and has suffered from rheumatoid arthritis since childhood. There are two small cysts in the thyroid region. Diarrhea occurs periodically during diet deviation.



Figure 2. Orthophoria on non-squinting period.

Discussion

What is the cause of cyclic esotropia?

The literature data that we found allow us to single out two reasons possibly causing cyclic deviation of the eyes. The first reason is refractive factors or low vision and lack of sight in one of the eyes, caused by various natural reasons. All these lead to a violation of stereopsis. The second reason is not related to the visible violation of stereopsis.

The onset of cyclic esotropia with impaired stereopsis

A case of cyclic esotropia with bilateral optic nerve atrophy has been previously documented (5).

This was a 37-year-old male with 4-day fixed cycles of orthotropia and esotropia. Moreover, he had not vision in one eye; it was a squint eye. In this case, there is no incentive to merge the images from the two eyes. In another case, the patient lost his eyesight after repeated operations on the retina (6).

A similar case of cyclic esotropia, which occurred after eye injury, has been described by other authors. The patient had traumatic aphakia which disappeared after intraocular lens implantation. Elimination of anisometropia led to restoration of the symmetrical position of the eyes (1)

This was confirmed by a case of a patient with high unilateral myopia who received a scleral buckle after retinal detachment. This patient had a 48-hour cycle with 24 hours of orthotropia and 24 hours of manifest esotropia. (8)

Indirect confirmation that the leading factor of cyclic esotropia is a violation of stereopsis, is evidenced by the occurrence of cyclic esotropia after surgery for intermittent exotropia. It is known that

intermittent exotropia occurs in patients with a history of an reduced stereopsis (9, 10). Weakening of the lateral rectus muscle leads to the opposite effect - the occurrence of cyclic esotropia. Indeed, even acquired traumatic abducens nerve palsy led to this form of esotropia (2).

The onset of cyclic esotropia without visible disturbance of stereopsis

An 8-year-old child with a long history of hyperkinesia and learning difficulties compatible with a diagnosis of minimal cerebral dysfunction developed cyclic esotropia. The child had no other disorders (11). The absence of an anomaly of refraction resulted in eye deviation.

Interestingly, some authors report that in five cases of cyclic esotropia, there was a disorder in the white matter of the frontal lobe of the brain (12). Of these, in two cases, the state of the central nervous system led to cyclic esotropia.

What is the Real Cause of Cyclic Esotropia?

It is interesting to note that in most cases, intermittent esotropia occurs in blind eyes where there is no light perception.

It is logical to assume that the same mechanisms may underlie both cyclic and common esotropia. We have shown that one of the main factors of esotropia is the difference in the clarity of the picture obtained on the retina. At an early age (up to a year), this leads to a violation of the formation of stereopsis.

The aforementioned clinical cases, in which there is no or decreased vision in one eye, confirm the fact that the cause of cyclic esotropia is a violation of stereopsis.

The question of why some patients, in the absence of vision in one eye (they also have a violation of stereopsis), the blind eye deviates outward, while in other patients, cyclic esotropia rarely occurs, remains unresolved.

Apparently, general factors influence the tone of the eye muscles. In some cases, this is associated with the state of the central nervous system and sometimes with dysfunction of the genitourinary tract (cyclic esotropia during the menstrual cycle).

The authors describe a very interesting case. A 46-year-old female patient had orthophoria, absence of refractive errors and diplopia. Every two weeks during the onset of menstruation, the patient developed esotropia with a degree of 35 prism diopters (13). Orthophoria was restored after 2 weeks. Evidently, changes in the function of the genitourinary tract had an effect on the occurrence of cyclic strabismus.

Conclusion

One of the causes of cyclic esotropia is binocular vision impairment caused by eye injury or retinal disease. Another reason lies in factors not directly related to vision organs or anatomical structures. It can be due to a violation of the central nervous system and other general diseases of the body (diseases of the gastrointestinal and urinary tract).

Conflict of interests

The author declares that there is no conflict of interest.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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Study association

This study is not associated with any thesis or dissertation work.

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