Report of Bilateral Persistent Pupillary Membrane in an Adolescent Female Patient

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ABSTRACT

We report the case of a 14-year-old female patient who attended the ophthalmology service due to her low visual acuity with her aerial correction, detecting a bilateral persistent pupillary membrane on examination. We describe the clinical picture, its embryologic origin, and the various possible procedures according to its severity.

Key words: pupillary membrane, persistence of ocular abnormalities, iris abnormalities, visual acuity, congenital eye abnormalities.

Informe acerca de membrana pupilar persistente bilateral en una paciente adolescente

RESUMEN

Se informa el caso de una paciente de 14 años que concurre al Servicio de Oftalmología motivada por su baja agudeza visual con su corrección aérea. Al examen se detecta una membrana pupilar persistente bilateral. Se describen el cuadro clínico, su origen embriológico y los diferentes tratamientos posibles según sus diferentes niveles de gravedad.

Palabras clave: membrana pupilar, persistencia de anomalías oculares, anormalidades del iris, agudeza visual, anormalidades congénitas del ojo.

INTRODUCTION

Persistent pupillary membranes (PPM) are usually non-pathologic signs of normal intrauterine development. They occur in up to 95% of neonates and tend to resolve in the first few weeks of life[1]. They are part of the broad clinical spectrum of persistent fetal vasculature; preterm infants are the most frequent sufferers.

During the first month of gestation, the fetal eyeball develops blood vessels in the intraocular cavity containing a meshwork of capillaries known as tunica vasculosa lentis that surrounds the lens, a completely avascular structure during extrauterine life.

This network of capillaries provides nutritional supply to the lens in the first six months of fetal life[2]. It is usually fully developed by the gestational age of nine weeks and disappears by apoptosis at 34 weeks to free the visual axis[3]. Incomplete regression of the anterior portion of the tunica vasculosa lentis is called a persistent pupillary membrane. If the MPP reduces the pupillary diameter to less than 1.5 mm, the image received by the retina will become blurred, causing deprivation amblyopia, with definite negative repercussions in adult life[4].

In 30 to 95% of individuals, isolated thin portions of the membrane may be visible, but its complete persistence is rare and is usually associated with microphthalmos[4].

When extensive PPM is present at birth, one would expect considerable membrane atrophy in the first year. If

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remnants remain after the first year, they may still be present to some extent thereafter[4].

This paper aims to present the case of an adolescent girl with a persistent pupillary membrane that, apart from being fully and bilaterally maintained, is not associated with ophthalmologic structural alterations or profound amblyopia.

CASE PRESENTATION

A 14-year-old female patient visited the Ophthalmology Service due to her low visual acuity with her corrective lenses. She was a full-term born patient with no significant personal or family medical history.

Her uncorrected visual acuity was 20/100 in the right eye (OD) and 20/30 in the left eye (OS). Biomicroscopy revealed a persistent pupillary membrane (PPM) in both eyes (Fig. 1a and Fig. 1b), with deep anterior chambers and clear corneas. The rest of the examination was within normal limits.

Regarding previous ophthalmological strategies before the current consultation, during the medical history, the patient's family reported that they had used mydriatics on several occasions during her childhood without positive results for the PPM.

Due to the physical interference of the membrane, autorefraction did not yield results, so we evaluated the patient under cycloplegic dilation, achieving very variable and inaccurate measurements corresponding to hyperopia and high astigmatism in the right eye (OD) and mild myopia and astigmatism in the left eye (OS). The cylinder degrees in both eyes varied widely. The fundus examination performed with binocular indirect ophthalmoscopy was unremarkable.

We repeated the study with the slit lamp under pupillary dilation (Fig. 2), visualizing adhesions between the membrane and the lens, firmly stuck even in the dilated state, both in the right eye (circular appearance) and the left eye (semi-circular appearance).

During the subjective refraction test, the best corrected visual acuity achieved was 20/25 in each eye (OD: sphere +1.50, cylinder -2.50 × 35°; OS: cylinder -1.00 × 168°), with the patient perfectly tolerating the corrective lenses.

Due to the good final visual acuity achieved with corrective lenses and the patient's age, which eliminates the risk of amblyopia, we decided to adopt a wait-and-see approach.

DISCUSSION

The tunica vasculosa lentis is a plexus of blood vessels that surrounds the crystalline lens, and it plays a pivotal role in its development and nutrition during embryonic life by supplying blood from the hyaloid artery, a branch of the primitive ophthalmic artery.

The hyaloid artery first enters the eye through the optic fissure and then incorporates into the center of the optic nerve as the optic fissure closes. The hyaloid vessels form a network around the posterior capsule of the lens and then anastomose anteriorly with the network of vessels of the pupillary membrane.

A failure of cellular activities resulting in a lack of pupillary membrane regression leads to MPP[5].

The severity of PPM can vary from thin filaments continuous with the iris stroma to thick, isolated projections or forming networks. Thin strands are usually avascular, while thick ones are often vascular.

Adhesions to the anterior lens capsule can exist, causing a small anterior polar cataract[1].

Although PPMs are rarely visually significant, when these remnants remain adhered to the iris collar and are

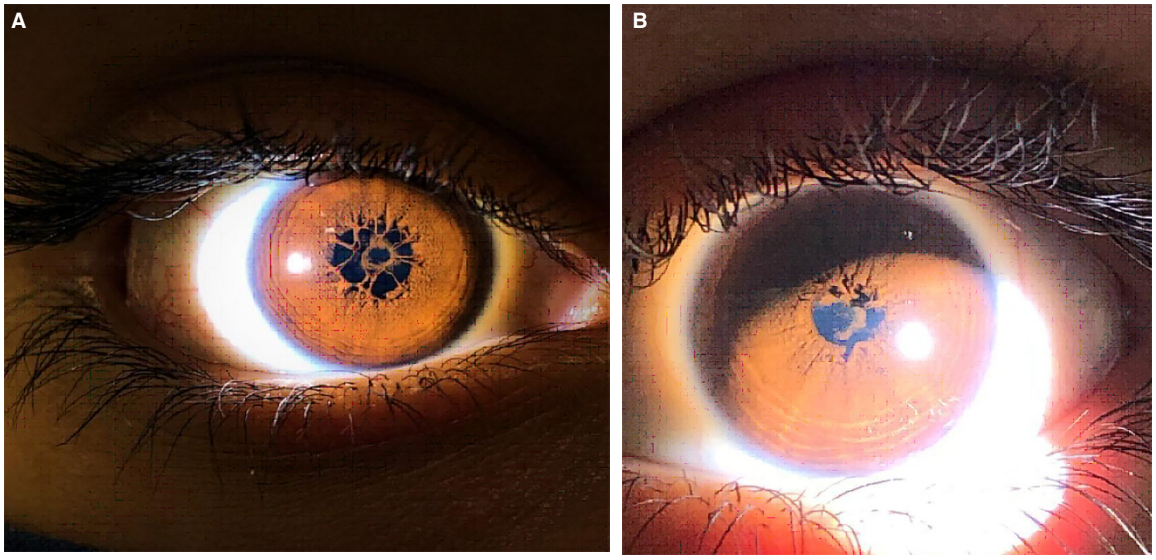

Figure 1. Photograph of the anterior segment of the right eye (A) and left eye (B) showing thick filaments suggesting a persistent pupillary membrane.

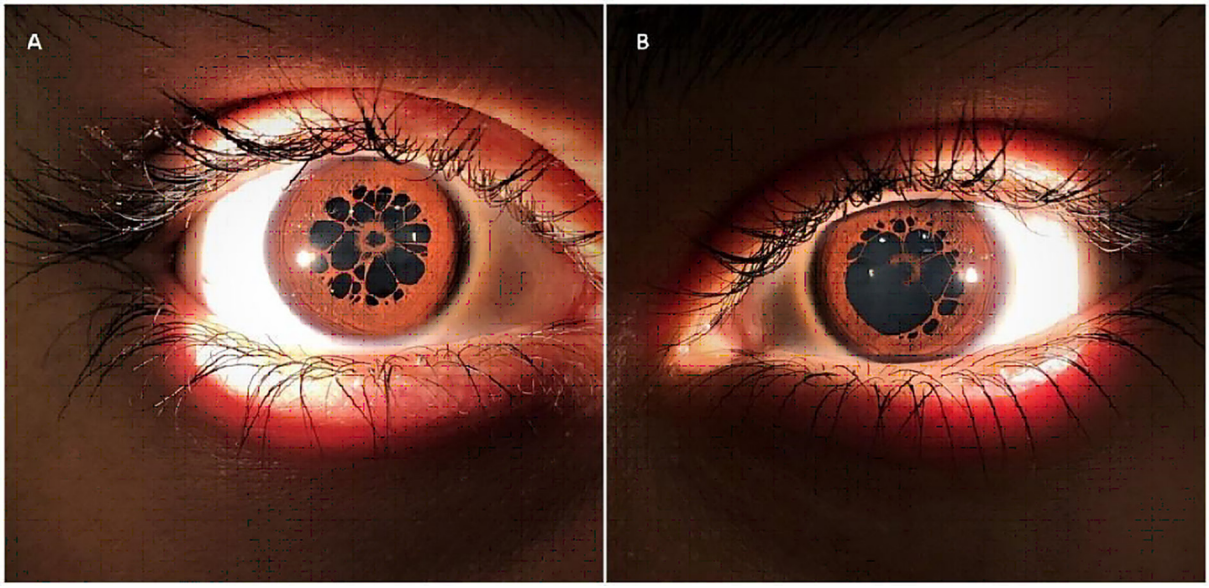

Figure 2. Persistent pupillary membrane under pupillary dilation. Adhesions between the membrane and the lens are visible in the right eye (circular appearance, A) and in the left eye (semi-circular appearance, B)..

dense enough, they can cause deprivation amblyopia by obstructing the pupillary area[6]. That is one of the most feared consequences.

While familial forms have been described[7], most cases are sporadic, asymptomatic, and of no functional significance, thus not requiring treatment. If there are visual repercussions, treatment of persistent pupillary membrane can include mydriatic agents, Nd: YAG laser destruction, or surgical resolution[2].

Mydriatic topical ophthalmic solutions rely on pupillary dilation by mechanically rupturing the membrane and releasing adhesions. As previously described, the patient had already used this therapeutic strategy without positive results, so we did not consider it again.

With the option of using Nd: YAG laser for membrane destruction, there is a risk of hyphema (bleeding in the anterior chamber), especially in those thick adhesions that include active blood vessels; even the lysis surgery proves problematic, and for this, it is used for thinner adhesions[2]. The advantage of this option is that it is non-invasive. Performing YAG laser lysis for fine avascular strands and argon laser followed by YAG laser for thicker vascular strands is also a possible option[8]. We ruled this option out because the patient improved her vision with glasses, a non-invasive, lower-risk therapeutic strategy. In patients with very extensive and occlusive membranes, surgical treatment may be necessary to achieve good visual function, even within weeks of life if the risk of deprivation amblyopia is present[9]. The surgical intervention may also include phacoemulsification if the membrane is severely adhered to the lens. In the slit-lamp examination performed under dilation, our patient's PPM showed points of attachment between the membrane and the lens (Fig. 2), which would have posed a greater risk of postoperative complications such as traumatic cataracts, anterior capsule rupture, or pigment dispersion if we had decided on surgical removal.

It is important to note that children with this condition should be evaluated for anisometropia to reduce the risk of amblyopia, especially if it is monocular, and to initiate appropriate treatment within the first years of life if necessary to avoid permanently poor visual acuity.

CONCLUSION

Our case is interesting because it presents in a full-term born patient with a very pronounced and bilateral PPM that, surprisingly, is not associated with severe amblyopia or other structural ophthalmological abnormalities.

Ethical Considerations: We conducted the present study complying with the guidelines established by the modified Helsinki Declaration.

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Conflict of Interest: The author declares no conflict of interest.

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