Inferior bullous keratopathy caused by iris fibers resolved with diode laser 532

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Abstract

**Purpose:** To describe a case of inferior bullous keratopathy caused by iris fibers resolved with laser diode 532.

**Case report:** A 74-year-old woman consulted for a deterioration of visual acuity in the right eye, accompanied by foreign body sensation. A phacoemulsification surgery with IOL implant had been performed in both eyes three months before. Best-corrected visual acuity reached 20/40 in the right eye. Slit lamp examination revealed bullous keratopathy located in the inferior central quarter of the cornea of her right eye. Gonioscopy was performed to rule out having nucleus fragments in the inferior angle. With higher magnification, a pair of fine undulating fibers were observed coming from the anterior layers of the iris and making contact with the posterior face of the cornea. Photocoagulation of the iris fibers was performed with laser diode 532 and photodisruption with Nd-YAG laser, applied at the base of the fibers. After nine days, resolution of corneal edema, and disappearance of bullae was observed. Best-corrected visual acuity improved to 20/25.

**Conclusions:** Photocoagulation of iris fibers with laser diode 532 complemented by photodisruption with Nd-YAG laser, in patients with iridoschisis, is an alternative to avoid endothelial decompensation and corneal edema, which may require corneal transplantation.

**Keywords:** iridoschisis; laser diode; bullous keratopathy.

Introduction

Iridoschisis is a rare pathology characterized by iris degeneration, in which the anterior layers of the iris become atrophic and separate from the posterior layers. These delicate fibers of the iris can make contact with the corneal endothelium, causing endothelial dysfunction with subsequent decompensation and formation of a bullous keratopathy in which a penetrating or endothelial corneal transplant could be required.1-7 Here, we present the case of a patient with inferior bullous keratopathy caused by iris strands that resolved with laser diode 532 and Nd-YAG laser shots.

Case Report

A 74-year-old female patient consulted for a decrease in visual acuity, accompanied by a foreign body sensation in the right eye. The patient reported having received cataract surgery with an IOL implant in both eyes three months before in another institution. At the time of her examination, her best-corrected visual acuity reached 20/40 in the right eye and 20/25 in the left eye. The slit lamp examination revealed bullous keratopathy located in the lower central quarter of the cornea in her right eye. Gonioscopy allowed discarding to have residual nucleus fragments. With higher magnification, a few fine undulating fibers were observed coming from the anterior layers of the iris and making contact with the posterior face of the cornea (Figure 1). Intraocular pressure taken with applanation tonometer recorded 14 mmHg in both eyes. Drops of 5% hypertonic saline three times a day and 0.1% fluorometholone twice a day were administered for one week. The patient returned with a
greater sensation of foreign body and decreased visual acuity at 20/50. The examination showed an increase in corneal edema with a more significant presence of bullae (Figure 2). Photocoagulation of the iris fibers with laser diode was proposed. Drops of proxymetacaine hydrochloride 5 mg were instilled before the procedure. The parameters used for the laser diode 532 were 13 shots of 50 microns in diameter, 140 milliseconds of time, 400 mW of energy applied at the base of the fibers. It was complemented with 23 shots of Nd-YAG with energy of 0.9 mJ. The medication treatment was continued. The patient returned nine days later with the resolution of the corneal edema, disappearance of bullae and best-corrected visual acuity of 20/25.

Several points were shot in the iris, at the root of the undulating fibers. A few days after laser treatment with diode 532 and Nd-YAG, the edema resolved. (Figure 3)

Discussion

Since iridoschisis occurs more frequently between the fifth and seventh decade of life, and patients of this age group require cataract surgery more often, it is a possibility that in these patients, iridoschisis is exacerbated and causes postoperative complications such as bullous keratopathy.3-9

Loewenstein et al. have proposed that iridoschisis could be the result of a trauma, which alters the fibers and could lead to the division of the anterior and posterior stroma of the iris.3

In the differential diagnosis of this patient, we discarded two other main abnormalities of the iris stroma, the iridocorneal endothelial syndrome, and the Axenfeld-Rieger syndrome. The age of onset of the iridocorneal endothelial syndrome is from the third or fourth decade and is unilateral and progressive, while iridoschisis appears later, usually in the sixth to the seventh decade, and is generally bilateral, symmetric and progressive (this patient does not have anything in the other eye). On the other hand, the Axenfeld-Rieger syndrome presented at birth has a congenital character, is bilateral, asymmetric and non-progressive. In the iridoschisis, the iris shows stromal division without any hole, it is sectorial, located mainly in the inferior part, with atro-
ophy of the anterior stroma and strands floating in the anterior chamber. The pupil is round, reactive to light and accommodation, and there is usually no change in the cornea, unless the strands of the anterior iris reach the endothelium. In the iridocorneal endothelial syndrome, stromal atrophy of the iris is observed, with or without holes, and anterior peripheral synechiae that extend to the Schwalbe line. The pupil can be ectopic, polycystic can even be observed, and the cornea manifests an abnormal endothelium with pleomorphism and cell loss. In the Axenfeld-Rieger syndrome, there is mild stromal thinning of the iris, atrophy and orifice formation, and peripheral anterior synechiae are observed in the previously displaced Schwalbe line. The pupil may be irregular, and the cornea has endothelial changes related to peripheral anterior synechiae.3

A surgical consideration during phacoemulsification in eyes with iridoschisis is the removal of atrophic iris fibrils. Although mechanical devices for iris retraction can restrict the trauma of the iris fibers intraoperatively,9-11 they do nothing to prevent the long-term postoperative complications derived from the anterior inclination of the iris fibers and iridocorneal contact.11,12 A vitrector can be used immediately before cataract extraction to eliminate loose fibrils, facilitating phacoemulsification and avoiding iridocorneal contact in the postoperative period. However, performing an iridectomy before cataract extraction carries the risk of damaging the anterior capsule. To minimize these risks, complete removal of the iris fibrils may occur after IOL implantation.11

This report shows that it is one of the multiple options offered by the use of diode and YAG lasers to treat injuries without the need for surgical intervention.

Among the shortcomings of the study, an endothelial cell count, before and after the procedure, was not possible to perform. Other diagnostic images such as anterior segment OCT and Pentacam, as well as a photograph of the other eye were not available. Finally, the follow-up was only two weeks because the patient did not return.

This report shows the therapeutic alternative for a patient with corneal edema due to iris fibers that correspond to iridoschisis versus remains of a persistent hyperplastic pupillary membrane, which manifested itself after phacoemulsification surgery. Fortunately, the diagnosis and its timely treatment prevented the rest of the corneal endothelium from decompensation and the need to receive a cornea transplant. As far as we know, this is the first report of the use of diode laser combined with Nd-YAG for treatment of iridoschisis that has caused a bullous keratopathy.

References