Retroiridian anterior vitrectomy: a novel technique for the removal of late cortical remnants located in the posterior segment for anterior segment surgeons

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Received: January 29th, 2024.
Approved: February 24th, 2024.

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Oftalmol Clin Exp (ISSNe 1851-2658)
2024; 17(1): e128-e133.

Abstract

We present a novel surgical technique for the aspiration of late cortical remnants in pseudophakic patients with posterior capsule rupture that are located on the anterior hyaloid visible with pupil dilation. The technique, called retroiridian anterior vitrectomy, consists of the insertion of an anterior vitrectomy tip through a peripheral iridectomy —behind the iris— to aspirate the cortical remnants. To maintain the anterior chamber formed during surgery, an irrigation line is used.
This technique offers a number of advantages over other techniques, such as its lower invasiveness, greater speed, and less need for equipment, as well as being easy to perform for any anterior segment surgeon.
Keywords: posterior capsule ruptura, cataract surgery, retained lens, anterior vitrectomy, retroiridian anterior vitrectomy.

Vitrectomía anterior retroiridiana: una técnica novedosa para la remoción de restos corticales tardíos localizados en el segmento posterior para cirujanos de segmento anterior

Resumen

Presentamos una novedosa técnica quirúrgica para la aspiración de remanentes corticales tardíos en pacientes pseudofáquicos con rotura de la cápsula posterior que se localizan en la hialoides anterior visibles con dilatación pupilar. La técnica, denominada vitrectomía anterior retroiridiana, consiste

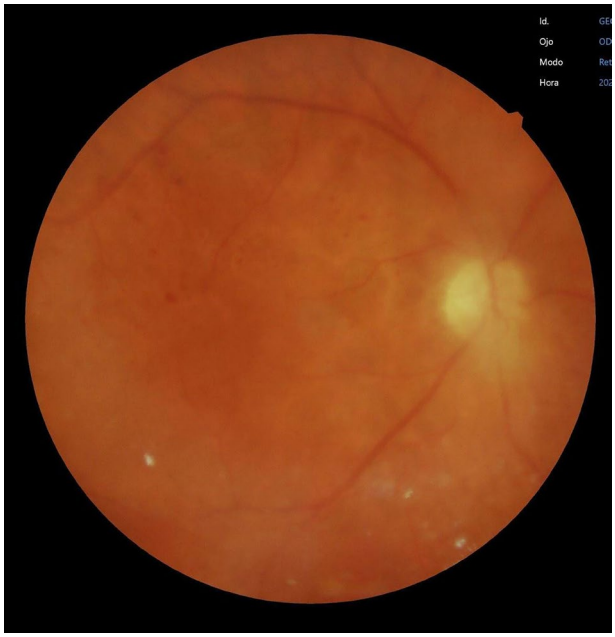

Figure 1. Color fundus photography of the right eye shows diabetic retinopathy with microaneurysms and/or microhemorrhages associated with white exudates.

en la inserción de una punta de vitrectomía anterior a través de una iridectomía periférica —por detrás del iris— para aspirar los restos corticales. Para mantener la cámara anterior formada durante la cirugía se utiliza una línea de irrigación.
Esta técnica ofrece una serie de ventajas sobre otras: menor invasión, mayor rapidez y menor necesidad de equipamiento, además de ser fácil de realizar para cualquier cirujano de segmento anterior.
Palabras clave: ruptura de cápsula posterior, cirugía de cataratas, retención de restos de cristalino, vitrectomía anterior, vitrectomía retroiridiana.

Vitrectomia anterior retroiridiana: uma nova técnica para remoção de detritos corticais tardios localizados no segmento posterior para cirurgiões do segmento anterior

Resumo

Apresentamos uma nova técnica cirúrgica para aspiração de remanescentes corticais tardios em pacientes pseudofácicos com ruptura da cápsula posterior localizada no hialóide anterior visível com dilatação pupilar. A técnica, chamada vitrectomia anterior retroiridiana, envolve a inserção de uma ponta de vitrectomia anterior através de uma iridectomia periférica – atrás da íris – para aspirar detritos corticais. Uma linha de irrigação é usada para manter a câmara anterior formada durante a cirurgia.
Essa técnica oferece uma série de vantagens em relação às demais: menor invasão, maior rapidez e menor necessidade de equipamentos, além de ser de fácil execução para qualquer cirurgião do segmento anterior.
Palavras-chave: ruptura de cápsula posterior, cirurgia de catarata, retenção de remanescente de cristalino, vitrectomia anterior, vitrectomia retroiridiana.

Introduction

Briefly, one of the complications that can occur during cataract surgery is posterior capsular rupture and migration of debris into the fundus[1]. Its resolution represents a therapeutic challenge that, as we will see in this work, can be solved by a retroiridian anterior vitrectomy.

Case

We present the case of a 75-year-old adult patient with a history of diabetic retinopathy (Figs. 1-2) and bilateral neovascular glaucoma, who underwent surgery for a posterior polar cataract in his right eye (RE) (Fig. 3) at our center one month ago. The surgery was complicated by posterior capsule rupture of the crystalline lens and migration of a cortical remnant to the level of the anterior hyaloid, behind the intraocular lens (IOL) placed in the sulcus, visible with pupil dilation. The patient underwent retroiridian anterior vitrectomy, a novel surgical technique that is safe and effective for the removal of late cortical remnants located in the posterior segment, supported on the anterior hyaloid, and designed specifically for anterior segment surgeons.

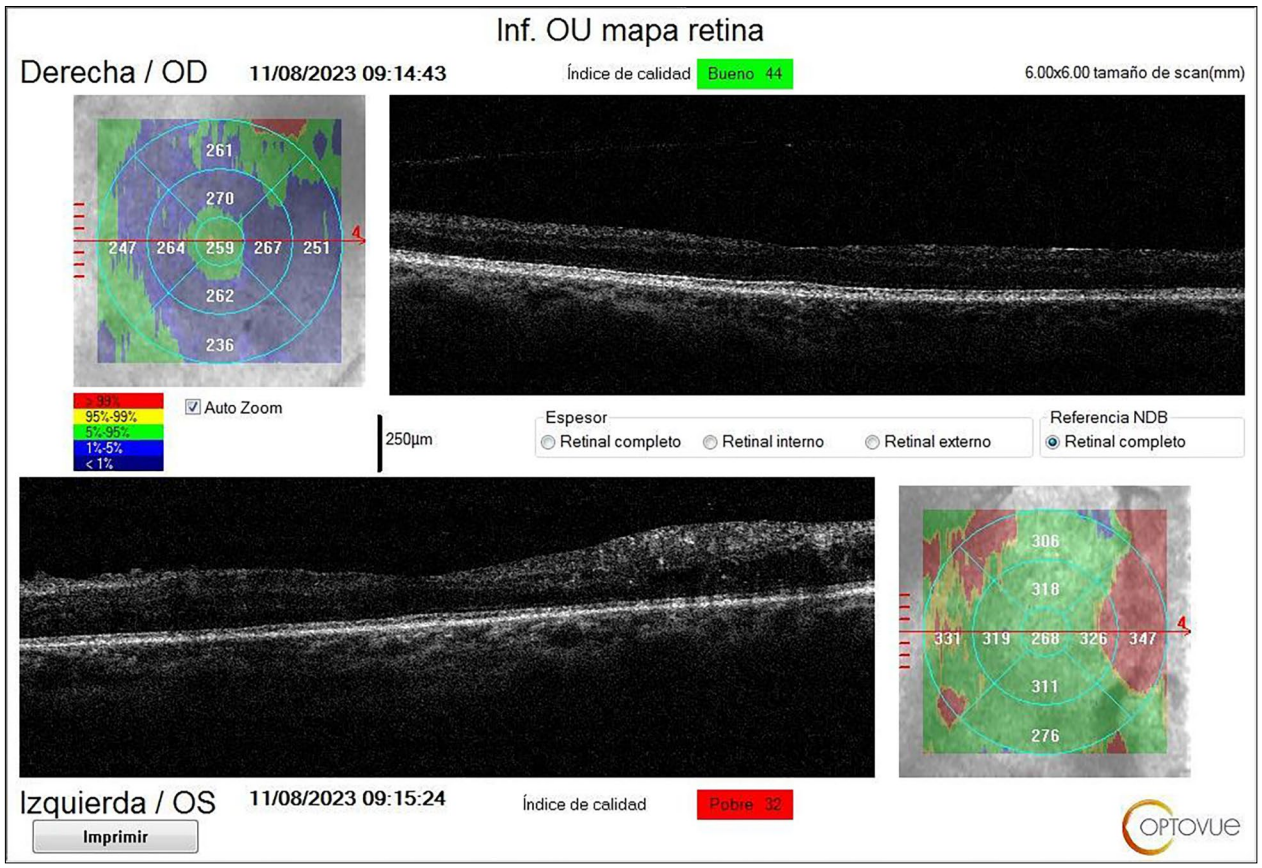

Figure 2. Posterior segment optical coherence tomography scan showcasing diabetic retinopathy features.

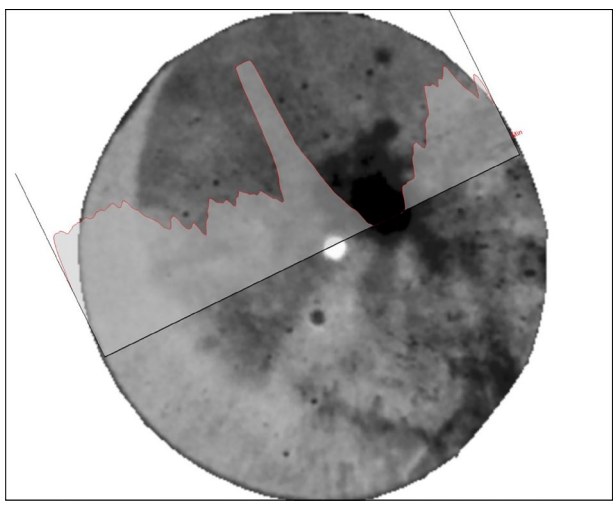

Figure 3. Scheimpflug camera image of the right eye with digital retroillumination, revealing a posterior polar cataract.

Surgical technique

Preparation

- A drop of 5% phenylephrine combined with 0.5% tropicamide was applied to the inferior conjunctival sac every 15 minutes, starting 2 hours before surgery (Fig. 4).
- Sub-Tenon's anesthesia was applied with a 19G curved Stevens cannula loaded with a mixture of 0.75 ml of 1% lidocaine and 0.75 ml of 0.5% bupivacaine, both preservative-free.

Incision

- The surgery was started by making two pre-existing incisions: one main incision at 0° and one secondary incision at 180°, both with a 15° stab knife (Fig. 5).

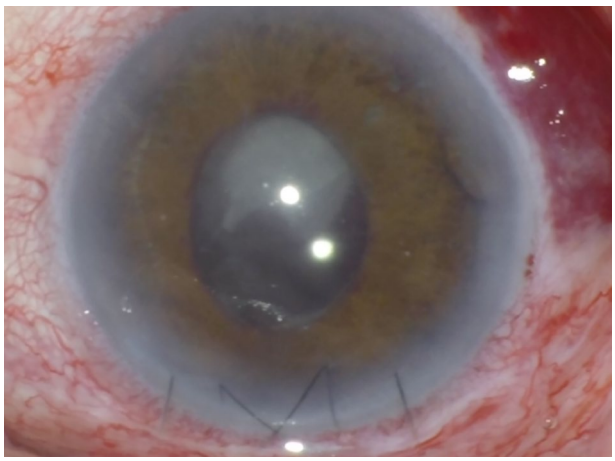

Figure 4. A drop of 5% phenylephrine combined with 0.5% tropicamide was applied to the inferior conjunctival sac every 15 minutes, starting 2 hours before surgery.

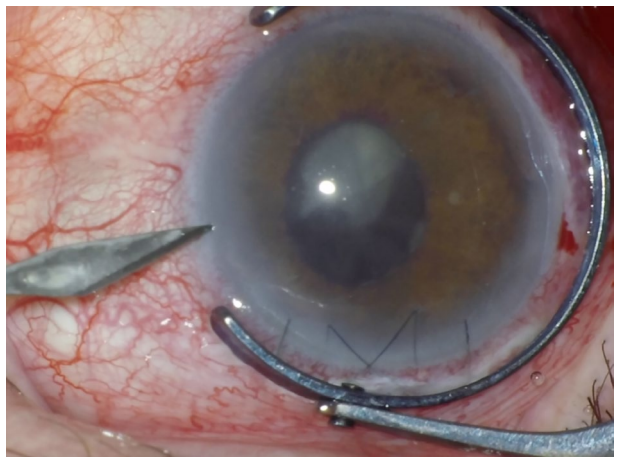

Figure 5. Surgery was started by making two pre-existing incisions: one main incision at 0° and one secondary incision at 180°, both with a 15° stab knife.

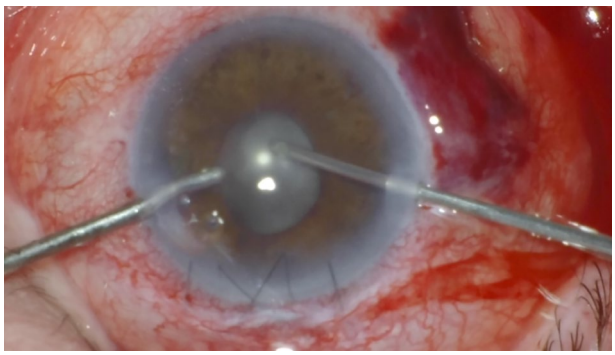

Figure 6. A 20G anterior vitrectomy tip was used through the main incision. With the left hand, an irrigation line was placed through the secondary incision to maintain the shape of the anterior chamber.

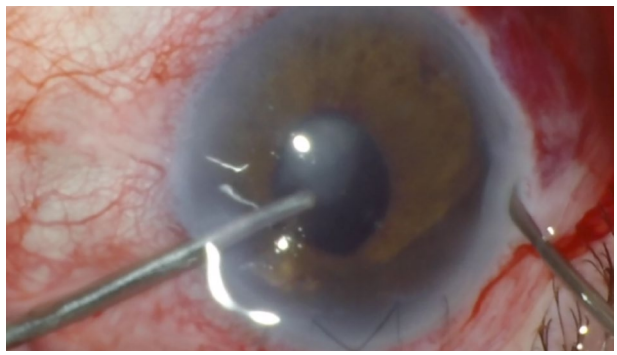

Figure 7. Tip of the vitrectomy was advanced to the extreme periphery, where a small iridectomy was performed. This iridectomy was used as a pathway to access the anterior hyaloid by traversing the zonules and positioning itself just behind the lens.

• Using the left hand, an irrigation line was placed through the secondary incision to maintain the shape of the anterior chamber.

Vitrectomy + aspiration

• A 20G anterior vitrectomy tip was used through the main incision (Fig. 6).
• The tip of the vitrectomy was advanced to the extreme periphery, where a small iridectomy was performed. This iridectomy was used as a pathway to access the anterior hyaloid by traversing the zonules and positioning itself just behind the lens (Fig. 7).
• A localized vitrectomy was performed only at the level of the cortical remnant, prioritizing the aspiration of the mass and not the vitreous (Fig. 8).
• The vitrectomy tip and then the irrigation line were removed.

Observations

• A peripheral iridectomy is useful in the event of possible vitreous or inflammatory pupillary block (Fig. 9).
• The surgery time was less than one minute.
• The patient was followed up at 24 hours and 7 days, presenting a successful recovery.

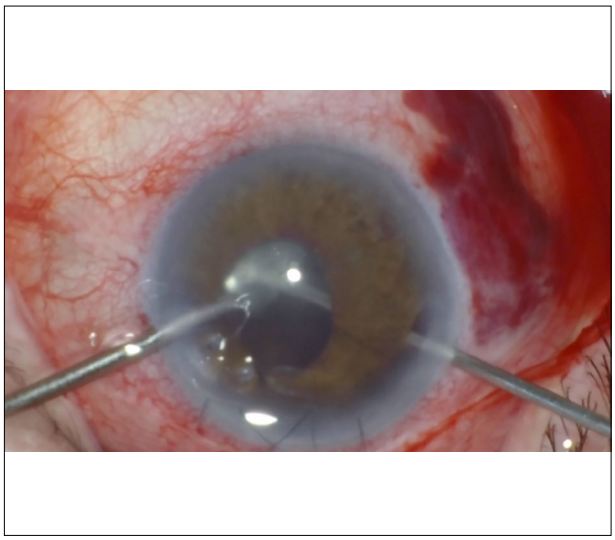

Figure 8. A localized vitrectomy was performed only at the level of the cortical remnant, prioritizing the aspiration of the mass and not the vitreous.

Figure 9. The peripheral iridectomy proved to be useful as it prevents pupillary block.

Discussion

In order to resolve the case, a medical treatment was initially decided[1], but the desired result was not obtained. Therefore, the other alternative was surgery. There are different ways to resolve it, such as posterior pars plana vitrectomy[1-2] or direct incidence of the cortical remnant behind the IOL, working through the anterior segment without peripheral iridectomy. However, this last technique could dislocate the IOL from the sulcus when trying to pass under it, causing it to fall to the posterior pole.

The novel retroiridian anterior vitrectomy, which is the technique developed, and presente in this work, consists of incising directly through the anterior segment using a peripheral iridectomy as a way to access the anterior hyaloid, working behind the iris, with an anterior vitrectomy tip to aspirate the cortical remnant and an irrigation line in the anterior chamber to keep it formed.

It is an innovative technique, easy to perform for anterior segment surgeons, fast, less invasive and requires less equipment. In addition, the iridectomy is also useful, as it prevents postoperative pupillary block glaucoma, product of the same remaining vitreous[3] or inflammation with resulting synechia formation, such as pupillary seclusion[4]. The author has experience working behind the iris with successful results[5].

Retroiridan anterior vitrectomy is an innovative surgical technique that offers a number of advantages over other surgical alternatives:

- *Less invasiveness:* Retroiridian anterior vitrectomy requires only two incisions, a main and a pre-existing secondary incision. This reduces the risk of complications such as infection, inflammation, astigmatism and loss of endothelial cells.
- *Greater speed*: Retroiridian anterior vitrectomy usually takes less than a minute. This is important for patients who have already undergone a first surgery and are reluctant to treat it.
- *Less need for equipment:* Retroiridian anterior vitrectomy only requires an anterior vitrectomy vitrector and an irrigation line. This reduces the cost of surgery, the complexity of preparation and is suitable for anterior segment surgeons.

Conclusion

Retroiridian anterior vitrectomy is a technique that can be performed by any anterior segment

surgeon. In the case presented, the patient had a rapid and successful recovery. Therefore, th presente technique is an attractively promising option for the aspiration of late cortical remnants with a vitrector tip in pseudophakic patients with posterior capsule rupture located on the anterior hyaloid visible with pupil dilation. It is expected to be able to have a series with more cases and longer follow-up time in the future.

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