Endophthalmitis associated with flange exposure after a 4-flanged canabrava fixation technique

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A 101-year-old woman who underwent 4-flanged intrascleral fixation intraocular lens (ISF IOL) technique surgery in her left eye (elsewhere) 6 months prior to her presentation, was referred to our department due to pain and loss of vision for the previous 4 days. The patient presented with left eye visual acuity of hand motion, conjunctival hyperemia, hypopyon, vitritis, and 2 polypropylene flanges exposed throughout the conjunctiva. Endophthalmitis was diagnosed followed by urgent treatment with vitreous and anterior chamber tap, and intravitreal injections of antibiotics and steroids. Cultures revealed *Streptococci viridans* infection. No further surgical intervention was performed due to patient opposition. The infection resolved within a few weeks; however, phthisis bulbi developed subsequently. ISF IOL with 4 polypropylene flanges has gained popularity. A rare complication of flange extrusion might lead to endophthalmitis. Studies evaluating short- and long-term complications of this technique are warranted.

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edema with Descemet folds, 4+ white cells in the anterior chamber with a 2.0 mm hypopyon, and a white membrane covering the pupil (Figure 2). The posterior segment was not visible. Ultrasonography revealed a hyperechoic homogeneous infiltrate in the anterior vitreous, choroidal thickening, mild T-sign, and macular abnormalities. No retinal or choroidal detachments were seen (Figure 3, A).

The patient was diagnosed with endophthalmitis in the left eye and was urgently treated with an anterior chamber and vitreous biopsy, followed by intravitreal injections of vancomycin (1 mg/0.1 mL), ceftazidime (2.25 mg/0.1 mL), and dexamethasone (400 μg/0.1 mL). The anterior chamber and vitreous specimens were sent for gram staining, culturing, and antibiotic sensitivity testing. Blood cultures were taken as well. Although explantation of the IOL and pars plana vitrectomy were recommended, the patient refused any surgical intervention. Immediately after the procedure, the patient was hospitalized and given an intravenous bolus of 1 g ceftriaxone daily along with the following topical medications regimen in the left eye: 0.1% dexamethasone and 0.3%, ofloxacin 8 times a day, and 1% cyclopentolate twice daily. Two days after the procedure, the pain improved significantly, and signs of inflammation started to subside. Three days after the procedure, the microbiology cultures from the anterior chamber revealed ceftazidime-sensitive Streptococcus viridans, and blood cultures showed negative results. Five days after the procedure, anterior chamber and vitreous tap culture showed negative results. Explantation of the IOL and pars plana vitrectomy were recommended again, yet the patient remained reluctant. She was discharged with topical 0.3% ofloxacin drops 6 times a day and 0.1% dexamethasone twice daily. At the 1-month follow-up visit, visual acuity was no light perception in both eyes, the infection on the left eye resolved leaving a fibrous plaque covering the pupil. IOP in the left eye was 6 mm Hg. Ultrasonography showed several hyperechoic lacunae membranes in the vitreous cavity and a tractional retinal detachment (Figure 3, B). At the 3-month follow-up, the eye was shrunken with an IOP of 3 mm Hg, phthisis bulbi was diagnosed, and the temporal flanges were still extruded.

DISCUSSION
Recently, sutureless ISF IOL techniques became more and more popular. When compared with the suture SF IOL techniques, the sutureless ISF IOL techniques advantages include simpler surgical fixation manipulations, shorter surgical time, and no risk of suture break. In addition, studies have proposed that the tilt and decentration of the IOL are minimal or even smaller in these techniques.5,8 One of the challenges that the sutureless techniques encounter is the need for a good burial of the haptics into the sclera because the risk of extrusion could imply an entry port for the surrounding flora pathogens, increasing the risk for endophthalmitis. Only a few studies have assessed the long-term complication rates of sutureless ISF IOL techniques, focusing mainly on the glued ISF IOL technique. In 2013, Kumar and Agarwal reviewed 486 eyes that had a 1-piece poly(methyl methacrylate) IOL compared with 191 eyes with a foldable 3-piece ISF IOL with a glue technique and found haptic-related complications as follows: haptic displacement (4.1% vs 2%), haptic tip extrusion (0.8% vs 0.5%), and subconjunctival haptic (0.4% vs 1.5%).9 In 2015, Oh et al. reported 1 case (4%) of early postoperative haptic exposure without endophthalmitis in a glued ISF IOL of 25 eyes evaluated during a 6-month follow-up period.10
Regarding suture-SF IOL techniques, endophthalmitis caused by transconjunctival exposure of knots has been reported anecdotally, and in the sutureless SF IOL techniques, Matsui et al. reported exposure of a haptic after a Y-technique fixation without endophthalmitis and Obata et al. reported a case of endophthalmitis secondary to an exposed haptic after a Yamane technique ISF IOL.11–15

It is reasonable that a 4-point fixation technique provides greater stability to the IOL than a 2-point fixation technique, and although exposure of a haptic or a flange seems to be very rare, theoretically, each fixating point adds a small risk for possible extrusion and, consequently, a risk for endophthalmitis. Surgeons should be aware of this, and make sure that the created flange is not too thick or big to be safely buried in a short scleral tunnel because only covering it with Tenon could cause chronic erosion and increase the risk for extrusion. Moreover, conjunctival and scleral thicknesses should be assessed before performing any ISF IOL, making notice of any condition that predisposes for delicate conjunctiva or sclera, such as previous ocular surgeries (eg, pterygium, filtration surgery, and extracapsular cataract extraction) or history of trauma, scleritis, episcleritis, chronic allergic conjunctivitis, or systemic diseases such as rheumatoid arthritis, ulcerative colitis, systemic lupus erythematosus, rosacea, or gout.

Properties of the nonabsorbable monofilament synthetic polypropylene suture include a high tensile strength, high plasticity, a very smooth surface and a low coefficient of friction resulting in low tissue trauma while suturing, and a very low host tissue reaction, even leaving a virtual space between the tissue and the suture path, making it an excellent extraocular suture. However, part of these polypropylene suture properties could be unfavorable when using it to fixate an IOL to the sclera because there is minimal or no suture adherence to it, and the remaining virtual space between the tissue and the suture could facilitate a path for pathogens when a flange is exposed outside the conjunctiva. The low flexibility of the 5-0 polypropylene suture is another disadvantage when using it in the 4-flanged ISF IOL technique with a 4-eyelet foldable IOL because the suture needs to be bent almost 180 degrees inside the eye when passing it through the eyelets and coming out again through the sclera.

In conclusion, to our knowledge, this is the first case report of endophthalmitis caused by an exposed flange after a Canabrava 4-flanged sutureless ISF IOL. Clinicians must be aware of the high importance of burying the flanges into a short scleral tunnel and the potential risk for endophthalmitis with exposed polypropylene flanges. In such patients, long-term follow-up is advised in addition to encouraging patients to seek medical care on any new ocular irritation.

WHAT WAS KNOWN
- Sutureless intrascleral-fixated intraocular lens (ISF IOL) has become a safe and popular procedure with low rates of haptic-related complications.
- New techniques have been developed recently; among them, the 4-flanged sutureless intrascleral-fixated intracocular lens technique.

WHAT THIS PAPER ADDS
- This is the first reported case, to our knowledge, of endophthalmitis-associated polypropylene flange exposure after a 4-flanged sutureless ISF IOL.
- Increase awareness of the need for better understanding the 5-0 polypropylene suture properties and its consequences in ISF IOL technique.

REFERENCES

Disclosures: None of the authors has a financial or proprietary interest in any material or method mentioned.