

# Retinal injury following intravitreal injection of a dexamethasone implant in a vitrectomized eye

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## Dear Editor,

**O**zurdex<sup>®</sup> (Allergan, Inc, Irvine, CA, USA) is a sustained-release dexamethasone implant and is an approved therapy for several types of macular edema (ME) and for treatment of inflammation associated with non-infectious uveitis. Common adverse effects from Ozurdex<sup>®</sup> insertion include increased intraocular pressure and cataract progression<sup>[1-2]</sup>, however other ocular complications, such as crystalline lens trauma, could develop<sup>[3-4]</sup>. In this case report, we describe the accidental retinal injury following intravitreal injection of Ozurdex<sup>®</sup> into a vitrectomized eye with branch retinal vein occlusion (BRVO) and ME.

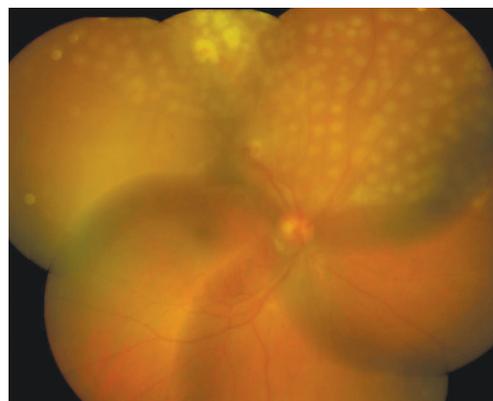
## CASE PRESENTATION

A 73-year-old woman with controlled hypertension presented with sudden visual loss in the right eye. Right eye visual acuity was counting fingers and examination of the fundus revealed vitreous hemorrhage and asteroid hyalosis. Par plana vitrectomy was performed, with concurrent cataract surgery and laser photocoagulation, because of the discovery during the operation of an attenuated retinal vein and neovascular membrane in the mid-peripheral retina (Figure 1). The patient was diagnosed with vitreous hemorrhage secondary to BRVO. Her vision had improved to 20/25 3mo after surgery. At five months post-surgery, the patient complained of gradual vision loss in the vitrectomized eye and a decline in vision to 20/50.

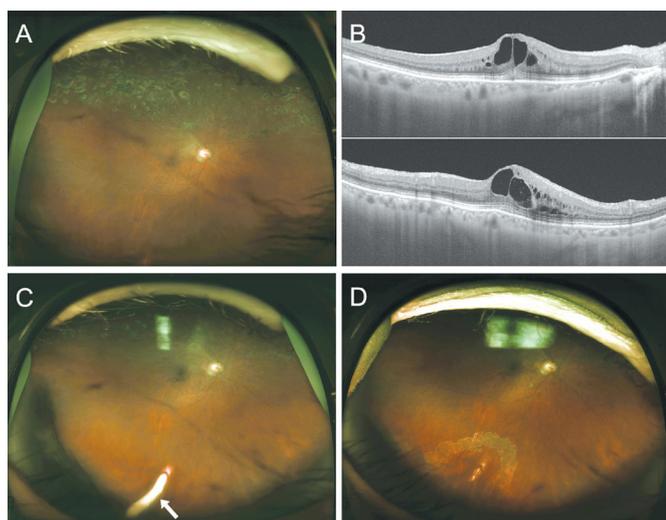
Fundus photography revealed attenuation of retinal vasculature and a laser photocoagulation scar in the superotemporal quadrant area. No evidence of vitreous hemorrhage was seen (Figure 2A), but ME was detected. Swept source optical coherence tomography (SS-OCT, Atlantis-OCT, Topcon, Tokyo, Japan) established that macular thickness had increased to 401  $\mu\text{m}$  because of the presence of intraretinal fluid (Figure 2B). The patient was diagnosed with ME resulting from BRVO. Ozurdex<sup>®</sup> was delivered by intravitreal injection through the superotemporal sclera, 3.5 mm away from the limbus, and positioned in the peripheral retina anterior to the equator. Fundus examination determined that the Ozurdex<sup>®</sup> implant had lodged in the retinal tissue (Figure 2C). Prophylactic laser photocoagulation was performed to prevent retinal detachment. One month later, the patient's vision had improved to 20/32. Macular thickness had decreased to 304  $\mu\text{m}$  and intraretinal fluid had disappeared. Three months after Ozurdex<sup>®</sup> injection, the implant had disappeared and a laser scar around bare sclera was seen (Figure 2D). The retina had not detached.

## DISCUSSION

Accidental injection of an Ozurdex<sup>®</sup> implant into retinal tissue is a rare and unexpected complication. Physicians normally inject intraocular drugs or implants into the central vitreous cavity for the treatment of vitreoretinal diseases, as these products are designed not to reach the retinal tissue. Injected Ozurdex<sup>®</sup> implant is generally settled on the inferior vitreous cavity even in vitrectomized eye. However, in this case, retinal injury did occur following intravitreal Ozurdex<sup>®</sup> injection in a



**Figure 1** Three days after surgery, the vitreous hemorrhage had resolved. Removed neovascular membrane, coagulated retinal vessel and retinal burns from laser photocoagulation were observed.



**Figure 2** Before and after Ozurdex<sup>®</sup> implant injection A: A wide-field fundus photograph showing photocoagulation scars in the area of the superior BRVO; B: Swept-source optical coherence tomography image showing cystoid ME; C: Following injection, the Ozurdex<sup>®</sup> implant was observed lodged in the inferior retina (white arrow); D: Three months later, implant had disappeared and a barrier photocoagulation scar around the bare sclera was seen. Retinal detachment did not occur.

patient presenting with BRVO and ME. It is possible that prior vitrectomy contributed to the retinal injury observed. Vitreous humor, a transparent, gelatinous tissue that fills the eye cavity, is composed of 98%-99% water and factors that contribute to its viscous nature, including collagen fiber, hyaluronin, and opticin<sup>[5]</sup>. Its viscosity is higher than that of water and balanced salt solution, and is affected by a number of factors, including age, eye axial length, and prior intraocular surgery. Lee *et al*<sup>[6]</sup> reported that the viscosity of human vitreous fluid was 300-2000 centipoise (cP), compared to a value of 1 cP for water. The viscosity of vitreous humor provides resistance against the projectile velocity of an intraocular injection. Upon injection of an Ozurdex<sup>®</sup> implant into a vitrectomized eye, intraocular resistance may be lower than expected, and injection velocity may be higher, which may cause the Ozurdex<sup>®</sup> implant to lodge in the retinal tissue. It is possible in this instance that the Ozurdex<sup>®</sup> implant was injected too anteriorly, rather than into the central vitreous cavity. It has been reported previously that injection of an Ozurdex<sup>®</sup> implant too anteriorly may cause complications such as crystalline lens trauma<sup>[3-4]</sup>. It is also possible that the peripheral retinal damage, rather than lens trauma, occurred because the patient had a pseudophakic eye. To prevent the accidental retinal damage following intravitreal injection of Ozurdex<sup>®</sup> implant, it should be injected posteriorly to secure over 15 mm distance in vitreous cavity. Panjaphongse

*et al*<sup>[7]</sup> reported that Ozurdex<sup>®</sup> implant could travel 15 mm in the vitrectomized eyes. In case of performing vitrectomy, it could be helpful to save the anterior vitreous for the patients receiving Ozurdex<sup>®</sup> implant later.

Prompt ocular examination using indirect ophthalmoscopy is crucial for post-injection management. Although retinal injury did develop following the Ozurdex<sup>®</sup> injection, severe ocular complications, such as retinal detachment, were avoided because of immediate ocular examination and prophylactic laser photocoagulation treatment.

In summary, intraocular Ozurdex<sup>®</sup> injection into a vitrectomized eye can result in accidental retinal injury. The ignorance for the kinematics of Ozurdex<sup>®</sup> injection in the vitrectomized eyes as well as the design of injectable drug delivery device may contribute to this accidental retinal injury. Prompt ocular examination and laser photocoagulation following the intravitreal injection are important for preventing subsequent ocular complications.

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