

Sympathetic ophthalmia after vitreoretinal surgery: a report of two cases

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Abstract

Sympathetic ophthalmia (SO) is a panuveitis that usually occurs after trauma to one eye. We describe two cases of SO occurring after 23-gauge vitrectomy. Case 1 involved a 66-year-old woman who underwent pars plana vitrectomy (PPV) for a rhegmatogenous retinal detachment. Two months later, she presented with decreased visual acuity (VA) and bilateral uveitis. Case 2 involved a 43-year-old woman who underwent a second PPV for recurrent retinal detachment. Two months later, she presented with bilateral panuveitis. Both patients were diagnosed with SO and were treated with methylprednisolone and cyclosporine. The first patient was further treated with a dexamethasone intravitreal implant (Ozurdex[®]) owing to the side effects of methylprednisolone. The VA and symptoms improved significantly after treatment in both patients. Bilateral granulomatous panuveitis following PPV should alert surgeons to consider SO. Appropriate interventions for SO can produce positive outcomes.

Keywords

Sympathetic ophthalmia, 23-gauge vitrectomy, retinal detachment, bilateral granulomatous panuveitis, inflammation, dexamethasone intravitreal implant

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Introduction

Sympathetic ophthalmia (SO), a bilateral granulomatous panuveitis, is usually caused by a penetrating ocular trauma. The injured eye is called the inciting eye, and the uninjured eye is called the

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sympathetic eye. Generally, the interval between the penetrating ocular injury and SO ranges from 2 weeks to 2 years; however, the time between the second to the eighth weeks is considered the most dangerous stage. In particular, SO is more likely following injury to the ciliary body or a wound with uveal incarceration or intraocular foreign bodies.¹ The incidence of SO following an injury is 0.2% to 0.5%. Recent findings have shown that SO also occurs following ocular surgeries, such as vitreoretinal surgeries, with an incidence of 0.01%.² Although the SO incidence is low, this condition can lead to bilateral blindness if not treated.³ Herein, we present two cases of SO after vitreoretinal surgery to treat rhegmatogenous retinal detachment (RRD).

Case reports

Case 1

The first patient was a 66-year-old woman who presented with blurred vision in the right eye. The best-corrected visual acuity (BCVA) was hand motion (HM) in the right eye (OD) and 20/32 in the left eye (OS). Ultra-wide-field scanning laser ophthalmoscopy (SLO) revealed macula-off RRD, with a retinal tear at the superior peripheral retina of the right eye (Figure 1a). She was diagnosed as having a right eye cataract and right eye RRD. She also had a history of diabetes mellitus. She underwent cataract extraction, intraocular lens implantation, pars plana vitrectomy (PPV), and gas tamponade in her right eye. After 1 week, her BCVA was 20/100 OD and 20/32 OS. She also underwent SLO and spectral-domain optical coherence tomography (SD-OCT), which revealed that the retina had reattached. Two months later, she presented with a headache, tinnitus, and acute vision loss, and her BCVA was limited to light perception

(LP) in both eyes. Slit-lamp examination revealed small keratic precipitates (KP), aqueous flare and cells in the anterior chamber, vitreous opacity, and RRD with edema in both eyes. SLO (Figure 1b), SD-OCT (Figure 1c), and B-scan ultrasonography (Figure 1d) revealed vitreous opacity, optic disc edema, exudative RRD, and choroidal detachment with edema in both eyes. Increased choroidal thickness was noted with SD-OCT. Fundus fluorescein angiography (FFA) revealed relatively lower fluorescence at the inferior retina and optic disc fluorescein staining in the late phase in both eyes (Figure 1e). She was ultimately diagnosed as having SO according to her clinical characteristics and operation history.

She was treated with prednisolone acetate and pranopfen eye drops and received pulse methylprednisolone therapy (500 mg/day) for 6 days. Subsequently, oral methylprednisolone was started at 48 mg/day (1 mg/kg/day), which was slowly tapered. Changes in blood routine laboratory values, including blood glucose, and liver and renal function were monitored. When oral methylprednisolone was reduced to 24 mg/day, she developed serious side effects, including hyperglycemia and osteoporosis. Slit-lamp examination revealed fewer KP and less anterior chamber inflammation in both eyes (Figure 2a). SLO revealed vitreous opacity, but the retinal and choroidal edema in both eyes had improved compared with earlier examinations (Figure 2b). SD-OCT revealed that the subretinal fluid volume had decreased compared with previous examinations; however, choroidal edema remained in both eyes (Figure 2c). A dexamethasone intravitreal implant (Ozurdex®; Allergan Inc., Irvine, CA, USA) was injected into her right eye, followed by a second injection into her left eye 1 week later. Concurrently, she was given methylprednisolone (12 mg/day). One month after the Ozurdex® treatment, her VA and other symptoms showed

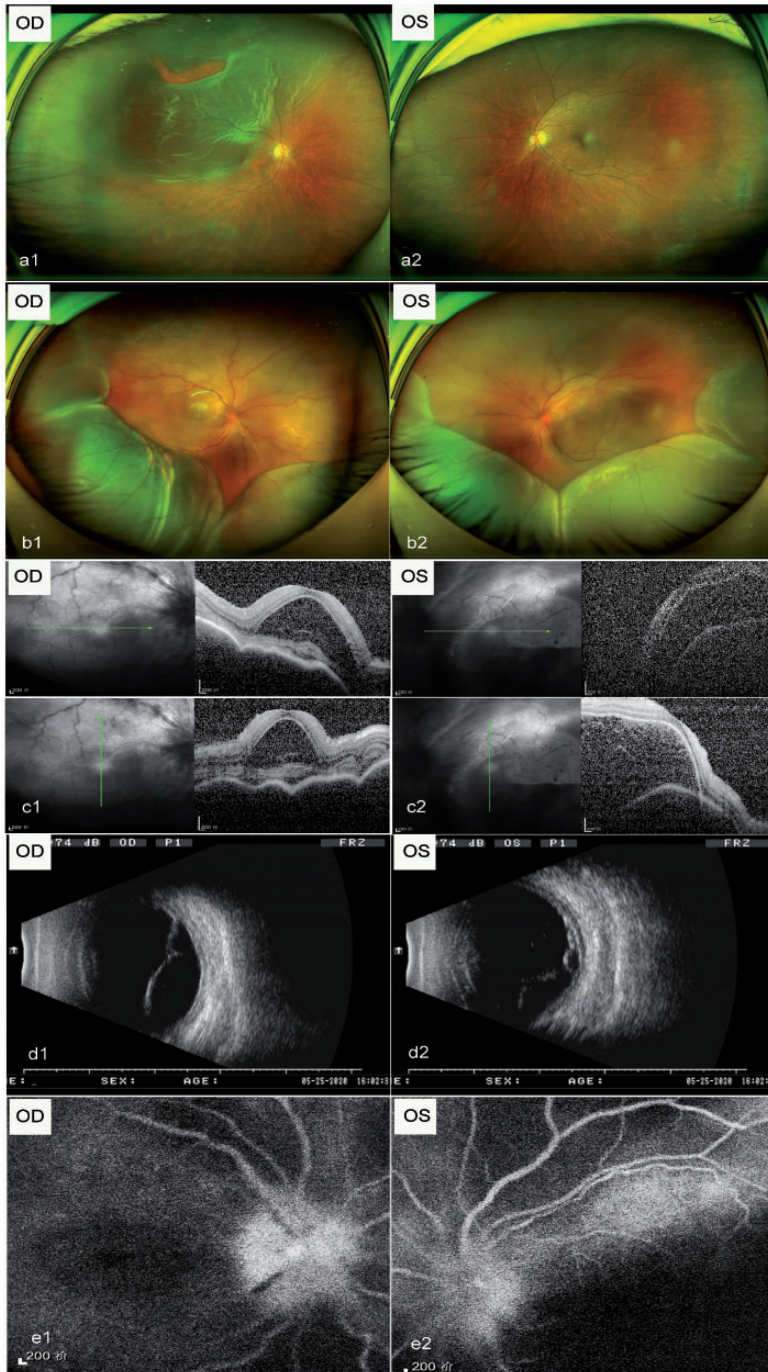


Figure 1. Bilateral ocular imaging findings for a 66-year-old woman with sympathetic ophthalmia after pars plana vitrectomy (PPV) surgery for rhegmatogenous retinal detachment in the right eye. At presentation, the patient’s visual acuity was hand motion and 20/32 for the right and left eyes, respectively. Fundus

(continued)

marked improvement. Anterior segment and fundus examinations (Figure 2d) showed no inflammatory reactions in either eye, and SD-OCT confirmed complete absorption of the subretinal fluid (Figure 2e). Her BCVA was 20/63 OD and 20/25 OS. She continued to take oral methylprednisolone (4 mg/day) and cyclosporine (100 mg/day), and the doses were slowly tapered.

Case 2

The second patient was a 43-year-old woman who presented with blurred vision in the left eye. She underwent cataract extraction; however, she had previously undergone intraocular lens implantation in both eyes 15 years earlier because of congenital cataracts. The BCVA was 20/25 OD and 20/32 OS. SLO revealed a flap tear and RRD at the upper temporal retina of the left eye (Figure 3a). She was diagnosed as having left eye pseudophakia RRD, and she underwent PPV and silicone oil tamponade in her left eye. The retina was reattached, and her BCVA was 20/25 OD and 10/80 OS. Three months later, she presented with acute vision loss, and her BCVA was 20/25 OD and 20/250 OS. SLO revealed a detached retina from the nasal side, which was diagnosed as recurrent RD in the left eye. She underwent a second PPV with the aid of an iris hook and silicone oil tamponade in her left eye. After 1 week, her

BCVA was 20/25 OD and HM OS, and B-scan ultrasonography revealed that the retina was well reattached. She subsequently presented with increased intraocular pressure (IOP), and received laser iridoplasty, mannitol, and IOP-lowering eye drops for the left eye. Her IOP then returned to normal. Two months after the second PPV, she presented with floating shadows in the front of the right eye. Her BCVA was 20/200 OD and HM OS, and IOP was 26.5 mmHg OD and 31 mmHg OS. Slit-lamp examination revealed small KP, and aqueous flare and cells in the anterior chamber in both eyes. SLO revealed a yellowish-white exudate located around the optic disc and macula of both eyes (Figure 3b). SD-OCT revealed vitreous opacity and increased choroidal thickness in both eyes, and she had neurosensory detachment and subretinal fluid collection under the macula of the right eye (Figure 3c). B-scan ultrasonography revealed vitreous opacity with posterior RD in the right eye (Figure 3d). FFA revealed hyperfluorescence of the optic disc followed by dye leakage from the optic disc and multiple pinpoint leakages at the nasal optic disc in the late phase in the right eye. Additionally, there was dye leakage from the optic disc and multiple pinpoint leakages around the optic disc and macula in the late phase in the left eye (Figure 3e). She was diagnosed with choroiditis and SO.

Figure 1. Continued

examination (a) revealed macula-off retinal detachment (RD) with a retinal tear at the superior peripheral retina of the right eye before surgery. Two months after PPV and gas tamponade, the patient was diagnosed with sympathetic ophthalmia, and her best-corrected visual acuity (BCVA) for both eyes was light perception. Fundus examination (b) showed optic disc edema, exudative retinal detachment, and choroidal detachment in both eyes. Spectral-domain optical coherence tomography (c) confirmed the presence of subretinal and intraretinal fluid and a wrinkled choroid in both eyes. B-scan ultrasonography (d) showing vitreous opacity, retinal detachment, and choroidal detachment with edema in both eyes. Fundus fluorescein angiography (FFA) (e) showing blocked fluorescence at the inferior retina, and optic disc fluorescein staining in both eyes.

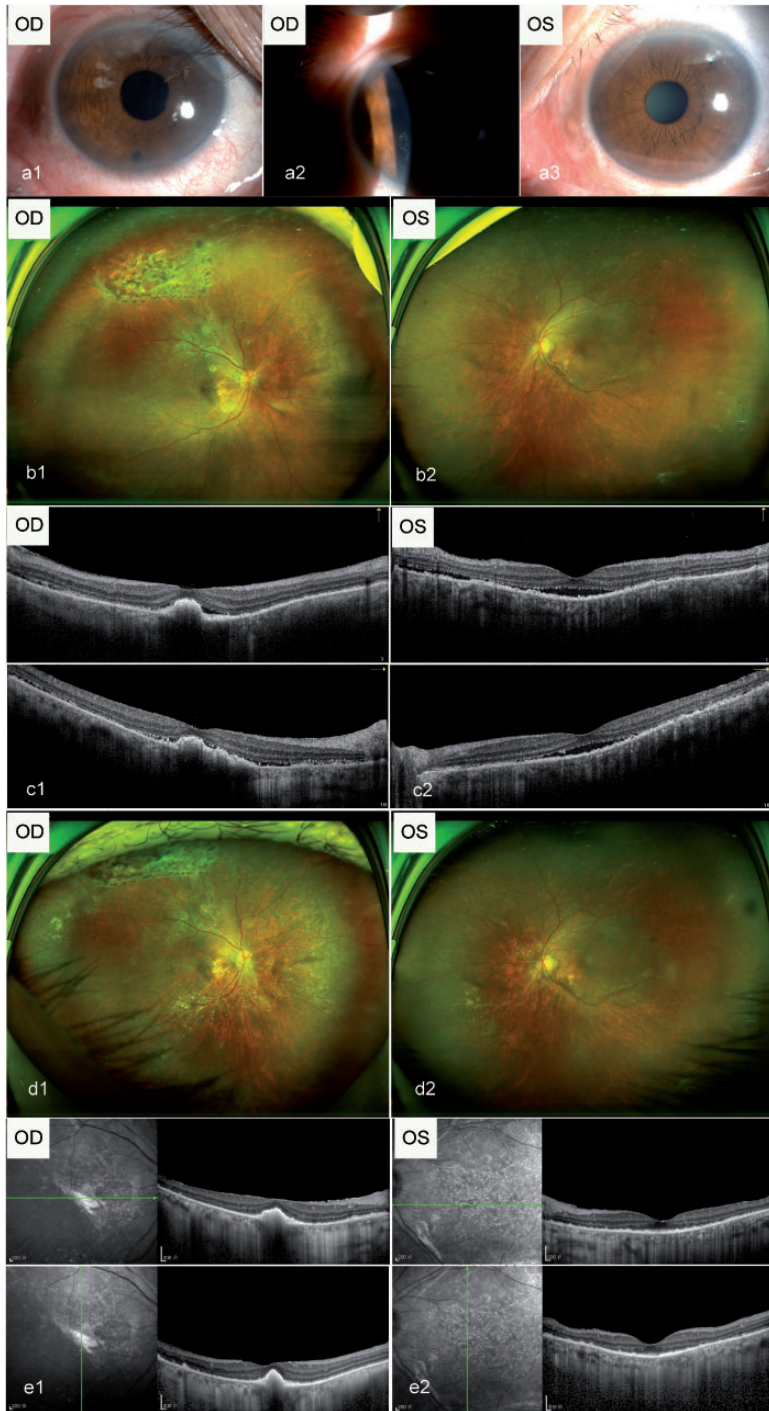


Figure 2. Bilateral ocular clinical and imaging findings for a 66-year-old woman with postsurgical sympathetic ophthalmia after treatment. One month after pulse methylprednisolone therapy and high-dose oral

(continued)

Methazolamide was given to lower the IOP. Simultaneously, she was treated with prednisolone acetate, bromfenac sodium eye drops, and pranoprofen eye drops. Additionally, she received oral methylprednisolone at the following dosages: 48 mg/day for the first week, 44 mg/day for the second week, and 40 mg/day for the third and fourth weeks. During the fifth week, she was treated with methylprednisolone (24 mg/day) and cyclosporine (100 mg/day). Changes in blood routine laboratory values, including blood glucose, and liver and renal function were monitored monthly. Two months after treatment, her BCVA was 20/25 OD and 20/100 OS; however, the IOPs of both eyes remained very high at 30.3 mmHg OD and 38 mmHg OS. Carteolol + brinzolamide + brimonidine tartrate eye drops were prescribed for both eyes to lower the IOP. Slit-lamp examination revealed no inflammatory reactions in the anterior chamber of either eye. Interestingly, we also found dark conjunctival pigmentation around the sclerotomy sites in the left eye, which is a reported preliminary sign of SO (Figure 4a).⁵ SLO revealed that the yellowish-white exudate in both eyes had decreased compared with previous examinations (Figure 4b), and SD-OCT revealed that the subretinal fluid in both eyes had almost disappeared, and that the cystoid macular edema in the left eye remained (Figure 4c). Two months after treatment, her IOP was 23.3 mmHg OD and 34.5 mmHg OS. The IOP-lowering eye drops were changed to bimatoprost

and timolol maleate + brinzolamide + brimonidine tartrate. Three months after treatment, her IOP had returned to normal, and her BCVA was 20/20 OD and 20/100 OS. SLO and SD-OCT confirmed that the subretinal fluid had completely resolved (Figure 4d and e). She continued to take cyclosporine (100 mg/day), which was slowly tapered.

This case report was prepared in accordance with CARE reporting guidelines.⁴

Discussion

The etiology of SO remains unknown, but it is believed to be an autoimmune reaction. An ocular penetrating injury permits contact between intraocular antigens and the extraocular system, which leads to contact between intraocular tissue and the lymphatic system, causing an autoimmune reaction. Sensitized lymphocytes attack the uveal tissue of the other eye with the same antigen, resulting in SO.⁶ Some SO cases occur following ocular surgeries, such as RD surgery, cataract surgery, trabeculectomy, and penetrating keratoplasty.⁷ PPV reportedly increases the risk of postsurgical SO because this surgery may cause a break in the blood-retinal barrier, which is deemed responsible for SO.⁸⁻¹⁰ To the best of our knowledge, ours is the first report of postsurgical SO from China.

We reported two cases of SO followed by PPV. In Case 1, the patient presented with extraocular symptoms, including headache and tinnitus. These symptoms are rare in

Figure 2. Continued

methylprednisolone, slit-lamp examination (a) showed less KP and anterior chamber inflammation in both eyes. Fundus examination (b) showed that the vitreous opacity, and retinal and choroidal edema in both eyes were improved compared with previous examinations. Spectral-domain optical coherence tomography (c) showed less subretinal fluid in both eyes compared with previous examinations. Three months after Ozurdex[®] intravitreal injections and methylprednisolone treatment, her BCVA was 20/63 OD and 20/25 OS. Fundus examination (d) and spectral-domain optical coherence tomography (e) showing that the subretinal fluid had completely disappeared in both eyes, and choroidal edema remained in the right eye.

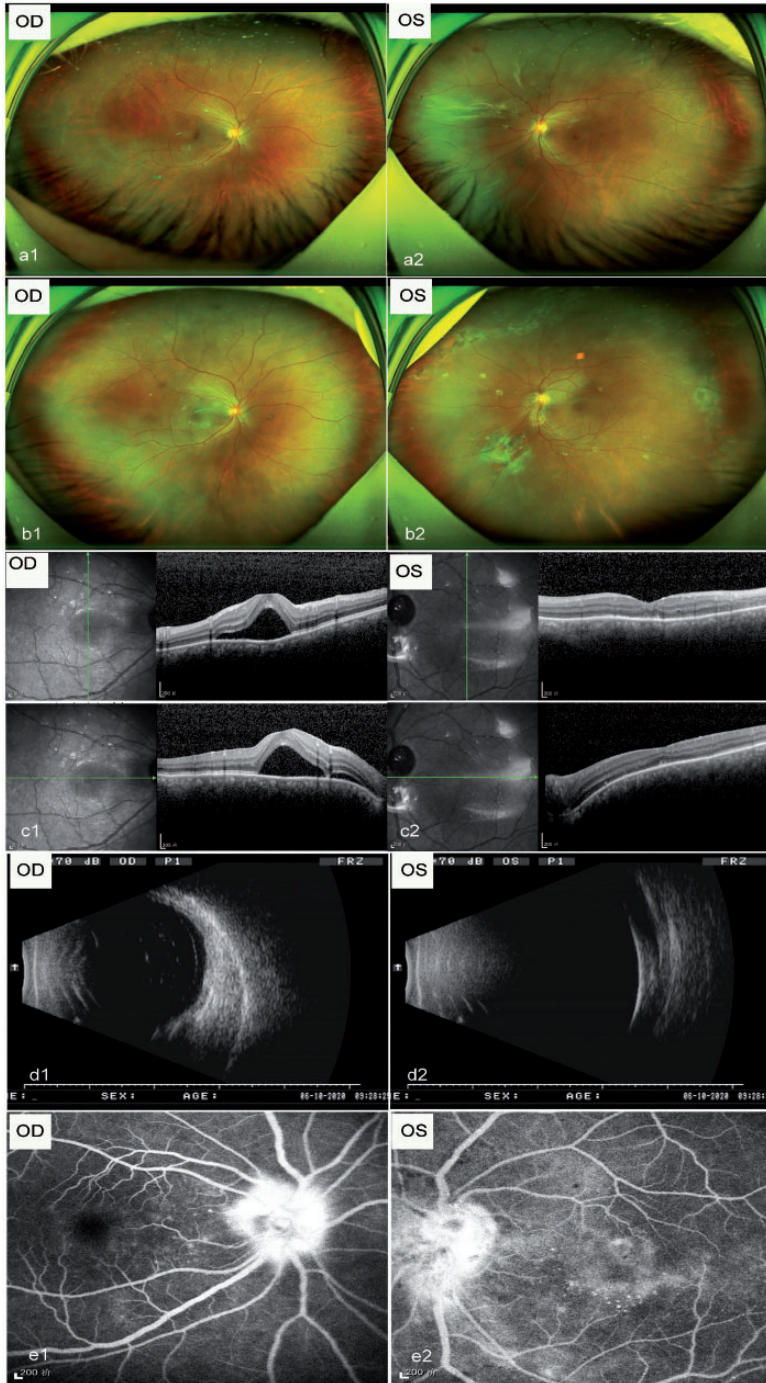


Figure 3. Bilateral ocular imaging findings for a 43-year-old woman with sympathetic ophthalmia after pars plana vitrectomy (PPV) surgery for recurrent rhegmatogenous retinal detachment (RRD) in the left eye.

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SO patients; only 9% of patients with SO experience headaches, and only 3% have tinnitus.¹¹ These symptoms are typical of Vogt–Koyanagi–Harada (VKH) disease; however, patients with VKH do not typically have a history of ocular penetrating injuries or ocular surgeries.¹² Postoperative complications, such as ocular hypertension, hypotony, wound leakage, and hyphema, were not observed in our cases. Case 2 was a patient with pseudophakia RRD. Multiple surgical interventions have been reported to increase the risk of postsurgical SO, given that a large number of uveal proteins are released during repeated surgeries.^{2,13,14} In addition, because the patient's pupils in Case 1 were unable to dilate sufficiently, an iris hook was used to assist the PPV. She presented with ocular hypertension after the PPV, which can be induced by either inflammation or steroid eye drops. For 23-gauge vitrectomy in our hospital, all sclerotomies are sutured after surgery. In Case 2, dark conjunctival pigmentation around the sclerotomy site was found in the inciting eye and, according to the literature, this is considered a preliminary sign of SO.⁵ Dark conjunctival pigmentation around sclerotomy sites indicates uveal antigens that are exposed to the lymphatic system and cause an autoimmune reaction. Classical granulomatous uveitis typically presents with mutton-fat KP, but we observed only small KP in both patients. Nevertheless, SO with nongranulomatous

inflammation is not uncommon.¹⁵ Dalen–Fuchs nodules are semicircular nodules that are mainly composed of epithelioid cells and lymphocytes within the choroid. These nodules are present in one-third of SO patients;^{16,17} however, we did not observe these nodules in our cases. This may be because our intervention was early and had preceded the development of granulomatous uveitis, or because the follow-up time was insufficient.

Previously, it was generally believed that patients would have better vision in the sympathetic eye if the inciting eye was enucleated within 2 weeks of SO onset.¹⁸ However, this opinion remains controversial.¹⁹ Current evidence and experts suggest that corticosteroids and immunomodulators, such as cyclosporine, are very effective in treating SO.²⁰ Prompt treatment can control SO and maintain good vision in the sympathetic eye.²¹ The first patient (Case 1) was treated with pulse methylprednisolone therapy and oral steroids. It should be noted that this patient was intolerant to high doses of steroids because of serious side effects. The Ozurdex[®] dexamethasone intravitreal implant has been approved for the treatment of noninfectious uveitis.²² Both of this patient's eyes received a single intravitreal injection of Ozurdex[®] to avoid side effects related to systemic steroids. Small doses of oral steroids and systemic immunosuppression were then used on a maintenance basis. The second patient did not receive Ozurdex[®]

Figure 3. Continued

At presentation, the patient's visual acuity was 20/25 in the right eye (OD) and 20/32 in the left eye (OS). Fundus examination (a) showing a flap tear and RRD at the upper temporal retina in the left eye. Two months after a second PPV and silicone oil tamponade for recurrent RRD, fundus examination (b) showed yellowish-white exudate located around the optic disc and macula in both eyes. Spectral-domain optical coherence tomography (c) confirmed neurosensory detachment and subretinal fluid collection under the macula of the right eye and vitreous opacity in both eyes. B-scan ultrasonography (d) revealed vitreous opacity with posterior retinal detachment in the right eye. Fundus fluorescein angiography (FFA) (e) showed dye leakage from the optic disc and multiple pinpoint leakages at the nasal optic disc in the right eye, and dye leakage from the optic disc and multiple pinpoint leakages around the optic disc or macula in the left eye.

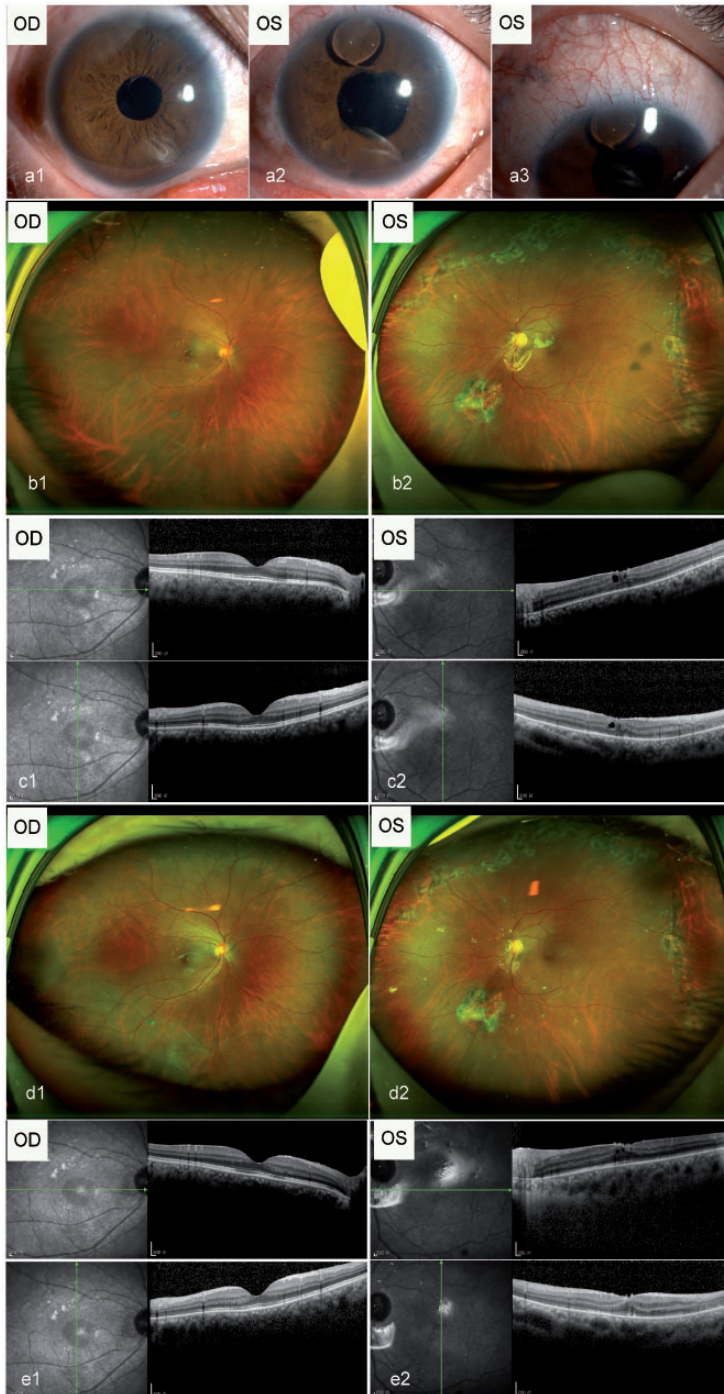


Figure 4. Bilateral ocular clinical and imaging findings for a 43-year-old woman with postsurgical sympathetic ophthalmia after treatment. Two months after high-dose oral methylprednisolone, slit-lamp

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owing to the high IOP. Instead, she was treated with oral steroids and systemic immunosuppressive drugs, which were slowly tapered. Indeed, the VA and symptoms in both patients improved significantly; however, long-term follow-up is necessary. With the increasing application of PPV, ophthalmologists should be alert to the possibility of postsurgical SO and provide appropriate treatments.

Declaration of conflicting interest

The authors declare that there is no conflict of interest.

Ethics statement

The study protocol was approved by the ethics committee of the Second Affiliated Hospital, School of Medicine, Zhejiang University (approval number: 2020-749). Written informed consent was obtained from the patient in this study.

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Figure 4. Continued

examination (a) showed no inflammatory reaction in the anterior chamber of both eyes and dark conjunctival pigmentation around the sclerotomy sites in the left eye. Fundus examination (b) revealed less yellowish-white exudates in both eyes compared with previous examination. Spectral-domain optical coherence tomography (c) revealed that the subretinal fluid in both eyes had almost disappeared compared with the previous examination. Three months after treatment, her best-corrected visual acuity (BCVA) was 20/20 in the right eye (OD) and 20/100 in the left eye (OS). Fundus examination (d) and spectral-domain optical coherence tomography (e) confirmed that the subretinal fluid had completely disappeared in both eyes.

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