

Toxic Posterior Segment Syndrome Presenting as Occlusive Retinal Vasculitis following Vitreoretinal Surgery

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Abstract

Purpose: To report a rare retinal manifestation of toxic posterior segment syndrome following vitreoretinal surgery.

Methods: In this case series, we report three cases of rhegmatogenous retinal detachment for which pars plana vitrectomy with silicone oil injection was done. All three patients developed an intense anterior chamber reaction along with occlusive vasculitis-like fundus picture.

Results: The three patients were started on topical and systemic steroids, and there was a dramatic improvement in vision and clinical signs at postoperative week 1.

Conclusion: Toxic posterior segment syndrome is a sight-threatening complication after vitreoretinal surgery, but responds well to topical and systemic steroids.

Keywords: Occlusive vasculitis, Silicone oil toxicity, Toxic posterior segment syndrome

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INTRODUCTION

Ocular inflammation in the form of toxic anterior segment syndrome is a common manifestation following various anterior and posterior segment surgeries. However, posterior segment inflammation is an uncommon entity following intraocular surgery. Patel *et al.* described seven cases of toxic posterior segment syndrome following administration of a combination of moxifloxacin and triamcinolone intracamerally.¹ Similarly, although severe anterior segment inflammation in the immediate postoperative period has been described following pars plana vitrectomy with silicone oil injection in several studies,^{2,3} toxicity to retina usually occurs after several months of initial surgery, mostly in the form of inner retinal damage.^{4,5} This series summarizes three patients that presented with intense anterior segment inflammation and an occlusive vasculitis-like fundus picture on the first

postoperative day after pars plana vitrectomy with the injection of silicone oil for fresh rhegmatogenous retinal detachment.

CASE REPORT

Case 1

A 53-year-old man presented with sudden onset diminution of vision in the right eye for 3 days. The patient was a known hypertensive. He had undergone cataract surgery in both eyes 3 years earlier. On examination, the best corrected visual acuity (BCVA) was counting fingers in the right eye and 20/20 in the left eye. Fundus examination showed macula-off rhegmatogenous retinal detachment with multiple mid-peripheral breaks. A standard 23-G pars plana vitrectomy with endolaser and silicone oil (*Aurosil Oil-1500* centistokes, *Auro Labs*, India) injection was done. Intraoperative adjuncts

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such as perfluorocarbon liquids (PFCL), triamcinolone acetonide (TA), or dyes were not used during surgery. On the first postoperative day, BCVA was 20/125 (Snellen equivalent). The anterior segment showed cellular reaction with no hypopyon. Fundus evaluation showed the presence of mild disc edema along with multiple areas of occlusive vasculitis, extensive superficial hemorrhages, and a patch of retinal whitening nasally [Figure 1a]. A provisional diagnosis of toxic posterior segment syndrome was made, and the patient was started on intravenous methylprednisolone (1 g) for 3 days followed by oral prednisone (1 mg/kg) along with topical steroids. At postoperative week 1, BCVA improved to 20/80. Fundus examination showed normal retinal blood vessels along with reduction of disc edema and retinal hemorrhages [Figure 1b]. Silicone oil was removed at postoperative month 1, and vision was maintained at 20/50 at the end of 3 months.

Case 2

A 36-year-old female presented with sudden onset diminution of vision in the right eye for 1 week. BCVA was counting fingers at 1 meter in the right eye and 20/30 in the left eye. She was a high myopic and had no history of intraocular surgery in the past. The left eye fundus examination showed an attached retina with peripheral lattices. Fundus examination of the right eye showed macula-off rhegmatogenous retinal detachment with two superior and one inferior break [Figure 2a]. A pars plana vitrectomy with endolaser photocoagulation and silicone oil (*Aurosil Oil-1000* centistokes, *Aurolabs*, India) injection was done. PFCL, TA, or dyes were not used intraoperatively. On the first postoperative day, BCVA was hand movements. The anterior segment showed intense fibrinous reaction [Figure 2b], and fundus evaluation showed the presence of multiple areas of occlusive vasculitis with few superficial hemorrhages [Figure 2c]. The patient was started on

oral prednisone (1 mg/kg) along with intense topical steroids. At postoperative week 1, BCVA improved to 20/125 (Snellen equivalent), and anterior segment reaction and vasculitis had resolved [Figure 2d]. Silicone oil was removed after 3 months, and vision was maintained at 20/100 at the last follow-up.

Case 3

A 34-year-old man presented to the outpatient department with sudden onset diminution of vision in the right eye for 2 weeks. He had no history of intraocular surgery or recent trauma. At presentation, BCVA was 20/320 in the right eye and 20/20 in the left eye. Fundus examination of the left eye was normal. However, right eye examination revealed a total rhegmatogenous retinal with a temporal giant retinal tear. A pars plana vitrectomy with silicone oil (*Aurosil Oil-1000* centistokes, *Aurolabs*, India) injection was planned. On the first postoperative day, BCVA was 20/320, and the anterior segment showed a cellular reaction. Fundus showed the presence of mild disc edema, occlusive vasculitis-like picture with superficial hemorrhages along with two patches of retinal whitening nasally [Figure 3a]. The patient was started on topical and oral steroids (1 mg/kg). At postoperative week 1, BCVA improved to 20/200 (Snellen equivalent) with complete resolution of fundus lesions [Figure 3b]. However, at postoperative month 1, the patient had developed a full-thickness macular hole [Figure 3c].

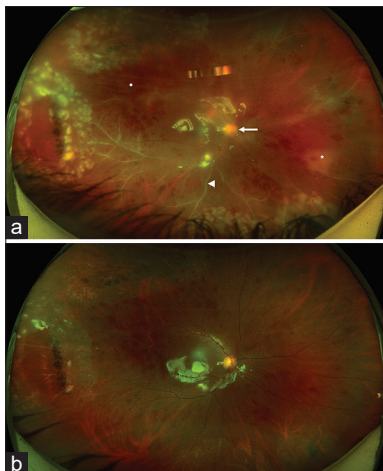


Figure 1: (a) A 53-year-old male presented with disc edema (arrow), occlusive vasculitis (arrowhead), multiple superficial hemorrhages (dot) and a patch of retinitis (asterisk) on the first postoperative day following pars plana vitrectomy with silicon oil injection for rhegmatogenous retinal detachment. The patient was managed with systemic and topical steroids. (b) The disc edema, occlusive vasculitis, and hemorrhages decreased significantly 1 week postoperatively

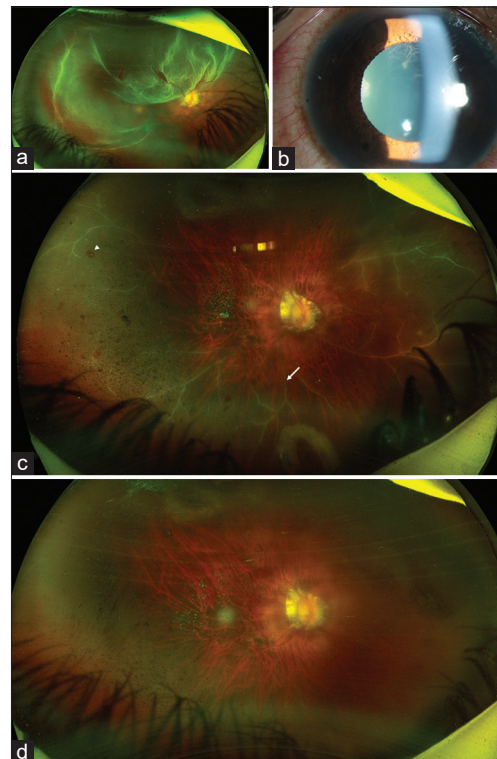


Figure 2: A 36-year-old myopic female presented with rhegmatogenous retinal detachment in right eye (a). Following pars plana vitrectomy with silicone oil tamponade, on the first postoperative day, she developed intense fibrinous reaction in anterior chamber. (b) and fundus showed occlusive vasculitis (arrow), few superficial hemorrhages (arrowhead). (c) The patient was managed with systemic and topical steroids. (d) The occlusive vasculitis and hemorrhages resolved after 1 week of treatment

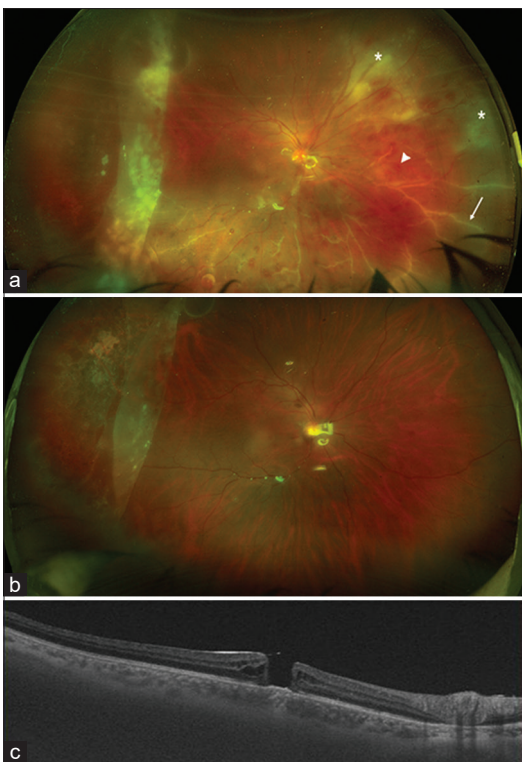


Figure 3: A 34-year-old male presented with rhegmatogenous retinal detachment with giant retinal tear in right eye. A pars plana vitrectomy with silicone oil tamponade was performed. (a) On the first postoperative day, fundus showed occlusive vasculitis (*arrow*), few superficial hemorrhages (*arrowhead*) and patches of retinal whitening (*asterisk*). The patient was managed with systemic and topical steroids. (b) The occlusive vasculitis and hemorrhages resolved after 1 week of treatment. (c) However, at postoperative month 1, he developed a full thickness macular hole

DISCUSSION

Surgery for retinal detachment repair often requires the intraocular use of a multitude of extrinsic agents such as PFCL, TA, intraocular dyes, irrigating solution, and silicone oil. Each agent has the potential of inciting a foreign body-type reaction inside the eye. PFCL and intraocular dyes such as brilliant blue and indocyanine green have been reported to have toxic damage to the retina in various studies.⁶⁻⁹ The toxicity has been implicated to their physical properties, as well as the presence of impurities. Interestingly, both the agents were not used in any of the patients during surgery. A retinal vasculitis-like picture has also been described following vitrectomy for retained lens fragment or dropped nucleus, where the authors attributed the clinical findings to the lenticular remnants, triggering focal inflammatory effect on retinal vessels.⁹ The only agent common to the cases in our study was the use of silicone oil. Silicone oil polydimethylsiloxane, (PDMS) has been used in vitreoretinal surgeries as a long-term tamponading agent for nearly three decades.¹⁰ It is considered safe for intraocular use because it is chemically inert and immunologically tolerable.¹¹ However, postoperative intraocular toxicity to the substance has been documented in literature.^{2,5,12} Possible mechanisms are the presence of occasional impurities such

as low-molecular-weight components, ionic compounds, and compounds with cleavable fluoride present in the silicone oil; direct immunogenicity and toxicity of the silicone oil; or secondary to emulsification.¹³ Impurities are considered to be highly volatile and known to diffuse into surrounding tissue causing toxicity.¹² On the other hand, emulsification has been documented to incite a foreign body-type reaction leading to retinal necrosis. Morescalchi *et al.* reported 13 cases of silicone oil-induced retinal toxicity, out of which one eye had a viral retinitis-like picture.¹² However, all the cases were reported following the use of heavy silicone oil, with signs developing only after 2 weeks. The cases were managed with the removal of silicone oil within 1 week of the development of signs.¹² The fundus findings in case-1 and case-3 of our series had a similar patch of retinal whitening. Moreover, our patients developed an occlusive vasculitis-like picture on the first postoperative day following injection of PDMS. In all three cases, the retinal findings were resolved completely with topical and systemic steroids, without immediate removal of silicone oil. Considering the fact that the surgeries were performed using new vitrectomy cutters, the role of silicone oil in the pathogenesis becomes more likely. These three cases occurred within a span of 1.5 years (January 2019 to June 2020). PDMS has been in use in our institute for many years; however, such reaction had never been seen in the past. Interestingly, we did not notice any such reaction in other patients during this surgical period, so we are still unsure about the mechanism. One possible explanation could be a foreign body like reaction secondary to impurities associated with the repeated use of flute cannula or endolaser probe. However, the association could not be confirmed in the above cases. Intraocular antibiotics were not used in any of the cases and thus, were not taken into consideration. Furthermore, ringer's lactate is uniformly used in all cases in our institute, and no such manifestation was seen in any patients receiving the same batch of solution.

In all three cases, one important differential was the possibility of postoperative endophthalmitis. Silicone oil is known to have antibacterial action, and the retinal findings could have been a sub-clinical presentation of endophthalmitis. However, owing to the fact that the signs in our case were seen on the first postoperative day, along with the absence of significant pain and conjunctival congestion, a provisional diagnosis of silicone oil-induced toxicity seemed more feasible. Moreover, the dramatic response to the initial short course of topical and systemic steroids points more in favor of inflammatory pathology.

In conclusion, regardless of the underlying agent responsible, toxic posterior segment syndrome in the form of an occlusive vasculitis-like picture can potentially be a sight-threatening complication following vitreoretinal surgery, and it responds well to topical and systemic steroids. However, further studies with larger and controlled samples are necessary to validate the association.

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Conflicts of interest

There are no conflicts of interest.

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