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

Niroj Kumar Sahoo1, Shashwat Behera1, Raja Narayanan2, Jay Chhablani1,2,3
1Department of Retina and Vitreous, L. V. Prasad Eye Institute, Kode Venkatadri Chowdary Campus, Tadigadapa, Vijayawada, Andhra Pradesh, India, 2Smt. Kanuri Santhamma Retina Vitreous Centre, L. V. Prasad Eye Institute, Hyderabad, Telangana, India, 3UPMC Eye Centre, University of Pittsburgh, Pittsburgh, PA, USA

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

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 intracameraly.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, Aurolabs, India) injection was done. Intraoperative adjuncts

How to cite this article: Sahoo NK, Behera S, Narayanan R, Chhablani J. Toxic posterior segment syndrome presenting as occlusive retinal vasculitis following vitreoretinal surgery. J Curr Ophthalmol 2021;33:345-8.

Quick Response Code:

Quick Response Code:

Website:

Website: www.jcurrophthalmol.org

DOI:

DOI: 10.4103/joco.joco_42_20

Access this article online

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

For reprints contact: WKHLRPMedknow_reprints@wolterskluwer.com

© 2021 Journal of Current Ophthalmology | Published by Wolters Kluwer - Medknow
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 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].
The toxicity has been documented in literature. PFCL and intraocular dyes such as brilliant blue and indocyanine green have been reported to have toxic damage to the retina in various studies. 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. 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. It is considered safe for intraocular use because it is chemically inert and immunologically tolerable. However, postoperative intraocular toxicity to the substance has been documented in literature. 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. Impurities are considered to be highly volatile and known to diffuse into surrounding tissue causing toxicity. 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. 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. 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.

**Financial support and sponsorship**
Nil.
Conflicts of interest
There are no conflicts of interest.

References
1. Patel SB, Reddy NK, He YG. Toxic posterior segment syndrome after dropless cataract surgery with compounded triamcinolone-moxifloxacin. Retina 2020;40:446-55.
2. Johnson RN, Flynn HW Jr., Parel JM, Portugal LM. Transient hypopyon with marked anterior chamber fibrin following pars plana vitrectomy and silicone oil injection. Arch Ophthalmol (Chicago, Ill: 1960) 1989;107:683-6.
3. Moisseiev E, Barak A. Toxic anterior segment syndrome outbreak after vitrectomy and silicone oil injection. Eur J Ophthalmol 2012;22:803-7.
4. Pichi F, Hay S, Abboud EB. Inner retinal toxicity due to silicone oil: A case series and review of the literature. Int Ophthalmol 2020;40:1-10.
5. Takkar B, Azad R, Kamble N, Azad S. Retinal nerve fiber layer changes following primary retinal detachment repair with silicone oil tamponade and subsequent oil removal. J Ophthalmic Vis Res 2018;13:124-9.
6. Pastor JC, Coco RM, Fernandez-Bueno I, Alonso-Alonso ML, Medina J, Sanz-Arranz A, et al. Acute retinal damage after using a toxic perfluorooctane for vitreo-retinal surgery. Retina 2017;37:1140-51.
7. M140-51.tinal d S, Calvo P, Rodriguez-Marco NA, Faus F, Abecia E, Pablo L. Blindness related to presumed retinal toxicity after using perfluorocarbon liquid during vitreo-retinal surgery. Retina 2018;38:1856-64.
8. Januschowski K, Irigoyen C, Pastor JC, Srivastava GK, Romano MR, Heimann H, et al. Retinal toxicity of medical devices used during vitreo-retinal surgery: A critical overview. Ophthalmologica 2018;240:236-43.
9. Örnek K, Onaran Z, Yılmazbaş P. Retinal vasculitis following pars plana vitrectomy for retained lens material. Clin Exp Optom 2011;94 (1):106-7.
10. Vaziri K, Schwartz S, Leffler C, Flynn H. Surgical tamponade in the treatment of retinal detachment. Retin Physician 2016;12:32-7.
11. Federman JL, Schubert HD. Complications associated with the use of silicone oil in 150 eyes after retina-vitreous surgery. Ophthalmology 1988;95:870-6.
12. Morescalchi F, Costagliola C, Duse S, Gambicorti E, Parolini B, Arcidiacono B, et al. Heavy silicone oil and intraocular inflammation. Biomed Res Int 2014;2014:574825.
13. Nakamura K, Refojo MF, Crabtree DV, Leong FL. Analysis and fractionation of silicone and fluorosilicone oils for intraocular use. Invest Ophthalmol Vis Sci 1990;31:2059-69.