Intravitreal Cotton Fiber Foreign Body after Intravitreal Injection

Fran Drnovšek     Xhevat Lumi

Department of Ophthalmology, University Medical Centre Ljubljana, Ljubljana, Slovenia

Keywords
Retained intravitreal fiber foreign body · Cotton fiber · Anti-VEGF complication · Pars plana vitrectomy

Abstract
Iatrogenic intraocular foreign bodies (IOFBs) are rare findings to be associated with sterile intraocular procedures. They are usually observed in the anterior chamber, introduced during cataract surgery, while IOFBs in the posterior segment of the eye are very rare. We report a case of a patient with intravitreal cotton fiber foreign body associated with intravitreal anti-VEGF injection. An 86-year-old male patient presented with sudden, painless loss of vision in his right eye. Examination of the fundus revealed dense subretinal hemorrhage (SRH) involving the macula and causing deterioration of vision. Examination also revealed a fiber foreign body in the posterior vitreous of the same eye. The patient had known neovascular age-related macular degeneration and had been treated with regular anti-VEGF intravitreal injections for the past 6 years. Due to SRH in his right, the only functioning eye, we decided to perform a pars plana vitrectomy. During the surgery, we were able to touch the intraocular fiber foreign body with surgical instruments and it proved to be soft, flexible, and relatively compact. Given the white color and composition, our conclusion was that it was a cotton fiber thread. Identical material is an integral part of cotton tips used to disinfect the conjunctiva with povidone iodine just before administering an intravitreal injection. We hypothesize that such a cotton tip was the source of the foreign body. Careful preparation of the operative field and selection of high-quality surgical materials are mandatory in avoiding such a complication.

Correspondence to:
Xhevat Lumi, xhevat.lumi @ kclj.si
Introduction

Intraocular foreign bodies (IOFB) are in the vast majority of cases result of ocular trauma [1]. However, iatrogenic IOFBs can also be associated with intraocular surgery [2]. Retained IOFBs, introduced into the anterior chamber during cataract phacoemulsification surgery, have already been described [3–8]. Most of these retained IOFBs were metallic-appearing [3], but objects like cilium [4], pieces of suture materials [5], suture needles [6], and fibers [7, 8] have also been reported. Compared to the other foreign bodies, cotton fiber foreign bodies seem to be a relatively common finding in the anterior chamber after intraocular surgery. In previously published reports, they have been noted in 0.78–1.7% of patients undergoing an uneventful cataract surgery [7, 8].

On the contrary, IOFBs introduced into the posterior segment of the eye during a surgical procedure are very rare findings [9–13]. Particularly fiber foreign bodies in the posterior segment are highly uncommon and are mostly associated with ocular trauma [1]. We report a case of a patient with intravitreal cotton fiber foreign body associated with intravitreal anti-VEGF injection.

Case Report/Presentation

An 86-year-old male patient was referred to the emergency clinic and from there to the medical retina service of the Department of Ophthalmology, University Medical Centre Ljubljana, Slovenia, after having noticed a sudden, painless loss of vision when waking up in the morning in his right, previously only functioning, eye. Due to a dense subretinal hemorrhage (SRH), he was then referred to the surgical retina service for further evaluation and treatment.

Examination at the surgical retina clinic revealed best-corrected visual acuity of hand movements in the right eye and no light perception in the left eye. Anterior segment examination showed normal findings in both eyes, except for intraocular lens in the right eye and mild cataract in the left eye. In the right eye, we observed a dense SRH, 3.5 disc diameters in width, involving the macula and causing deterioration of vision. Optic disc showed glaucomatous optic neuropathy, with cup-to-disc ratio of 0.9. Examination also revealed a fiber foreign body in the posterior vitreous of the right eye, approximately 2 disc diameters in length (shown in Fig. 1). There were no signs of inflammation neither in the anterior nor in the posterior segment.

The patient’s medical history showed that his right eye had been treated for neovascular age-related macular degeneration with regular intravitreal injections of anti-VEGF for the

Fig. 1. Intraocular fiber foreign body: white threaded fiber in the posterior vitreous (a); with the movement of the eye, the thread changed position (b).
past 6 years. The treatment was initiated with 0.5 mg/0.05 mL ranibizumab and then switched to 2 mg/0.05 mL aflibercept. Altogether, he had received 38 intravitreal injections. Last application was 7 weeks before deterioration of the vision, with no complications reported. Five years ago, he also had a similar event with SRH in the same eye, which was managed by intravitreal injection of tissue plasminogen activator (25 μg/0.1 mL) and 0.3 mL sulfur hexafluoride gas. Patient also had cataract surgery that was unremarkable 2 years prior. His left eye was blind as a consequence of absolute glaucoma for the last 3 years. On the day of presentation, before being referred to surgical retina for further treatment, the patient received intravitreal anti-VEGF injection (2 mg/0.05 mL aflibercept) at the medical retina service.

Due to dense SRH in the only functional eye, we decided to perform pars plana vitrectomy. During the surgery, we were able to touch the fiber IOFB with surgical instruments. When touched, the fiber showed to be soft, flexible, and relatively compact (shown in Fig. 2a). Given the white color, composition, and softness, our conclusion was that it was a cotton fiber thread. Identical material is an integral part of cotton swabs used to disinfect the conjunctiva with povidone iodine just before administering an intravitreal injection.

Intravitreal fiber foreign body was removed with the vitreous cutter, without showing any signs of rigidity (Fig. 2b). During the surgery, we administered subretinal tissue plasminogen activator (25 μg/0.1 mL), performed fluid/air exchange, and gas tamponade with 10% perfluoropropane gas. No complications were observed during or after the surgery. The patient was discharged home, with careful follow-up and an exact schedule for subsequent intravitreal anti-VEGF injections. Although exudative activity of the neovascular age-related macular degeneration was continuously observed at the follow-up examinations, 6 months after the surgery best-corrected visual acuity gradually improved to 20/125 on Snellen charts and stayed stable during the 2-year follow-up.

Discussion/Conclusion

Despite the widespread use of anti-VEGF intravitreal injections for treatment of retinal diseases, intravitreal foreign bodies associated with injections are very uncommon. Silicon oil droplets in the vitreous, originating from syringes used for intravitreal injections have been described [9, 10]. Another report described inert, translucent particles in the vitreous, possibly carbon microparticles that migrated into the bevacizumab ampule during the sealing process [11].
However, we have traced only two reports describing intravitreal fiber foreign bodies following intravitreal anti-VEGF injection [12, 13]. In the report of Cassar et al. a cotton fiber was observed in the vitreous after anti-VEGF injection. The supposed origin of the IOFB was a cotton bud, used to displace conjunctiva at the time of injection [12]. Al Bdour et al. [13] also reported a case of a patient who observed a floater 2 months after the intravitreal anti-VEGF injection. At the examination, a cotton fiber in the posterior vitreous was found. The authors stated that a specific source of the cotton fiber could not be determined, as it could have originated in any step of the procedure and then transferred into the vitreous with the needle during the injection [13]. No inflammation in the posterior segment was observed in either of cases.

Apart from deterioration of vision due to SRH, our patient had not experienced any symptoms related to intravitreal foreign body. We consider that the fiber was inserted into the vitreous during the last anti-VEGF injection, as it was not observed during any prior fundus examinations.

Intraoperative observation of the fiber demonstrated that the foreign body in the vitreous was most likely a cotton fiber. We found similar fibers in the cotton tip that is dipped in 5% povidone-iodine ophthalmic solution and applied on the site of injection just before the administration of intravitreal injection. They were not observed in any other surgical material used in the preparation of the injection site. We hypothesize that the cotton tip was the source of the foreign body. Other studies observing fiber foreign bodies also determined that the origin of fibers are most likely textiles used in the operating theater, such as cotton balls, sponges, scrubs, and draping materials [7, 8, 12–14]. Another report, however, mentioned patients’ own clothing as another possible source of fibers [14]. Analysis of fibers determined that most fibers are cotton, derived from cotton balls and gauzes that have high dust generation rates, and are routinely used during surgery [2, 8]. Elimination of cotton balls alone greatly reduced the number of observed cotton fiber foreign bodies in the anterior chamber after the cataract surgery [8].

Long-term follow-up of patients with retained cotton fiber foreign body in the anterior chamber showed no intraocular inflammation or other complications [2, 8, 15]. Cotton fibers are relatively inert and according to some authors the removal from the vitreous is not always necessary [7, 15]. However, since all IOFBs can potentially cause inflammation, we recommend caution and close monitoring of these patients. Particular care during the preparation of the operative field for intravitreal injection and selection of high-quality surgical materials are mandatory in avoiding such a complication.

**Statement of Ethics**

Written informed consent to publish the case report (medical case and images) was obtained from the participant. This report does not contain any personal information that could identify the patient. Ethical approval is not required for this study in accordance with national guidelines.

**Conflict of Interest Statement**

The authors have no possible conflicts of interest or financial disclosures.

**Funding Sources**

No funding received.
Author Contributions

All authors attest that they meet the current ICMJE criteria for Authorship. Fran Drnovšek: acquisition of data, writing. Xhevat Lumi: conception of work, surgery, writing.

Data Availability Statement

All data that support the findings of this case report are included in this article. Additional data was not included and is not publicly available on ethical grounds as it could reveal identity of the patient. Further inquiries can be directed to the corresponding author.

References

1. Loporchio D, Muklamala L, Gorukanti K, Zarbin M, Langer P, Bhagat N. Intraocular foreign bodies: a review. Surv Ophthalmol. 2016;61(5):582–96.
2. Yuen HKL, Lam RF, Kwong YYY, Rao SK, Lam BNM, Lam DSC. Retained presumed intraocular cotton fiber after cataract operation: long-term follow-up with in vivo confocal microscopy. J Cataract Refract Surg. 2005;31(8):1582–7.
3. Dunbar CM, Goble RR, Gregory DW, Church WC. Intraocular deposition of metallic fragments during phacoemulsification: possible causes and effects. Eye. 1995;9(4):434–6.
4. Islam N, Dabbagh A. Inert intraocular eyelash foreign body following phacoemulsification cataract surgery. Acta Ophthalmol Scand. 2006;84(3):432–4.
5. Selvan H, Gupta S, Gupta V. Retained intraocular surgical needle. Ophthalmology. 2019;126(8):1083.
6. Dunbar CM, Goble RR, Gregory DW, Church WC. Intraocular deposition of metallic fragments during phacoemulsification cataract surgery. Acta Ophthalmol Scand. 2006;84(3):432–4.
7. McPherson ZE, Jung-Yeon Ku J, Chong E, Amjadi S, Francis KE, Lauschke JL, et al. Fibres found in the eye during and after phacoemulsification cataract surgery. Eye. 2014;28(8):958–61.
8. Shimada H, Arai S, Kawamata M, Nakashizuka H, Hattori T, Yuzawa M. Frequency, source, and prevention of cotton fibers in the anterior chamber during cataract surgery. J Cataract Refract Surg. 2008;34(8):1389–92.
9. Kocabora MS, Ozbilen KT, Serefoglu K. Intravitreal silicone oil droplets following pegaptanib injection. Acta Ophthalmol. 2010;88(2):e44–5.
10. Freund KB, Laud K, Eandi CM, Spaide RF. Silicone oil droplets following intravitreal injection. Retina. 2006;26(6):701–3.
11. Venkatesh P, Chawla R, Shah B, Garg SP. Surprises during intravitreal drug delivery: a report of three cases. Digit J Ophthalmol. 2017;23(1):33–5.
12. Cassar J, Smith T, Kwan T. Intravitreal inoculation of cotton after bevacizumab (Avastin) injection. Arch Ophthalmol. 2012;130(1):126.
13. Al Bdeour MD, Ali ZR. Intravitreal foreign body following intravitreal anti-VEGF injection: a case report. Eye. 2014;28(2):244–5.
14. Pisani S. Fibres found during cataract surgery. Br J Perioper Nurs. 2004;14(11):508–4.
15. Peiffer RL, Safrit HD, White E, Eifrig DE. Intraocular response to cotton, collagen and cellulose in the rabbit. Ophthalmic Surg. 1983;14(7):582–7.