Effectiveness of Aflibercept in a Case of TASS-Associated Macular Edema

Handan Canan[1]

ABSTRACT

Toxic anterior segment syndrome (TASS) is an acute, non-infectious postoperative inflammatory reaction of the anterior segment of the eye, that usually develops 12-48 hours after intraocular surgery. Mostly, the inflammation is resolved with appropriate treatment within days or weeks, with a good outcome; however, infrequently complications such as permanent corneal edema, secondary glaucoma, and chronic macular edema can occur jeopardizing the visual outcome. The aim of this study is to present the clinical outcomes of intravitreal aflibercept injection in a case with macular edema associated with TASS.

Keywords: Macular edema, Toxic anterior segment syndrome.

INTRODUCTION

Toxic anterior segment syndrome (TASS) was first described by Monson at al. as an acute, noninfectious postoperative inflammatory reaction of the anterior segment of the eye developing within 12-24 hours after intraocular particularly cataract surgery[1]. The typical clinical signs are limbus-to-limbus corneal edema, fibrin in the anterior chamber and an irregular or fixed dilated pupil that does not respond to light[2,3]. Anterior vitreous opacities can rarely be seen. Ophthalmic instrument cleaning and sterilization processes and the products used in the surgery were most commonly reported to be associated with TASS[2,3]. The main treatment of TASS includes intense regimen of topical steroids. Subconjunctival steroid injection can be used for corneal edema that cannot be resolved with topical steroids[2-4]. In most cases, the inflammation is resolved with appropriate treatment within days or weeks and has a good outcome; but in some cases, complications such as permanent corneal edema, secondary glaucoma, and chronic macular edema can occur resulting in decreased vision[2-4]. The aim of this study is to report the clinical features and treatment outcome in a patient presenting with resistant macular edema associated with TASS.

CASE PRESENTATION

A 70-year-old Caucasian female was referred to our hospital with the diagnosis of TASS. The patient had undergone an uncomplicated phacoemulsification surgery in another clinic two weeks ago. She complained of decreased vision in the right eye from the first postoperative day and her visual acuity and corneal edema did not improve despite the following intensive medical treatment: dexamethasone (q1hr), moxifloxacin HCl (QID) eye drops for two weeks. She did not have any history of systemic diseases. Her best corrected visual acuity (BCVA) was hand motions in the right eye. The IOP was 15 mmHg under medication (fixed combination of topical dorzolamide HCl/timolol maleate (BID) and oral acetazolamide (QID)). Slit-lamp examination of the right eye revealed severe corneal edema extending from limbus to limbus, which obscured the anterior segment details. Diffuse corneal edema was depicted by anterior segment-optical coherence tomography (AS-OCT) (Optovue RTVue 100-2, Fremont, CA); central corneal thickness was 775 µm (Figure 1A). USG scan revealed no sign of vitreous inflammation. The patient's treatment regimen was rearranged. Moxifloxacin and dexamethasone were discontinued, and hourly prednisolone acetate eye drops (Pred-forte 1%; Allergan,

1- MD, FEBO, Professor, Baskent University Medical Faculty, Ophthalmology Department, Adana Teaching and Medical Research Center, Adana,Turkey

Received: 21.05.2020
Accepted: 23.09.2020

Ret-Vit 2021; 30:308-311

DOİ: 10.37845/ret.vit.2021.30.54

Correspondence Adress:
Handan Canan
Baskent University Medical Faculty, Ophthalmology Department, Adana Teaching and Medical Research Center, Adana,Turkey
Phone: +90 322 327 2727/2092
E-mail: handanakkaya@yahoo.com

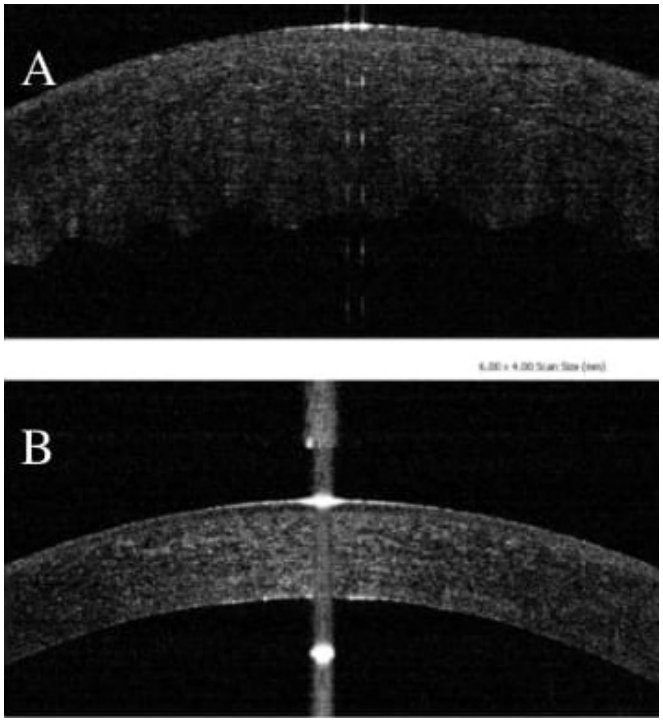

Figure 1: *Anterior-segment SD-OCT scan of the right eye.* **A)** *OCT image demonstrated severe corneal edema at initial presentation;* **B)** *Complete resolution of corneal edema after treatment.*

SD-OCT: Spectral domain optical coherence tomography

Irvine, CA, USA), topical NaCl 5% ophthalmic solution (TID), and artificial tear drops without preservatives (Artelac Complete, Bausch& Lomb, Berlin, Germany) (QID) were prescribed. The corneal edema gradually resolved in four weeks and the anterior chamber was silent. While CCT decreased to 558 µm in AS-OCT (Figure 1B), the patient's BCVA increased to 20/200 in the postoperative 6th week. The IOP was 18 mmHg under medication (fixed combination of topical dorzolamide HCl/timolol maleate). The fundus examination of the right eye revealed a small hypopigmented spot in the temporal of the macula and absent of foveal reflex (Figure 2 A). There were no inflammatory cells in the vitreous. Spectral-domain optical coherence tomography (SD-OCT) (Optovue RTVue 100-2, Fremont, CA) revealed macular edema (ME) and the central macular thickness (CMT) was 346µm (Figure 3 A). The fluorescein angiography (FA) of the right eye revealed mild hyperfluorescence in the early phase starting in the posterior pole (Figure 2 B) and cystoid ME with staining in the nasal aspect of the optic disc in the late phase (Figure 2 C). There was no sign of vasculitis. The left eye revealed normal angiographic features (Figure 2 D). Topical ketorolac tromethamine 0.5% solution (Acular; Pharm Allergan) (QID) was added and topical

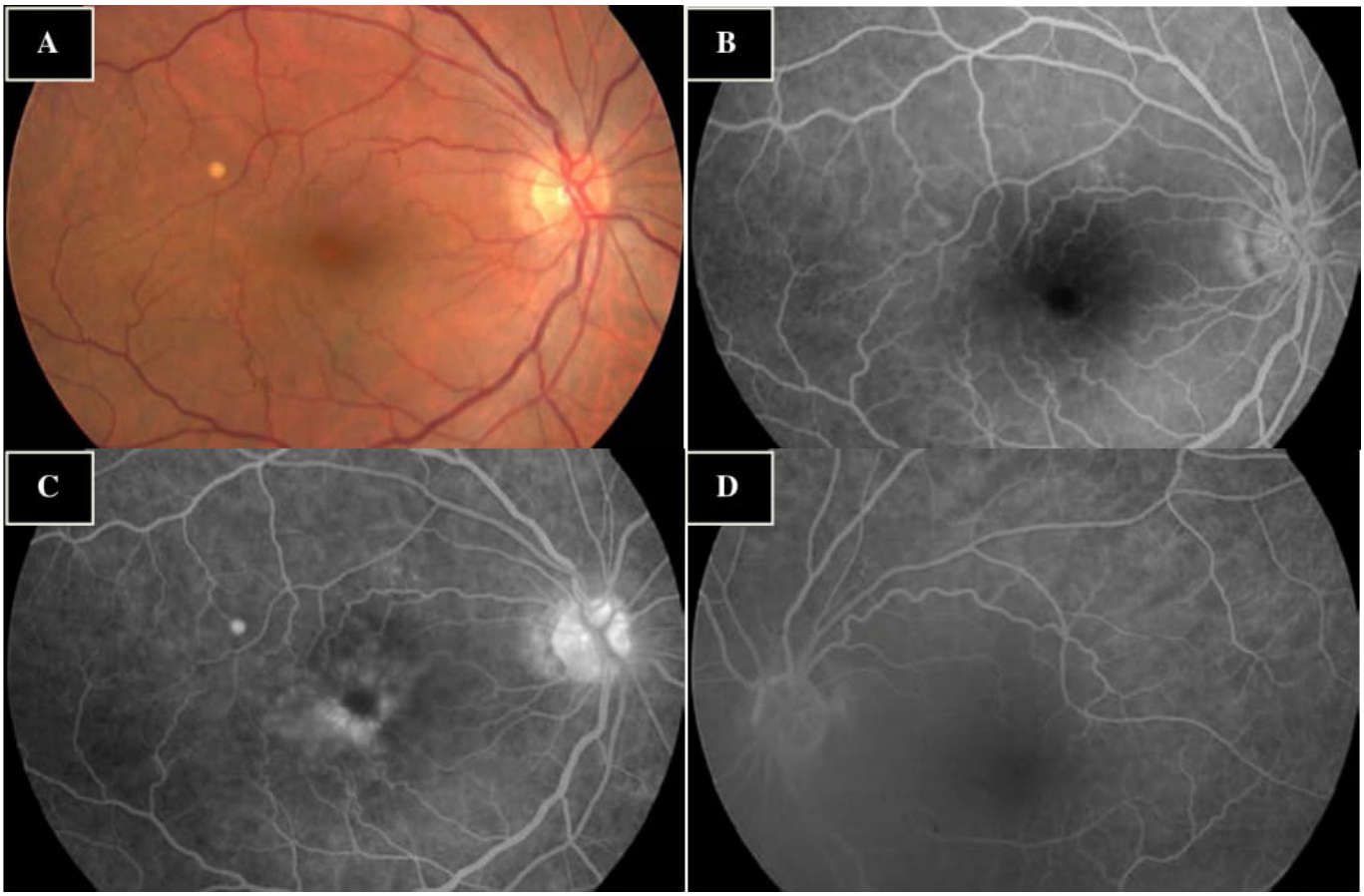

Figure 2: A) *Color fundus photo of the right eye*, **B)** *FA of the right eye, early-phase*, **C)** l*ate-phase* **D)** *FA of the left eye.*

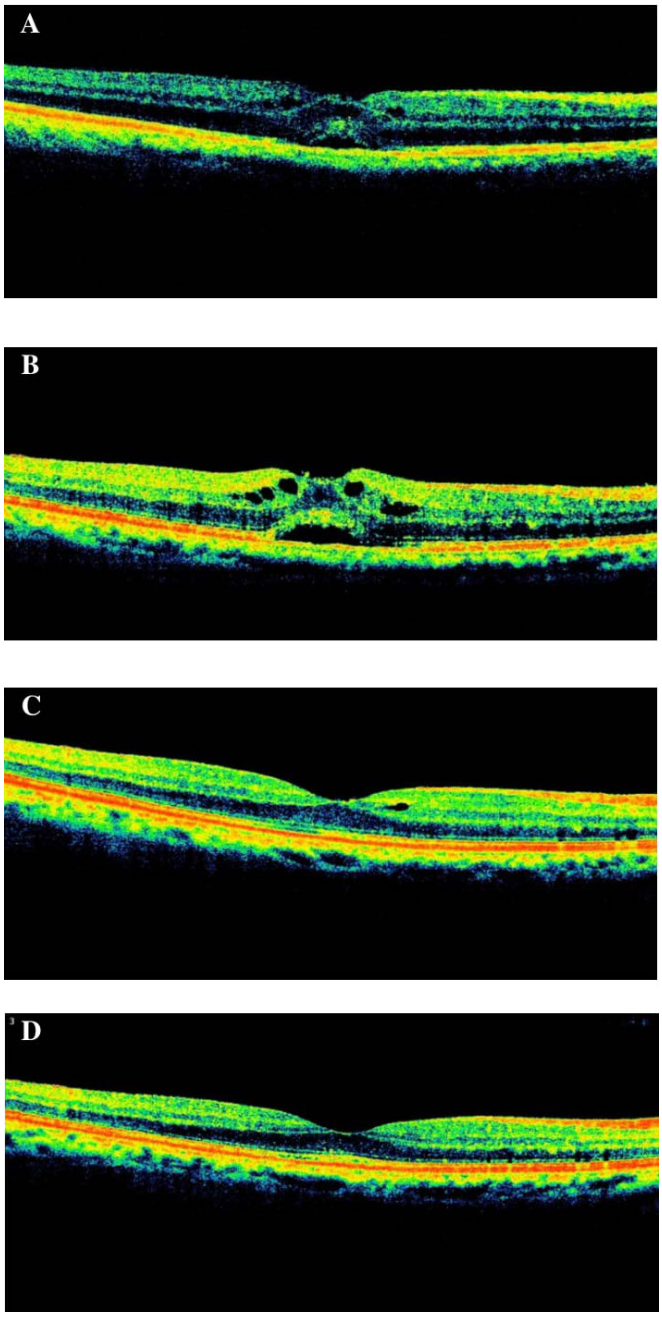

Figure 3*: Posterior segment SD-OCT scan of the right eye.* **A)** *OCT image revealed an increased CMT;* **B)** *After medical treatment, the CMT was 419 µm with intraretinal cystoid macular edema and subfoveal fluid;* **C)** *OCT image showed CME was resolved after three consecutive intravitreal injections of aflibercept;* **D)** *At one-year follow-up, CMT was 277 µm with normal foveal contour.*

SD-OCT: Spectral domain optical coherence tomography; **CCT:** Central corneal thickness; **CMT:** Central macular thickness; **CME:** Cystoid macular edema; **FA:** Fluorescein angiography.

NaCl drops were discontinued. In addition, a sub-Tenon's injection of triamcinolone acetonide was performed. At the visit six weeks later, which was the 3rd month following cataract surgery, macular edema was increased, SD-OCT revealed a CMT of 419 µm (Figure 3 B). Since the ME was resistant to treatment, intravitreal aflibercept (Eylea; Bayer HealthCare, Berlin, Germany) injection was recommended. Intravitreal anti-VEGF therapy was preferred instead of intravitreal corticosteroid due to risk of intraocular pressure elevation. After obtaining an informed consent, she was treated with three consecutive monthly intravitreal injections of aflibercept (2 mg/0.5 mL). Following after the third injection BCVA increased to 20/30; the SD-OCT scan showed resolution of ME and CMT decreased to 283µm at the postoperative 6th-month visit. However, there was a small intraretinal cyst with a slight deterioration in the ellipsoid zone (Figure 3 C). No side effects were seen or no recurrence was observed during the one-year follow-up period. Her BCVA was 20/30 and CMT was 277 µm (Figure 3 D).

DISCUSSION

The incidence of TASS following phacoemulsification surgery was reported to be 0.1-2%.[2] Vision-threatening complications such as permanent corneal edema, secondary glaucoma and chronic macular edema can be seen as the consequences of TASS.[2-4]

Based on the literature review, macular edema secondary to TASS is a rarely seen condition and is considerably caused by a mechanism triggered by the severe inflammation, as in Irvine-Gass syndrome (pseudophakic cystoid ME). Several potential mechanisms were concerned in the pathogenesis Irvine-Gass syndrome.[5,6] However, release of inflammatory mediators (such as prostaglandins, complement components, cytokines, and VEGF), increased retinal capillary permeability and disruption of the blood-retina barrier appear to be the major factors[5-8]. The ME was reported to resolve spontaneously in most of the cases. Topical non-steroidal anti-inflammatory drugs (NSAIDs) and corticosteroids are commonly used in the first-line treatment of Irvine-Gass; however, refractory ME cases that did not respond to therapy were reported[6-8]. Although there is no standard treatment regimen for the management of refractory ME cases, periocular and/or intravitreal corticosteroids and anti-VEGF treatment have been shown to be effective[5-9]. On the other hand, intravitreal steroid injections bear the risk of intraocular pressure rise[5,8,9]. To the best of our knowledge, there is a small number of TASS-associated macular edema cases reported in the current literature[10,11]. Data regarding treatment was available for only one of these cases. Ugurbas et al reported that the patient responded well to intravitreal triamcinolone injection[11].

In this current case, ME developed due to severe inflammation was unresponsive to previous treatment with

NSAIDs and topical and periocular steroids. Therefore, it was decided to administer intravitreal injection; corticosteroids were avoided due to a risk of intraocular pressure rise. Studies showed that anti-VEGF agents are useful in the treatment of macular edema secondary to various retinal diseases[6,8,12]. The significant improvement in BCVA was observed after three consecutive monthly injections. The CMT decreased from 419 µm at baseline to 277 µm. In the follow-up, permanent regression of CME and increased visual acuity were achieved without additional treatment. OCT provides important information about retinal microstructure change as well as macular thickness[5,13,14]. The chronicity and severity of CME might cause permanent changes in the photoreceptor layer, and therefore low visual acuity. Previous studies showed that the structural changes in the photoreceptor layer (particularly photoreceptor inner and outer segments -ellipsoid zone-) and the external limiting membrane is helpful in predicting the final visual outcome in macular diseases. [13,14] Hunter et al. reported that persistent anatomic alteration of photoreceptors defined by OCT correlated with reduced BCVA in patients with pseudophakic CME. [14] In this case report, the patient's BCVA did not return to 20/20 despite resolution of the CME. It was thought that disruption to ellipsoid zone might have a negative effect on visual acuity.

CONCLUSION

Based on the review of the literature, this is the first case that TASS-related macular edema which was treated with intravitreal aflibercept injection. In conclusion, intravitreal injection of aflibercept was found to be an effective and safe therapy for the treatment of ME associated with TASS. It may be a valuable, alternative treatment of refractory ME especially in patients who have the risk of IOP rise. However further studies are needed to confirm these findings.

REFERENCES

1. Monson MC, Mamalis N, Olson RJ. Toxic anterior segment inflammation following cataract surgery. J Cataract Refract Surg. 1992;18:184-9.
2. Shouchane-Blum K, Dotan A, Bahar I. The evolution of toxic anterior segment syndrome. Curr Opin Ophthalmol. 2019;30:50-5.
3. Park CY, Lee JK, Chuck RS. Toxic anterior segment syndrome-an updated review. BMC Ophthalmol. 2018 ;18:276.
4. Sızmaz S, Küçükerdönmez C, Çetinkaya A, et al. A New Potential Cause in the Development of Toxic Anterior Segment Syndrome: Fibrin Glue .Turk J Ophthalmol 2014; 44: 280-3. doi: 10.4274/tjo.69885.
5. Zur D, Fischer N, Tufail A, et al. Postsurgical cystoid macular edema. Eur J Ophthalmol. 2011;21 Suppl6:S62-8. doi: 10.5301/EJO.2010.6058
6. Arevalo JF, Maia M, Garcia-Amaris RA, et al; Pan-American Collaborative Retina Study Group. Intravitreal bevacizumab for refractory pseudophakic cystoid macular edema: the Pan-American Collaborative Retina Study Group results. Ophthalmology. 2009;116:1481-7.
7. Lin CJ, Tsai YY. Use of aflibercept for the management of refractory pseudophakic macular edema in Irvine-Gass syndrome and literature review. Retin Cases Brief Rep. 2018;12:59-62.
8. Guo S, Patel S, Baumrind B, et al. Management of pseudophakic cystoid macular edema. Surv Ophthalmol. 2015;60:123-37.
9. Bellocq D, Korobelnik JF, Burillon C, et al. Effectiveness and safety of dexamethasone implants for post-surgical macular oedema including Irvine-Gass syndrome: the EPISODIC study. Br J Ophthalmol. 2015 Jul;99:979-83.
10. Sengupta S, Chang DF, Gandhi R, et al. Incidence and long-term outcomes of toxic anterior segment syndrome at Aravind Eye Hospital. J Cataract Refract Surg. 2011;37:1673-8.
11. Ugurbas SC, Akova YA. Toxic anterior segment syndrome presenting as isolated cystoid macular edema after removal of entrapped ophthalmic ointment. Cutan Ocul Toxicol. 2010;29:221-3.
12. Pham B, Thomas SM, Lillie E, et al. Anti-vascular endothelial growth factor treatment for retinal conditions: a systematic review and meta-analysis. BMJ Open. 2019;9:e022031.
13. Ian Y Wong, Lawrence P Iu, Hideki Koizumi et al. The inner segment/outer segment junction: what have we learnt so far?. Curr Opin Ophthalmol. 2012;23:210-8.
14. Allan A Hunter, Sara P Modjtahedi, Kuumba Long,et al. Improving visual outcomes by preserving outer retina morphology in eyes with resolved pseudophakic cystoid macular edema. J Cataract Refract Surg. 2014;40:626-31.