

Optical coherence tomography evaluation of macular edema after intravitreal triamcinolone acetonide in patients with parafoveal telangiectasis

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PURPOSE. *Parafoveal telangiectasis (PT) is a developmental or acquired microvascular abnormality of the macula. Leakage of the abnormal parafoveal capillaries leads to macular edema with subsequent decrease in visual acuity. Intravitreal triamcinolone acetonide is recently widely used in the management of intraocular proliferative, edematous, and neovascular diseases.*

METHODS. *This report presents the evaluation of three cases with PT in whom intravitreal triamcinolone acetonide (IVTA) injection was performed. Fundus fluorescein angiography (FA) and optical coherence tomography (OCT) were used in follow-up of the patients.*

RESULTS. *Following pars plana intravitreal injection of 4 mg of triamcinolone acetonide, the patients had angiographic improvement of the macular edema and minimal decrease in retinal thickness on OCT, accompanied by improvement in visual acuity and subjective visual assessment.*

CONCLUSIONS. *The results of the present study on parafoveal capillary telangiectasis suggest that the intravitreal injection of triamcinolone acetonide may be a therapeutic option to increase visual acuity and decrease vascular leakage on FA. Following IVTA procedure, follow-up of these patients with both OCT and FA is important for correct clinical evaluation. Future studies on this method seem to be warranted. (Eur J Ophthalmol 2006; 16: 711-7)*

KEY WORDS. *Parafoveal telangiectasis, IVTA, OCT*

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INTRODUCTION

Parafoveal telangiectasis (PT) is a microvascular abnormality of the macula. This may be developmental or acquired. On the basis of its ophthalmoscopic and fluorescein angiographic features, Gass classified the disease into three groups.

Bilateral gradual visual loss is thought to be due to the leakage of the abnormal retinal capillaries in the parafoveal region, which in turn causes macular edema

(1). No definitive treatment of the disease has been known until now. Treatment with argon laser photocoagulation (ALPC) (2) and photodynamic therapy (PDT) (3) have been proposed and studied in the past with disappointing results.

In patients with intraocular proliferative, edematous, and neovascular diseases, intravitreal triamcinolone acetonide (IVTA) injection has increasingly been used recently (4, 5). It is theorized that IVTA injection could be helpful in the management of PT and decreases angiographic ede-

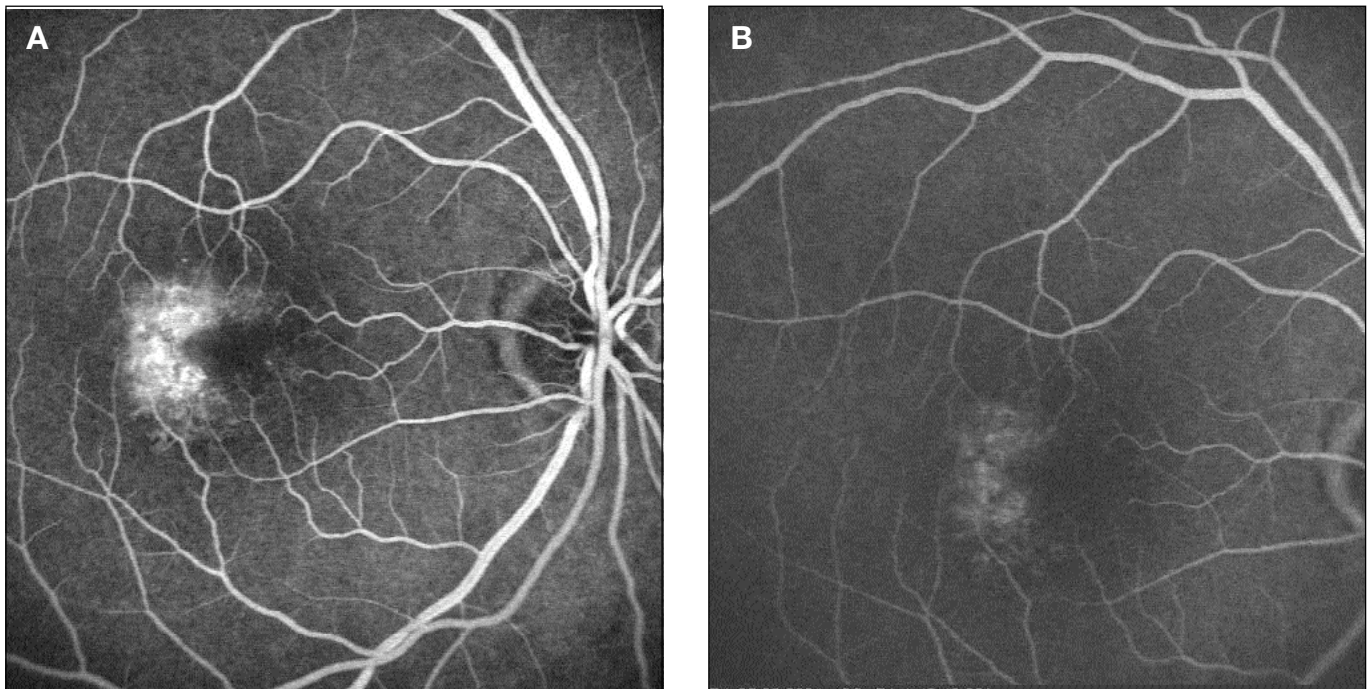


Fig. 1 - Preoperative (A) and postoperative (B) fundus fluorescein angiographies of Case 1.

ma. In this report, we present the evaluation of the management of PT by fundus fluorescein angiography (FA) and optical coherence tomography (OCT) in three patients with PT type 2A in whom IVTA injection was performed.

METHODS

The cases were admitted with decreased visual acuity. Full ophthalmologic examination was carried out. By means of FA and OCT, macular edema due to PT was demonstrated and IVTA injection was performed.

The technique used for IVTA procedure was as follows. Following proparacaine drops and 10% Betadine solution instillation into the conjunctival sac, 2% subconjunctival lidocaine was used for anesthesia. Four milligrams (0.1 mL) of triamcinolone acetonide suspension (Kenakort®-A, Bristol-Myers Squibb) was injected through the pars plana into the vitreous cavity using a 30-gauge hypodermic needle.

Postoperatively, patients were followed up on the first day, first week, and first, second, third, and sixth months. In control examinations, full ophthalmologic examination with FA and OCT was done and the regression of the macular edema with accompanying increase in visual acuity was followed up.

RESULTS

Case 1

A 65-year-old woman with 10-year duration of systemic hypertension (HT) but no history of diabetes mellitus (DM) presented with a bilateral decrease in visual acuity for 6 months. Her hemogram, sedimentation rates, and biochemistry were within normal limits, except for the abnormally high triglyceride level (402 mg/dL). Grid laser photocoagulation was applied to her left eye 2 years ago and to her right eye 1 year ago, for the treatment of cystoid macular edema due to PT.

Her best-corrected visual acuity (BCVA) was 0.5 in the right eye (OD) and 0.6 in the left (OS) in Snellen lines. Her intraocular pressures (IOP) were within normal limits. Funduscopy revealed microaneurysmal lesions concentrated on the temporal side of the parafoveal region in both eyes in addition to the grid laser photocoagulation spots on the right macula and nasally on the left macula. In her left eye, parafoveal region was edematous.

FA revealed bilateral dilated parafoveal capillaries with profuse petaloid late dye leakage and angiographic macular edema, and on the left eye, localized pigment hyperplasia nasal to the fovea (Fig. 1A). By OCT, parafoveal retinal thickness (PRT)/parafoveal macular volumetric

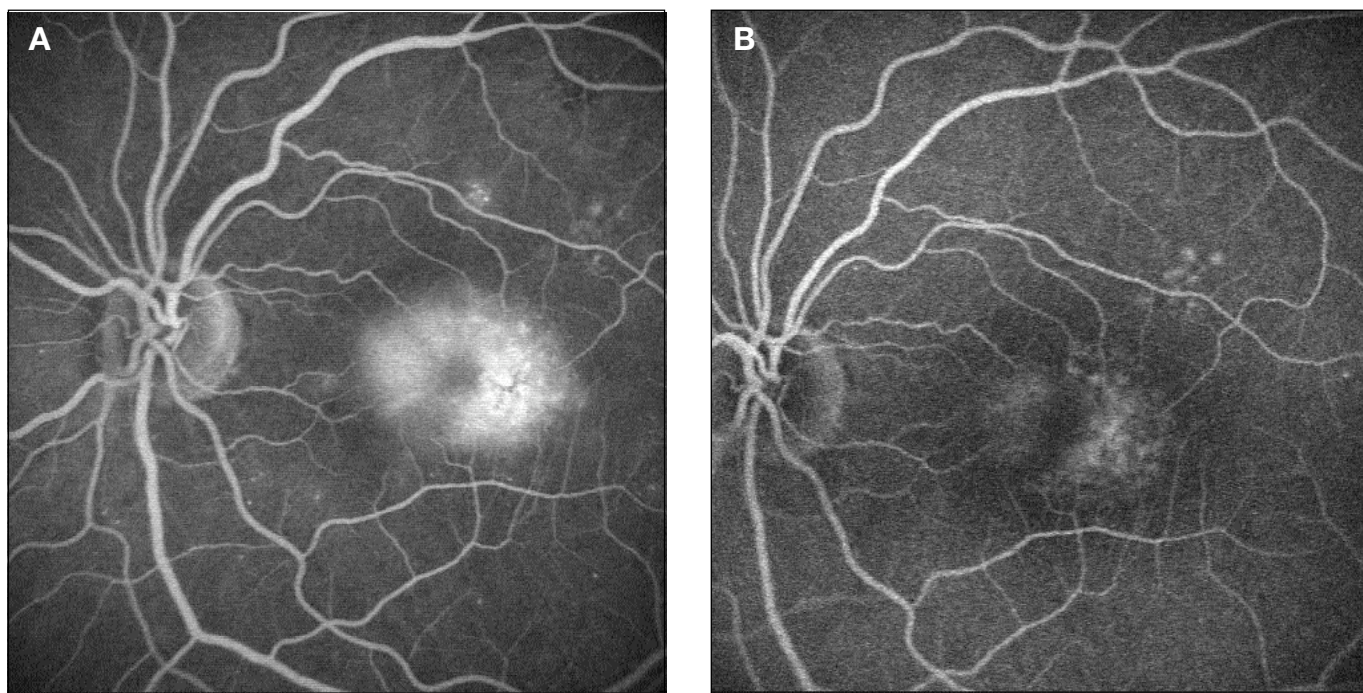


Fig. 2 - Preoperative (A) and postoperative (B) fundus fluorescein angiographies of Case 3.

average (PMVA) of $149 \mu/0.12 \text{ mm}^3$ and $176 \mu/0.13 \text{ mm}^3$ were found on the right and left eyes, respectively.

On May 17, 2004, IVTA injection was performed in her right eye. Postoperatively, her visual acuity increased to 0.8 Snellen lines and PRT/PMVA measurements by OCT showed gradual decrease in macular thickness: $145 \mu/0.12 \text{ mm}^3$ on the fourth day, $136 \mu/0.11 \text{ mm}^3$ on the 15th day, $131 \mu/0.10 \text{ mm}^3$ on the second month, $142 \mu/0.11 \text{ mm}^3$ on the third month. On the first month, FA demonstrated significant decrease in the amount of macular leakage (Fig. 1B).

On the postoperative sixth month, her visual acuity was stabilized at 0.8 Snellen lines, and OCT revealed PRT/PMVA of $164 \mu/0.12 \text{ mm}^3$ on the right eye.

Case 2

A 75-year-old woman presented with bilateral progressive decrease in visual acuity in the last 15 years. She had laser photocoagulation in her left eye 13 years ago. Her medical history did not reveal DM or HT.

Her visual acuity was 0.2 OD and finger counting from 1 meter (1 mfc) OS. Her IOPs were within normal limits. Funduscopy revealed cystoid macular edema and PE alterations on the right eye, laser photocoagulation spots on the left eye. FA revealed right macular diffuse leakage,

left macular grid laser photocoagulation spots besides hyperfluorescence due to pigment epithelial window defects.

In April 2003, she underwent bilateral cataract extraction and posterior chamber in-the-bag intraocular lens implantation. Postoperatively, her visual acuities were 0.2 OD and 0.05 OS. FA revealed right macular cystoid macular edema and peripheral diffuse vascular leakage which was increased compared to the previous FA. Bilateral peribulbar 40 mg triamcinolone acetonide (Kenakort®-A) injection was performed. Her visual acuities did not change and macular edema in the left eye persisted.

On April 19, 2004, FA showed late hyperfluorescence due to leakage from the capillary telangiectasis and cystoid macular edema in the right eye, and laser photocoagulation scars on the left macula. PRT/PMVA was $341 \mu/0.26 \text{ mm}^3$ and $271 \mu/0.23 \text{ mm}^3$ by OCT, on the right and left eyes, respectively.

On April 20, 2004, IVTA injection was performed on the right eye. Postoperatively, OCT revealed PRT/PMVA of $326 \mu/0.26 \text{ mm}^3$ on the second day, $316 \mu/0.25 \text{ mm}^3$ on the ninth day, $321 \mu/0.24 \text{ mm}^3$ on the first month, and $370 \mu/0.29 \text{ mm}^3$ on the second month with concomitant taut posterior hyaloid. Her visual acuity improved to 0.3 at the first month, but later on, stabilized at 0.2 level.

FA on May 15, 2004, showed leakage from right

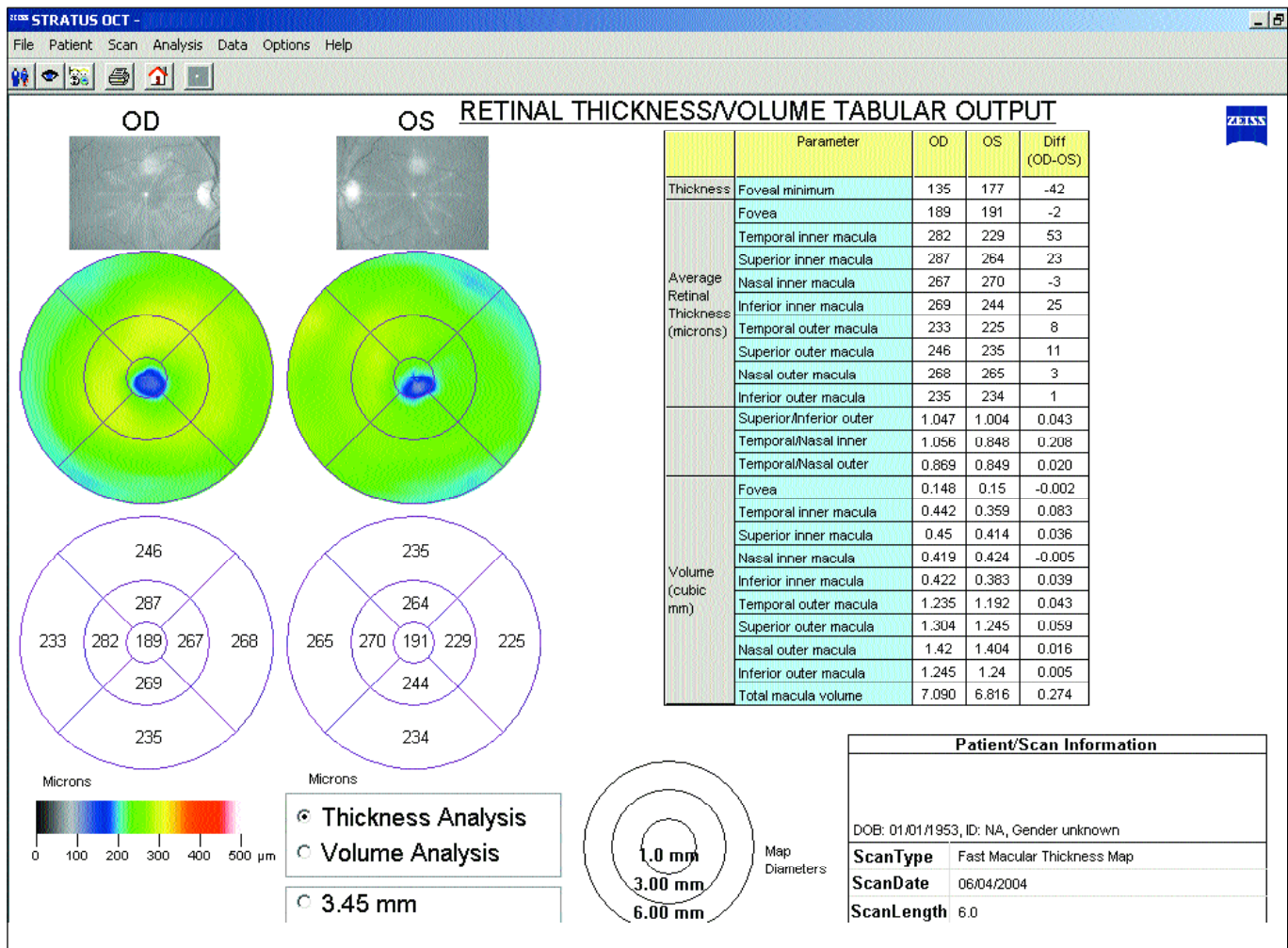


Fig. 3A - Preoperative optical coherence tomography images of Case 3.

parafoveolar capillary telangiectasias, which was significantly decreased compared with the previous FAs.

On August 9, 2004, the patient was referred for recurrence of the disturbance in visual acuity, which was 0.2 OD that time. She was diagnosed with right epiretinal membrane and taut posterior hyaloid; she underwent pars plana vitrectomy. Four months postoperatively, her visual acuities were 0.2 OD and 1.5 mfc OS. OCT revealed PRT/PMVA of 331 μ /0.26 mm³ OD; the central macular thickness was 186 μ with atrophic fovea.

Case 3

A 47-year-old man with a 10-year history of DM type II had decreased visual acuity in his left eye for 1 year. His BCVA were 1.0 OD and 0.6 OS. His blood glucose level

was regulated in the range of 120 to 180 mg/dL.

Slit lamp examination was normal in both eyes. IOPs were within normal limits. On ophthalmoscopy, there were microaneurysmal lesions concentrated on the temporal side of the parafoveal region on the right eye, whereas on the left eye cystoid macular edema and peripherally located hard exudates were noted.

He was diagnosed with background diabetic retinopathy. FA showed leakage from the parafoveolar capillaries, besides hyperfluorescence due to microaneurysms and hypofluorescence due to hard exudates peripheral to the macula (Fig. 2A).

On June 18, 2003, grid and focal laser photocoagulation on the temporal regions of the left macula were performed (100 μ spot size, 0.1 sec, 140 mW, 30 spots). At the control visit 1 month later, his visual acuity in the left

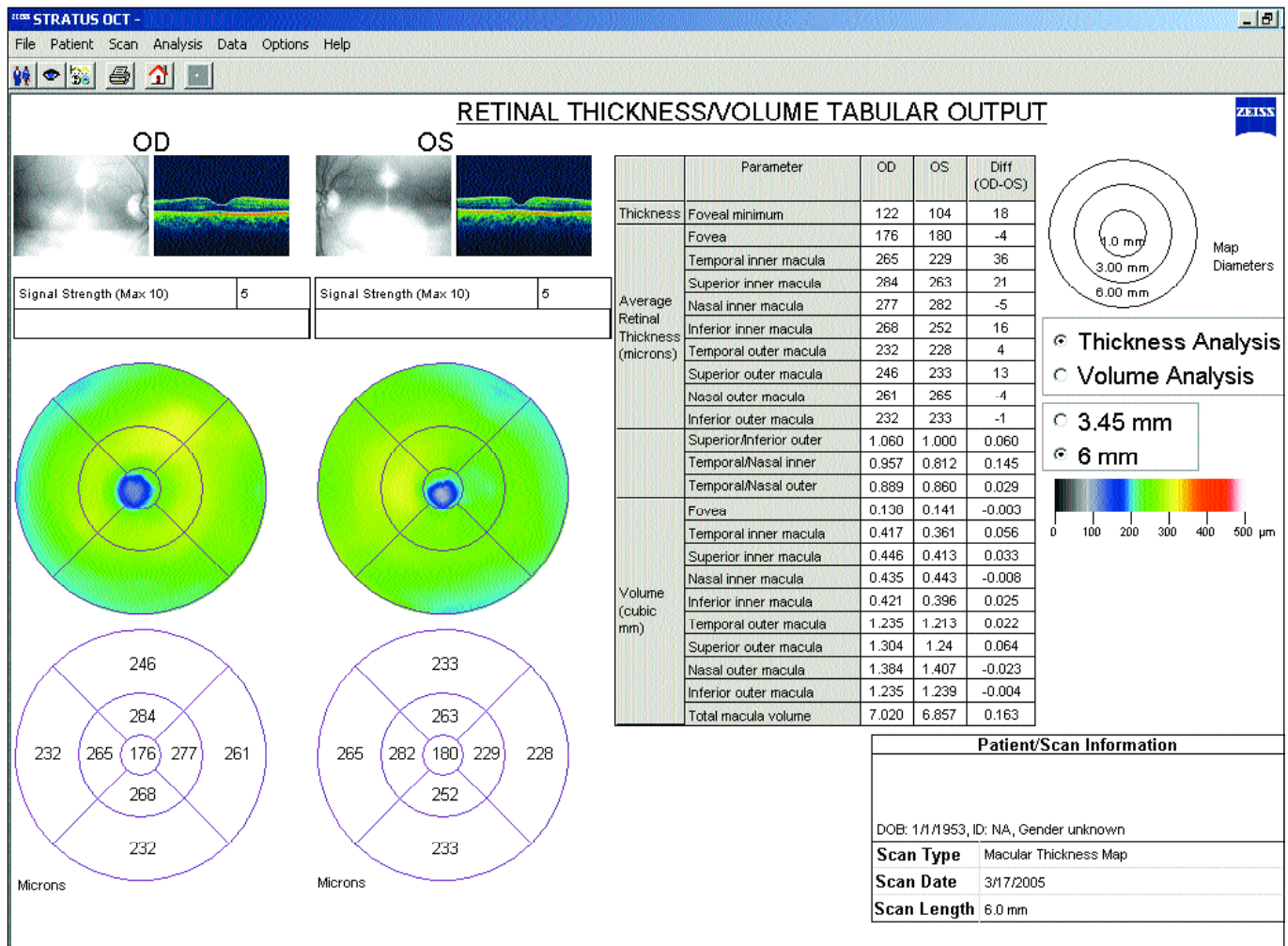


Fig. 3B - Postoperative optical coherence tomography images of Case 3.

eye was 0.7 Snellen lines.

One year later, the patient returned with decrease in visual acuity in his left eye. His BCVA was 0.6 OS. On OCT, PRT/PMVA was 189 μ/0.14 mm³ OD and 191 μ/0.15 mm³ OS (Fig. 3A).

On June 7, 2004, IVTA injection to the left eye was performed. Postoperatively the BCVA improved to 0.8 OS. IOP was 23 mmHg, therefore beta blocker medication (Carteolol®, bid) was started. On the postoperative first day, OCT revealed PRT/PMVA of 183 μ/0.18 mm³, on the eighth day 163 μ/0.13 mm³, and on the first month 157 μ/0.13 mm³.

At the last follow-up, 9 months after IVTA injection, his BCVA was 0.5 OS with late capillary leakage temporally to the fovea on FA (Fig. 2B). OCT revealed PRT/PMVA of 180 μ/0.14 mm³ (Fig. 3B) and re-IVTA injection was planned.

DISCUSSION

Parafoveal capillary telangiectasis is a disease that causes reduction in visual acuity by the telangiectatic dilatation of the parafoveal capillaries and leakage from these vessels.

All three cases in our series were classified as Group 2A, idiopathic perifoveal telangiectasis, due to their fluorescein angiographic findings. They were also associated with minimal macular edema on biomicroscopy (6, 7).

Diabetic retinopathy is the abnormality most likely to be confused with primary juxtafoveolar retinal telangiectasis (8). Therefore, glucose tolerance testing should be considered in all patients with retinal telangiectasis. One of our patients was diagnosed with overt diabetes mellitus, which could represent the association between the two diseases.

Idiopathic juxtafoveal telangiectasia was reported to be associated with lamellar macular hole (9). In our series, one of the cases had impending hole with taut hyaloid, which required subsequent PPV.

Many different treatment modalities have been tried in the management of PT, but still, an efficient treatment modality could not be found. Various treatment alternatives were tried for PT including grid laser treatment (2) and photodynamic therapy (3, 10).

Corticosteroids have been used in ophthalmology for the reduction of intraocular inflammation or prevention of vascular leakage by stabilization of the blood-retina barrier. Intravitreal applications of steroids recently gained popularity, in order to prevent systemic adverse effects and achieve high concentrations locally (11). Previous studies had demonstrated that iatrogenic intraocular application of corticosteroids does not have toxic effects (12-14).

Intravitreal injection of triamcinolone has increasingly been used in previous studies for treatment of intraocular proliferative, edematous, and neovascular diseases, including diabetic macular edema (15), uveitis-related cystoid macular edema (16), and idiopathic juxtafoveal telangiectasis. It is theorized that it could be helpful in PT. Previously, two other reports also showed the beneficial effects of IVTA in these patients (17, 18).

OCT is a reliable diagnostic method that displays the thickness and edema in the macula by using low coherent light in the 810 nm wavelength to display two dimensional sections of the retina in high resolution (19). On the other hand, FA is routinely used in the edematous and neovascular diseases of the retina for the detection of leakage. In our case series with PT, we evaluated the efficiency of IVTA injection by OCT and FA.

According to our clinical observations, although PT created prominent angiographic macular edema, increase in macular thickness in OCT was not correlated with this edema. IVTA injection caused minimal decrease in PMVA, which indicates minimal decrease in central macular thickness; however, in FA, leakage from telangiectatic vessels decreased significantly. In the first and third cases, significant decrease in hyperfluorescence in FA in the paramacular region following IVTA injection was detected. PRT/PMVA in OCT decreased from 146 μ /0.12 mm³ and 191 μ /0.15 mm³ to 131 μ /0.10 mm³ and 157 μ /0.13 mm³ in the first and third case, respectively, following IVTA injection. We did not detect volumetric change as it is frequently seen in diabetic macular edema, since the preoperative macular thicknesses were not greater than 300 μ m

as in DME. In Case 2, there was concomitant diabetic retinopathy with taut posterior hyaloid. Following IVTA injection, angiographic leakage was less and the macular thickness decreased from 341 μ to 321 μ in the postoperative first month, however, it increased to 370 μ in the second month. In this case, the edema was thought to be the effect of mechanical traction and in order to relieve mechanical traction, PPV and posterior hyaloid peeling was performed.

Following pars plana intravitreal injection of 4 mg of triamcinolone acetonide, our patients had angiographic improvement of the macular edema and minimal decrease in retinal thickness on OCT, accompanied by improvement in visual acuity and subjective visual assessment (BCVA increased from 0.5 to 0.8 in the first case, from 0.6 to 0.8 in the third case, and it was stabilized at 0.2 Snellen lines in the second case). Additionally, following IVTA procedure, follow-up of these patients with both OCT and FA is important for the correct clinical evaluation.

The results of the present study on parafoveal capillary telangiectasis suggest that the intravitreal injection of triamcinolone acetonide may be a therapeutic option to increase visual acuity and decrease vascular leakage on FA. Future studies on this method seem to be warranted.

None of the authors has any financial or proprietary interest in this study.

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