

The effect of a single intravitreal implantation of dexamethasone on the fellow eye in bilateral non-infectious uveitis – case report

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Abstract. – OBJECTIVE: To present the influence of dexamethasone intravitreal implant due to macular edema in non-infectious uveitis in the fellow eye.

PATIENTS AND METHODS: A 25-year-old patient with a long history of juvenile arthritis with concomitant recurrent bilateral uveitis, complicated with increases of intraocular pressure and macular edema was treated with a single intravitreal dexamethasone implant into the eye with lower visual acuity.

RESULTS: During a 36-month follow-up, the patient's bilateral visual acuity improved. The retinal thickness in both maculae decreased.

CONCLUSIONS: Treating macular edema in the course of recurrent uveitis accompanying a systemic disease with dexamethasone depot in vitreous may play a beneficial role also in the fellow eye, when affected. This therapeutic effect in the fellow eye may suggest that the medication can penetrate into the circulatory system and reach such other organs as the fellow eye.

Key Words:

Fellow eye, Intravitreal dexamethasone implant, Juvenile arthritis, Macular edema, Uveitis.

Introduction

Chronic uveitis leads to numerous complications and it is responsible for 2.8-15% of cases of significantly decreased visual acuity (VA), including blindness. One of the most severe complications is the cystoid macular edema (CMO)^{1,2}.

Long-term inflammation processes in the uvea damage the outer and inner blood-retinal barriers, which in turn leads to the migration of inflammatory cells. Macular edema results from the impairment in the retinal pigment epithelium (RPE) (fluid accumulates in the outer plexiform layer of the macula) and the damage in the endothelium of the retinal vessels. Patent edema leads to the formation of cysts, which in turn re-

sults in significantly decreased visual acuity and even loss of central vision. It is often accompanied by the presence of an epiretinal membrane (ERM)³.

Standard treatment of this complication includes topical administration of steroid and non-steroid anti-inflammatory drugs and systemic treatment involving broadly-understood immunosuppression (steroid therapy, immunosuppression), which is associated with a risk of numerous systemic adverse effects.

Introducing a therapy, which uses intravitreal implants of 0.7 mg dexamethasone depot (Ozurdex[®], Allergan) in the treatment of CMO, may constitute an alternative to systemic treatment. The implant is injected into the vitreous, where it releases dexamethasone from the biodegradable matrix during a 6-month period. The maximal drug concentration in vitreous is observed at 2-3 months after the initial treatment.

Complications are possible due to dexamethasone (intraocular pressure increases, lens opalescence) and/or the injection into the vitreous (a mechanical damage of ocular structures).

Case Presentation

A 25-year-old male patient presented at the Department of Ophthalmology of the Medical University of Warsaw in January 2012 due to blurred vision in both eyes. Starting in 2004, when bilateral uveitis was diagnosed, the recurrences complicated with macular edema and periodic increases in intraocular pressure (IOP) in both eyes: in the right eye (RE) up to 34 mmHg and in the left eye (LE) up to 30 mm Hg had been observed. He was treated with topical eye drops (steroids, non steroid anti-inflammatory drugs, mydriatics) with short and limited efficacy. When IOP elevated, he received topical beta blockers, carbonic anhydrase inhibitors and even systemic carbonic anhydrase drugs with good results.

Juvenile arthritis — multiarticular form, not responding to biologic treatment with adalimumab, was diagnosed in 2000. Since 2011, the patient has been receiving etanercept at the dose of 50 mg/week and the remission has been achieved.

Ophthalmic examination at admission with best-corrected visual acuity (BCVA):

VA RE = 7/10 – 1.0 Dsph VA LE = 5/10 – 1.0 Dsph
 IOP RE = 16 mmHg IOP LE = 10 mmHg

Ophthalmic examination revealed mild flare in the anterior chambers in both eyes (RE < LE), posterior synechies, lenses opacity and mild flare in vitreous. Optic discs were unchanged and vessels appeared normal. In maculae thin mild cellophane maculopathy was observed. Fluorescein angiography (FA) revealed changes typical of CMO and leakage within optic discs. Optical coherence tomography (OCT) in both eyes revealed thickening, cystoid and spongy edema within the maculae as well as a very thin epiretinal membrane (ERM).

In addition, as a part of qualification for drug administration, a diurnal IOP was taken. The results in the RE: 13-22 mmHg and in the LE: 12-18 mmHg, while applying topical hypotensive treatment (dorzolamid) in both eyes. The LE was qualified to intravitreal dexamethasone implantation due to lower visual acuity. The drug was administered in July 2012 into the LE. Three and a half months (15 weeks) following the injection, the BCVA in both eyes (LE from 5/10 to 7/10, RE from 7/10 to 9/10) improved. OCT revealed decreased retinal thickness in the LE and the RE (fellow eye).

Subsequent follow-up ophthalmic examinations of both eyes revealed subsiding of flare in the anterior chamber and in the vitreous.

BCVA in both eyes in the 5th month after injection gained 10/10 and has not deteriorated until now.

The long-term results in BCVA and OCT in both eyes before and after dexamethasone implantation into LE is show in Table I.

Figure 1 depicts OCT scans of bilaterally subsiding macular edema on the 14th week and 5th, 12th, 24th, 32nd, 36th months after dexamethasone injection into the LE.

Figure 2 shows the resultant improvement seen in FA in both maculae after dexamethasone implantation into the LE in the 12, 32 month of the follow-up.

During 36 months of follow-up, no increases in IOP were observed. IOP in the ranged from 8 to 15 mmHg while in the RE from 10 to 14 mmHg, corrected by central corneal thickness (CCT): RE 569 μm (–1.0 mmHg), LE 584 μm (–3.0 mmHg).

Additional examinations: GDx and Frequency Doubling Technology (FDT) perimetry did not reveal any signs of glaucomatous damage to the optic nerves.

Discussion

In the observed case of a 25-year-old male patient with chronic, recurrent uveitis and increases of IOP of both eyes (stable after topical treatment) before our treatment, after one dexamethasone implantation (Ozurdex®, Allergan) into the vitreous of the LE, the following results were observed: bilateral improvement of VA, subsiding of inflammatory process in the anterior segment and in the vitreous, as well as a decrease in retinal thickness in the maculae.

The patient has been treated for 14 years due to juvenile arthritis. Because of these, he has re-

Table I. Summarized results in BCVA and OCT in both eyes before and after single dexamethasone implantation into LE.

Eye		Before implantation	3.5 months after implant.	5 months after implant.	12 months after implant.	32 months after implant.	36 months after implant.
Treated LE	BCVA	5/10	7/10	10/10	10/10	10/10	10/10
	CST (μm)	341	272	273	260	253	250
	CAT (μm)	358	291	290	279	277	279
Fellow RE	BCVA	7/10	9/10	10/10	10/10	10/10	10/10
	CST (μm)	354	299	280	266	255	253
	CAT(μm)	349	299	282	279	270	270

BCVA: best corrected visual acuity; CST: central subfield thickness (μm); CAT: cube average thickness (μm).

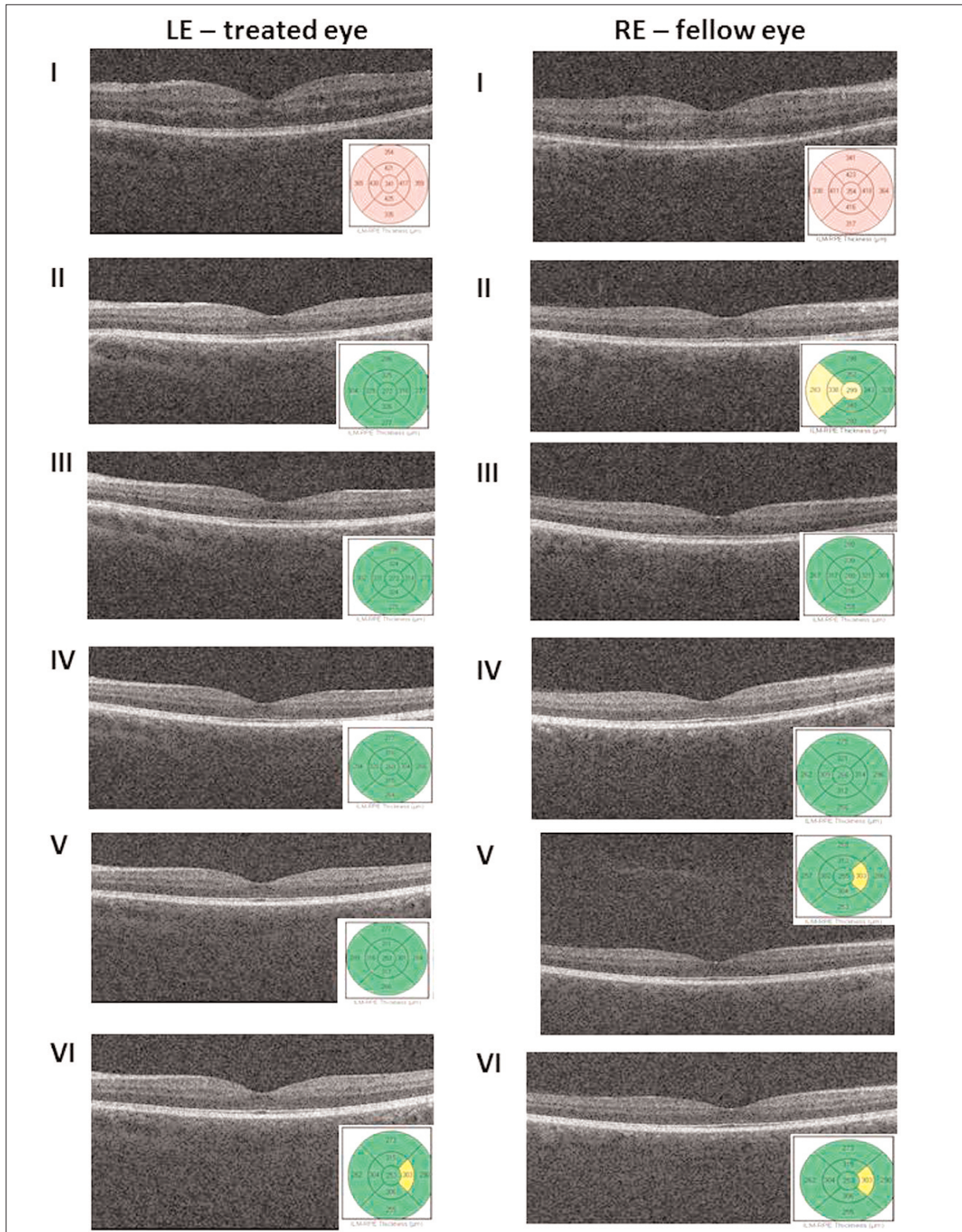


Figure 1. The evolution of the maculae scans in Optical Coherence Tomography (OCT). Before dexamethasone intravitreal implant administration – cystoid and spongy edema in OCT in LE (treated) and RE (fellow) eye is present. Three and a half months after dexamethasone intravitreal implant administration into LE the improvement in both maculae is noticed. Six months after intravitreal dexamethasone implantation the maculae of LE and RE appear normal. The long-term remission of macular edema not only in treated, but also in fellow eye is present 12, 32 and 36 months after intravitreal dexamethasone implantation.

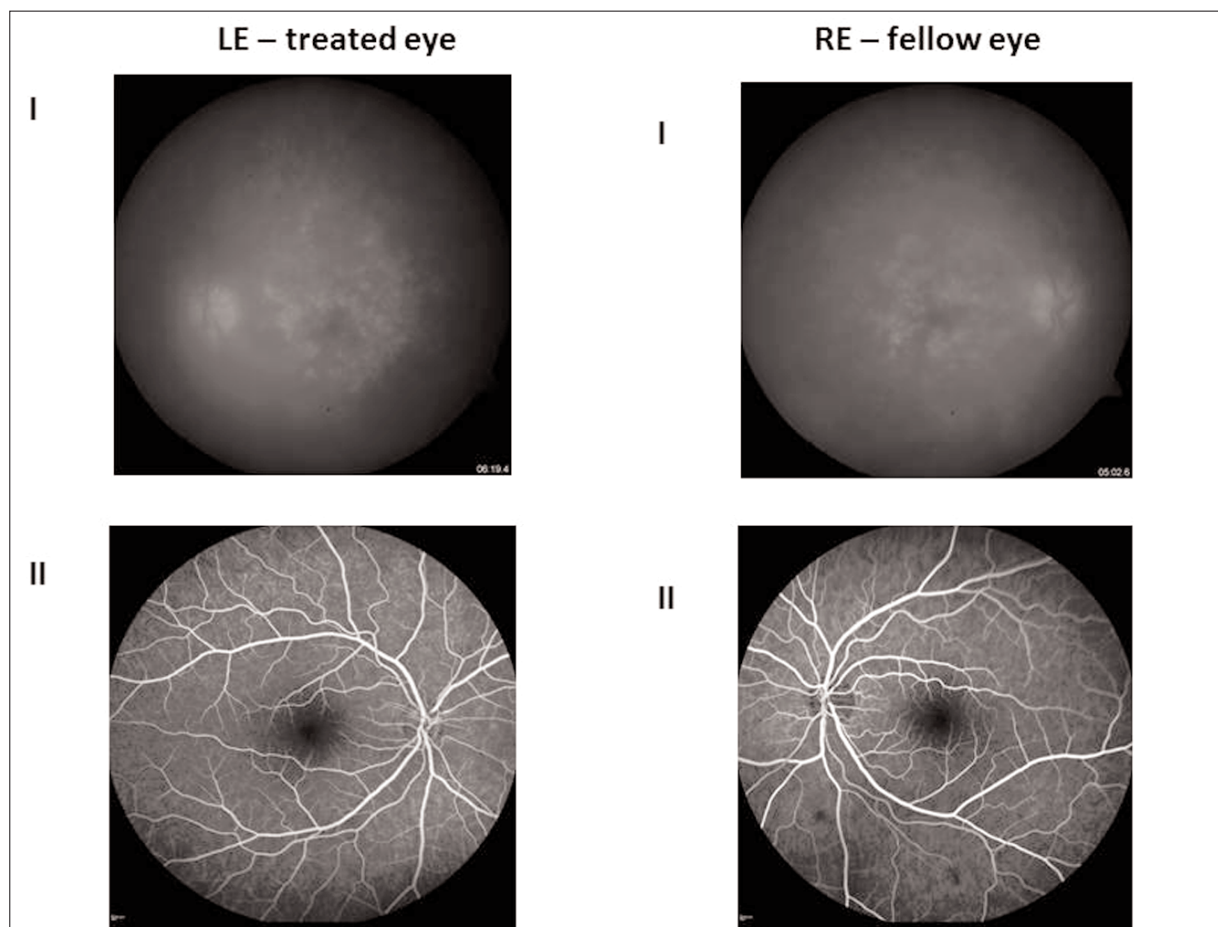


Figure 2. Fluorescein Angiography findings in macula of both eyes before and 32 months after dexamethasone implant in to vitreous of left eye. Note hyperfluorescence associated with macular edema and leakage in the optic disc in both eyes before dexamethasone vitreal administration to the LE. Notice no leakage of fluorescein in treated and fellow eye 32 months after dexamethasone implant to the LE.

ceived etanercept for more than 3 years with good effect. Etanercept is a biologic drug, an inhibitor of tumor necrosis factor (TNF) used in the treatment of rheumatic diseases and uveitis. Nevertheless, uveitis developed while this drug was being used. Riffkin et al⁴ reported that etanercept was not effective enough in the treatment of concomitant uveitis, which was confirmed by our observations.

The administration of dexamethasone implant to the LE vitreous led in this case to subsiding of inflammation in the anterior chamber and vitreous, a decrease in retinal thickness in the fovea and an improvement of VA. However, what deserves our attention, was an improvement of VA and the decrease in retinal thickness in the untreated RE. Habot-Wilner et al⁵ observed a similar, but in a shorter term, a beneficial effect of dexamethasone implant in the non treated eye in

a patient with noninfectious bilateral uveitis complicated with CMO. No recurrences complicated with macular edema were observed in either eye over the 32-month follow-up. Ozurdex Summary of Product Characteristics, based on animal studies, confirmed the presence of the dexamethasone in blood serum after an intravitreal administration. Therefore, it cannot be excluded that depot of dexamethasone in the human vitreous body has also a therapeutic effect on the fellow eye. This fact can explain the desirable, yet unexpected therapeutic effect in the fellow eye, which might have occurred via dexamethasone penetrating into the blood through the damaged blood-retinal barrier. There are also reports concerning the effects of ranibizumab and bevacizumab on the fellow eye macula in the treatment of age related macular edema (AMD) and diabetic retinopathy^{6,7}.

The therapeutic effect of dexamethasone depot in vitreous in our patient (remission of uveitis, improvement of VA, no symptoms of CMO revealed by OCT and FA) was maintained in both eyes for 32 months after the administration (July 2012), which is much longer of what manufacturer declares (by 6 months).

Conclusions

Our study carries a potential hope for the fellow eye in the course of bilateral noninfectious uveitis, when only one eye is treated with dexamethasone intravitreal injection. Naturally, clinical results have to be confirmed on larger groups of patients and the mechanism of the fellow eye improvement need to be elucidated.

Funding and Support

The idea and design of this paper is an original contribution of the authors, not supported by pharmaceutical industry. JC, JBG, AKB, DK participated in the clinical trial sponsored by Allergan. JC, JBG, AKB received fees for lectures at meetings organized by Allergan.

Conflict of Interest

The Authors declare that there are no conflicts of interest.

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