Optical Coherence Tomography-guided intravitreal bevacizumab in the treatment of refractory pseudophakic cystoid macular edema – case study

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Abstract.
One of the serious vision threatened complications of cataract surgery is refractory PCME. That is why this complication has to be managed in time and adequately. Non steroidal and steroidal antiinflammatory and anti VEGF agents like bevacizumab are useful for refractory PCME. OCT has an important role in detecting PCME and measurement of central macular thickness to control the treatment of PCME. In this case study patient after rutin uncomplicated PACO surgery with refractory PCME at postop 4-th week is described. Despite of using of topical NSAID+steroidal antiinflammatory treatment there was no improvement in decreased vision and CMT was remained stable increased (811 mmk). Vision was increased only after 2 week of i/v bevacizumab injection, macular edema resolved and CMT decreased (280 mmk) which was revealed by OCT. In conclusion, OCT quided i/v bevacizumab is safe and well tolerated treatment option for refractory PCME.

Keywords:
intravitreal bevacizumab
OCT
refractory pseudophakic cystoid macular edema
MEDICINE AND PHARMACY

Introduction: One of the vision-threatening complications after cataract surgery is pseudophakic cystoid macular edema (PCME) [1]. PCME, also known as Irvine-Gass syndrome, was first described in 1953 by Irvine [2] and later by D.Gass [3]. In general, as in cystoid macular edema (CME), PCME is a result of the accumulation of retinal fluid between the inner and outer nuclear layers of the retina and the formation of fluid-filled cystic spaces [4].

The incidence of PCME varies from 1 to 30% (depending on factors such as surgical methods, intraoperative complications, surgeon's experience, presence of concomitant risk factors, etc.) [1, 5, 6]. In the absence of risk factors and intraoperative complications, 1-2% are found [5]. PCME after phacoemulsification of the cataract (PACO) is less frequent compared to extracapsular cataract extraction (ECCE) and especially intracapsular extraction [7, 8, 9]. Modern imaging methods such as Fundus Fluorescein Angiography (FFA) and Optical Coherence Tomography (OCT) and medical treatment (non-steroidal and anti-steroidal anti-inflammatory) have a special role in early detection, effective targeting and treatment of PCME [6, 10, 11, 12]. However, refractory CME remains on the agenda as it is difficult to respond to traditional treatment. Recently, it has been shown that anti-VEGF drugs are more effective in the treatment of refractory PCME than oral, subtenon and intravitreal (i/v) administrations of non-steroidal and steroidal anti-inflammatory drugs [13, 14, 15, 17, 16]. Measuring the central macular thickness (CMT) with OCT is very important step in evaluating and guiding the effectiveness of treatment [12].

Purpose: To evaluate the clinical efficacy and safety of i/v bevacizumab guided by OCT in the treatment of refractory PCM after uncomplicated FACO. The patient was under observation for 6 months. The effectiveness of the treatment was assessed by best corrected visual acuity and CMT measured by OCT.

Clinical case: a patient with type 2 diabetes for a long time visited to our clinic with a complaint of poor vision in both eyes with diagnosis of cataract in both eyes.

During examination: Vis OD=0.2 n/corr, Tn OD=16 mm.Hg. Vis OD=0.04 n/corr, Tn OD=18 mm.Hg.

In both eyes, the fundus is not examined in detail. Due to the poor dilation of the pupil, diclofenac sodium was
prescribed to the eye to be operated on, 1 drop 3 times a day for 3 days before surgery. FACO, intraocular lens (IOL) implantation surgery was performed in the patient's left eye. The operation and the postoperative (postop) period were uneventful.

Postop Day 1:
Vis OS=0.8, Tn OS=17 mm.Hg
The cornea and the anterior chamber fluid is clear, and the pupil is alive.
Treatment: prednisolone acetate - 1 drop 6 times, moxifloxacin - 1 drop 6 times, diclofenac sodium - 1 drop 3 times.

Postop 3rd week:
Visual functions are fixed, fixed drops have been reduced.
However, in the 4th postoperative week, the patient returned with a complaint of a serious decrease in vision in the left eye.
During examination:
Vis OD=0.08 n/corrected, Tn OS=20 mm.Hg
The cornea is transparent, anterior chamber fluid is clear, the vitreous is stable (US), the pupil's reaction to light is alive, the IOL is in a stable position inside the capsule bag.
Fundus examination: significant macular edema and loss of foveal reflex are noted.
OCT: intraretinal cysts, subretinal fluid collection and increased CMT (811 mmk) are noted (Figs 1, 2, 3).

Figure 1
Prednisolone acetate - 1 drop 6 times, nepafenac - 1 drop - 4 times, oral diacarb 1 tab (0.5 mg) 1 time per day for 5 days, subtenon triamcinolone acetate (0.5 ml) was injected.

2 weeks later: the vision in the left eye has improved slightly.
Vis OS=0.2 n/corr, Tn OS=19 mm.Hg

However, since there was no significant change in CMT, close follow-up of the treatment was continued.

Postop 8th week: visual acuity remains same as at 6th week.
OCT - CMT slightly decreased (680 mmk), (Figs 4, 5).
Bevacizumab (1.25 mg) was injected i/v into the left eye. 2 weeks after injection: Vis OS=0.7 n/corr, Tn OS=17 mm.Hg OCT - CMT significantly decreased (280 mmk) (Fig. 6, 7, 8).
Nepafenac was continued with 1 drop 3 times a day.

Postop 12th week:
Vis OS=0.9, Tn OS=16 mm.Hg, foveal reflex is clear, Amsler test-negative.

Discussion: Irvine-Gass syndrome or PCME causes cystoid edema in the macula after cataract surgery, causing vision loss [1, 18]. Although PCME can occur after uncomplicated cataract surgery [5], more commonly PCME (especially refractory PCME) develops after complicated surgery due to anterior vitreous displacement and vitreous loss during surgery [19], posterior capsule tear [20], and inflammation caused by contact of the IOL with the iris [21]. It is thought that the disruption of internal and external blood-retinal barriers or the activation of the inflammatory cascade in all structures of the eye as a result of the inflammation caused by the increase in the amount of prostaglandins due to surgical trauma has an important role in the development of PCME [22, 23]. On the other hand, it is thought that the increase in metabolic activity in the RPE due to the effect of light entering into the eye during surgery leads to activation of the angiogenesis, which can lead to the development of PCME [24]. Factors such as diabetes, uveitis, epiretinal membrane (ERM), use of prostaglandin analogs, choroidal tumors and aging are known to play a role in the development of PCME also [25]. Due to the high metabolic activity of the fovea, the mentioned pathological changes create the basis for the development of CME in the foveal zone, which in turn leads to an increase in CME and a decrease of visual acuity [26].

It should be noted that opinions on the treatment of PCME are controversial: although self-regression of PCME is possible in many cases, treatment is very important in other cases, especially in refractory PCME [6]. There is strong evidence of the effectiveness of anti-VEGFs along with non-steroidal and steroidal anti-inflammatory drugs in the treatment of refractory CME [6, 27-29].

In the patient we report, refractory PCME was detected in the 4th postoperative week. In addition to a serious decrease in visual acuity, the loss of the foveal reflex, a prominent increase in the CMT in the OCT examination, and the appearance of fluid-filled cystic spaces between the layers of the retina, the typical clover leaf sign [30] in the FFA confirm
Irvine-Gass syndrome (Fig. 9).

It should also be noted that the patient has long-term diabetes mellitus as a risk factor. Although the patient was given subtenon triamcinolone acetate injection and oral carbonic anhydrase inhibitor along with topical non-steroid and steroid drops, the visual acuity improved slightly, but the OCT image at week 8 postop was not encouraging: no decrease in CMT was noted. Prolonged elevation of CMT despite treatment posed a serious threat to visual acuity as an indicator of refractory PCM. In order to eliminate this threat, as shown in the scientific literature [6, 13, 14, 15], intravitreal bevacizumab was injected. 2 weeks after the injection, an increase in visual acuity to 0.7 was noted. Here we should specially mention the role of OCT. Thus, OCT is a method that allows clinical monitoring of macular edema by measuring macular thickness and detecting intraretinal cysts [10]. Therefore, the correct decision - intravitreal bevacizumab injection - was made because OCT showed no decrease in CCT despite a subjective improvement in vision at 8 weeks postoperatively.

Continued observation showed the complete recovery of the patient's visual acuity and foveal reflex, regression of the CCT to its normal size, absorption of macular edema.

In conclusion, we should note that refractory PCME is a serious vision-threatening complication which develops after
cataract surgery. OCT-guided intravitreal bevacizumab injection in eliminating of this complication is effective and safe, leading to significant improvement of visual acuity, reduction of CCT, and absorption of macular edema.

References:


10.1167/iovs.10-6001. PMID: 20720227.


