Intravitreal pegaptanib sodium for refractory pseudophakic macular oedema

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Abstract

Purpose Evaluate the efficacy of intravitreal pegaptanib sodium (Macugen®) in refractory pseudophakic cystoid macular oedema (CME).

Design and methods Prospective, nonrandomized, interventional case series. Four eyes of four patients with refractory pseudophakic CME to pars plana vitrectomy and intravitreal bevacizumab and triamcinolone, were treated with pegaptanib sodium, with a mean follow up of 4 months. Pre- and postinfection examinations included assessment of best-corrected visual acuity (BCVA) using the Early Treatment Diabetic Retinopathy Study chart (ETDRS), fluorescein angiography (FA), and optical coherence tomography (OCT).

Results Visual acuity increased in all patients after intravitreal pegaptanib sodium. OCT showed improvement of the retinal thickness in the macular area.

Conclusion Intravitreal pegaptanib sodium (Macugen®) is a promising treatment for pseudophakic cystoid macular oedema resistant to other medical treatment strategies. However, further study is needed to assess the treatment's long term efficacy and the need for retreatment.

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surgery, operative complications as well as grading methods to assess CME. ¹ Fortunately, the advent of phacoemulsification techniques has dramatically reduced the occurrence of CME. ²

In mild cases, postoperative CME resolves spontaneously and requires no treatment, but other eyes may be resistant to common medical treatment strategies, including systemic or topical nonsteroidal anti-inflammatory agents or steroids, vitreolysis, ³ and pars plana vitrectomy. ⁴ More recently, intravitreal use of triamcinolone acetonide ^{5–7} and bevacizumab (Avastin®) ^{8,9} has been offered as alternative treatment of persistent pseudophakic CME.

In this study, we prospectively studied the efficacy of intravitreal pegaptanib sodium (Macugen®) by the use of optical coherence tomography (OCT) (Stratus OCT Model 3000, Humphrey Instruments, Carl Zeiss Inc., Dublin, CA, USA) and best-corrected visual acuity (BCVA) in four eyes of four patients with persistent refractory CME after cataract extraction, with a mean follow-up of 4 months.

Materials and methods

Four patients, aged 55–75 years, presented with pseudophakic refractory CME in four eyes lasting for 6–12 months following cataract surgery (Table 1). A minimum of two intravitreal injections of bevacizumab were administered in all patients (separated by a 5-week period). Four injections were necessary for patient 2; although CME showed improvement after each injection, as measured by OCT, it reappeared after a short period of time. Intravitreal injection of triamcinolone was administered previously in patients 3 and 4. Patient 1 underwent vitrectomy, because an important traction of the vitreous cortex on the macula was confirmed by OCT. Intravitreal

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Introduction

Postoperative cystoid macular oedema (CME) is a common complication after cataract surgery, with angiographic CME varying from 3 to 70% depending on the study, method of cataract

Table 1 Characteristics of four patients with refractory CME treated with Macugen[®]

Patient	Age (years)	Type of surgery	Duration of CME	Treatment before Macugen injection	Pre-injection BCVA and macular thickness	Post-injection final BCVA and macular thickness at 4 month	Second injection
1	75	Complicated cataract extraction with anterior IOL	8 months	Pars plana vitrectomy	1.0	0.8	No
				Two intravitreal bevacizumab	360 μ	260 μ	
2	78	Complicated cataract. Secondary IOL implantation	9 months	Four intravitreal bevacizumab	0.6	0.26	Yes
					416 μ	230 μ	
3	56	Not complicated cataract	6 months	One intravitreal triamcinolone	0.5	0.1	No
				Two intravitreal bevacizumab	485	255 μ	
4	76	Not complicated cataract	12 months	Two intravitreal triamcinolone	0.3	0.1	No
				Three intravitreal bevacizumab	389 μ	213 μ	

BCVA = best-corrected visual acuity measured by logMar system; CME = cystoid macular oedema.

pegaptanib treatment was commenced at 6 weeks after the last bevacizumab injection. Only patient 2 needed a second injection of pegaptanib to get complete resolution of CME. Pre- and post-injection examinations included assessment of BCVA using the Early Treatment Diabetic Retinopathy Study chart (ETDRS), fluorescein angiography (FA), and OCT. CME was assessed by measuring the thickness of the 1 mm central macular area. Intravitreal injections of pegaptanib sodium (Macugen) were administered with full asepsis in the surgery room.

Results

In all four patients, macular thickness had decreased from a mean of 412 ± 20 to $239 \pm 20 \mu\text{m}$ 1 month after intravitreal pegaptanib sodium injection (Figure 1). By that time, BCVA had also improved (mean improvement 17 letters, equivalent to 3, 5 Snellen lines). Within 2–4 months, the oedema minimally recurred in one eye (patient 2), and the patient accepted a second intravitreal pegaptanib sodium injection, which again led to the regression of CME 1 month later.

Discussion

To the best of our knowledge, our four patients are the first reported cases of refractory pseudophakic macular oedema treated with pegaptanib sodium (Macugen). It is

Figure 1 Fluorescein angiography and optical coherence tomography of patient 4. (a and b) Fluorescein angiogram before and after one pegaptanib injection. (c and d) Complete macular oedema resolution 15 days after the treatment measured by OCT in the same patient.

possible that resistance or tachyphylaxis to our new class of medications might develop after a sufficient time or number of treatments. VEGF is both a potent enhancer of vascular permeability and a key inducer of angiogenesis. Pegaptanib sodium, currently approved in the treatment

of exudative age-related macular degeneration, binds to and inactivates VEGF₁₆₅, which has been implicated as a potent permeability factor implicated in CME. Pegaptanib has also demonstrated to be effective in retinal macular oedema due to vascular disorders such as diabetic retinopathy.¹⁰

Our four patients had severe vision loss, which was refractory to different treatments, included bevacizumab, but which responded to an intravitreal injection of pegaptanib sodium. The CME resolved clinically as well as by FA and OCT, with an important increase in visual acuity. There has been no recurrence of the CME and no complications from intravitreal pegaptanib sodium. The long-term outcome is currently unknown. CME recurrence is a possibility and may require additional therapy. VEGF-A has recently been recognised as an important neuroprotectant in central nervous system and retina,¹¹ that is why we think that the chronic panVEGF inhibition can damage retina in vascular disorders and a specific inhibition of VEGF₁₆₅ may be an effective alternative in the treatment of CME.

In conclusion, intravitreal pegaptanib sodium (Macugen) may be an excellent treatment modality for patients with CME unresponsive to other treatments.

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