Saudi Journal of Ophthalmology (2015) 29, 182–186

Original Article

Comparison of intravitreal ranibizumab between phakic and pseudophakic neovascular age-related macular degeneration patients Two-year results

Abdullah Ozkaya *; Zeynep Alkin; Ihsan Yilmaz; Ahmet Taylan Yazici

Abstract

Background and objective: To compare the efficacy of intravitreal ranibizumab (IVR) for the treatment of neovascular age-related macular degeneration (nAMD) between phakic and pseudophakic eyes after a follow-up of two years.
Materials and methods: Data were analyzed retrospectively. The newly diagnosed and treatment naïve nAMD patients were included in the study. The patients were divided into two subgroups: phakic group, and pseudophakic. All patients received 3 consecutive monthly IVR injections, and then the treatment was continued on an as-needed regimen. Patients were examined monthly, and the data at the baseline, at month 6, 12, 18, and 24 were evaluated. The changes in best corrected visual acuity (BCVA), central retinal thickness (CRT), and the number of injections were compared between the two groups.
Results: The study included 92 eyes of 87 patients (58 phakic, 34 pseudophakic). Mean logarithm of the minimal angle of resolution (LogMAR) VA at the baseline, and at month 6, 12, 18, and 24 was 0.89, 0.74, 0.75, 0.73, and 0.75, in the phakic group; and 0.79, 0.71, 0.66, 0.70, and 0.70 in the pseudophakic group, respectively. The change in mean BCVA from the baseline to month 6, 12, 18, and 24 was not statistically different between the two groups ($p = 0.4$, $p = 0.9$, $p = 0.5$, $p = 0.6$, respectively). Mean injection number at month 24 was 7.9 and 8.1 in the phakic and pseudophakic group, respectively ($p = 0.7$).
Conclusion: Intravitreal ranibizumab treatment on an as-needed treatment regimen is effective in preserving vision and improving central retinal thickness in both the phakic and pseudophakic group of nAMD patients. The functional and anatomical outcomes of the treatment, and the number of injections were similar in the phakic and pseudophakic nAMD patients after a follow-up time of 24 months.

Keywords: Age-related macular degeneration, Cataract, Lens, Pseudophakia, Ranibizumab, Visual acuity

http://dx.doi.org/10.1016/j.sjopt.2014.12.002

Introduction

Neovascular age-related macular degeneration (nAMD) is the leading cause of severe visual loss among elderly population in developed countries.[1,2] Before the era of intravitreal anti-vascular endothelial growth factor (anti-VEGF) therapy, only prevention for visual loss might have been achieved in a limited number of nAMD patients with different treatment options.[3–8] The introduction of bevacizumab (full length antibody against VEGF-A) and ranibizumab (Fab part of antibody

Received 22 July 2014; received in revised form 19 November 2014; accepted 4 December 2014; available online 13 December 2014.

Beyoglu Eye Research and Training Hospital, Beyoglu, Istanbul, Turkey

* Corresponding author at: Beyoglu Eye Research and Education Hospital, Bereketzade Cami Sok. No: 2 Beyoglu, İstanbul, Turkey. Tel.: +90 2125215900; fax: +90 2122526109.
e-mail addresses: abdozkaya@gmail.com (A. Ozkaya), zeynepalkin@gmail.com (Z. Alkin), ihsanyilmaz.dr@gmail.com (I. Yilmaz), ahmettaylan19@gmail.com (A.T. Yazici).

Peer review under responsibility of Saudi Ophthalmological Society, King Saud University

Production and hosting by Elsevier

Access this article online: www.saudiophthaljournal.com www.sciencedirect.com

against VEGF-A) has led the vast majority of the patients to preserve the baseline visual acuity (VA) and gave the chance of visual improvement to at least one third of the nAMD patients.[9,10] The multicenter studies showed that ranibizumab was effective to prevent VA loss up to 95% of the patients, and was effective to make an improvement in VA up to 40% of the patients.[10–13] These studies were mainly efficacy and dosing regimen studies, therefore they did not focus on lens status.

Recently, three studies were published about the effect of lens status on the treatment of nAMD with ranibizumab.[14–16] One of these studies was a meta-analysis of the patient data from ANCHOR and MARINA studies,[14] and the two other studies were retrospective single center studies.[15,16] No visual or anatomical differences were found between the phakic and pseudophakic eyes in these three studies.[14–16]

Hereditary factors, environmental factors, and ocular factors such as age-related alterations of the retina, inflammatory reactions, and the effect of free radicals are thought to be responsible for the pathogenesis of AMD.[17] In some experimental studies it was shown that excessive levels of white light exposure may induce the apoptosis of the photoreceptors.[18,19] Therefore the effect of cataract extraction on the progression of AMD is evaluated in many studies.[17,20–25] In most of the studies, it was suggested that cataract surgery may increase the development and progression of AMD.[20–25] This phenomenon was attributed to increased light toxicity, increased inflammation, and postoperative cystoid macular edema after cataract surgery.[17] However, there is still an ongoing debate about whether the cataract surgery has any effect on progression of AMD.[25] Many anatomical and biochemical changes occur in the vitreous after cataract surgery.[26,27] In addition, it is reported that posterior vitreous detachment (PVD) was induced after cataract surgery, and the presence of PVD was found to be related with increased retinal penetration of bevacizumab in rabbit eyes.[28] In regard to these findings we hypothesized that all of these changes after cataract surgery may affect the outcomes of IVR treatment for nAMD in pseudophakic patients and since there is a little amount of data on this topic, we aimed to compare the efficacy of IVR on an as-needed regimen between phakic and pseudophakic nAMD patients.

Materials and methods

In this retrospective, comparative study, we reviewed the records of the nAMD patients who had a baseline VA between 1.8 and 0.3 LogMAR and treated with intravitreal ranibizumab injection on an as-needed treatment regimen between January 2009 and January 2011. A written informed consent for the treatment was obtained from all patients before the treatment, and the study adhered to the tenets of the Declaration of Helsinki.

To be included in the study, each patient was required to have all of the following criteria; age $\geqslant$50 years, a best corrected VA (BCVA) between LogMAR 1.8 and 0.3, to be newly diagnosed as nAMD and treatment naive, and a minimum follow-up time of 24 months. Patients were not included in the study if they had a retinal disease other than nAMD, or if they had received previous intravitreal injection, or photodynamic therapy for nAMD, or if they had diagnosed as polypoidal choroidal vasculopathy, or retinal angiomatous proliferation, or if they were treated with other retreatment regimens, or if all of the follow-up data were not available. Also, the phakic patients who underwent cataract surgery during the follow-up time were excluded from the study. The patients were divided into two groups according to their lens state which were phakic and pseudophakic groups at the initial diagnosis. All the pseudophakic patients had undergone uneventful phacoemulsification surgery and had intact posterior capsules. The pseudophakic patients who were included had undergone cataract surgery at least 6 months before the beginning of the IVR treatment.

Data collected from the patients' records included age, gender, choroidal neovascularization (CNV) type (predominantly classic or minimal classic/occult), BCVA and central retinal thickness (CRT) at baseline, month 6, month 12, month 18, and month 24. The total number of injections at month 12 and 24 was also recorded.

The included patients underwent a standardized examination including measurement of BCVA (visual acuity was measured as Snellen lines then converted to LogMAR for statistical analyses), slit-lamp biomicroscopy, intraocular pressure (IOP) measurement via applanation tonometry, and fundus examination. Fundus photography, fluorescein angiography (FA) (HRA-2; Heidelberg Engineering, Heidelberg, Germany), and optical coherence tomography (OCT) imaging (Stratus OCT TM; Carl Zeiss Meditec Inc., Dublin, CA, USA.) were performed before treatment. All examinations were repeated monthly, except FA. Fluorescein angiography was repeated only when the cause of VA deterioration could not be clarified with the other methods. Optical coherence tomography was used for detecting subretinal fluid and measurement of CRT. Central retinal thickness, defined as the mean thickness of the neurosensory retina in a central 1 mm diameter area, was computed using OCT mapping software generated by the device.

All injections were performed under sterile conditions after topical anesthesia, 10% povidone-iodine (Betadine; Purdue Pharma, Stamford, CT) scrub was used on the lids and lashes, and 5% povidone-iodine was administered on the conjunctival sac. Intravitreal ranibizumab (Lucentis; Novartis, Basel, Switzerland) was injected through the pars plana at 3.5 mm posterior to the limbus with a 30-gauge needle. Patients were instructed to return to the hospital if they experienced decreased vision, eye pain, or any new symptoms.

Initially, all patients received a loading dose of three consecutive monthly IVR injections (0.5 mg/0.05 ml). Then the patients were followed monthly, and a single injection of IVR was repeated when the VA decreased by one or more ETDRS lines from the last visit, or newly developed macular hemorrhage, or evidence of subretinal fluid on OCT. The follow-up visits of the patients were performed by two physicians who had the same clinical practice patterns (AO, ATY).

Primary outcome measures of this study included the change in BCVA and OCT defined CRT from baseline to months 6, 12, 18, and 24. Secondary outcome measures were the total number of injections at months 12 and 24, and the complications of intravitreal injections.

Statistical analysis

Visual acuity was converted to the logarithm of the minimum angle of resolution (LogMAR) for statistical analysis.