An efficacy analysis of anti-vascular endothelial growth factor therapy for choroidal neovascularization secondary to multifocal choroiditis and comparison with wet age-related macular degeneration*

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Abstract: Objective: To evaluate the effect of anti-vascular endothelial growth factor (VEGF) on juxtafoveal choroidal neovascularization (CNV) secondary to multifocal choroiditis (MFC) and wet age-related macular degeneration (AMD). Methods: In this retrospective, comparative study, 20 unique eyes with CNV were divided into two groups: 10 patients affected by MFC and 10 patients diagnosed with wet AMD. They all received local intravitreal (IVT) injections of ranibizumab, with 6 months of follow-up. Retreatment injections were performed based on findings suggestive of active neovascularization. Results: Significant improvements were observed in the juxtafoveal CNV lesions, and average central macular thickness decreased in both groups following the anti-VEGF therapy (P<0.05). The average number of injections used in MFC patients was 1.6, while three injections on average were used in wet AMD patients (Z=−2.844, P=0.009). Best-corrected visual acuity was significantly improved in MFC patients after anti-VEGF therapy (P<0.05), and there was no significant difference in wet AMD patients between before anti-VEGF therapy and 6 months later (P>0.05). Conclusions: IVT ranibizumab resulted in good clinical outcomes for juxtafoveal CNV secondary to MFC and wet AMD, but the average number of injections used in MFC was fewer than that used in wet AMD over a 6-month observation period. Compared with the wet AMD group, visual acuity was obviously improved in the MFC group at 6 months.

Key words: Wet age-related macular degeneration (AMD); Multifocal choroiditis (MFC); Juxtafoveal choroidal neovascularization (CNV); Anti-vascular endothelial growth factor (VEGF) therapy

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1 Introduction

Multifocal choroiditis (MFC) is characterized by distinct spots of inflammation in the photoreceptor-retinal pigment epithelium complex. Choroidal neovascularization (CNV) is a well-known complication of MFC, often resulting in severe vision loss (Haen and Spaide, 2008; Thurau and Wildner, 2010). Many treatment options have been proposed for MFC-related CNV including steroids, immunosuppressants, photodynamic therapy, and surgical excision (Hochman et al., 1999; Gerth et al., 2006; Jutley et al., 2011; D’Ambrosio et al., 2014). However, these methods are not always sufficiently effective and some uncontrolled sub- or juxtafoveal CNVs may remain, significantly decreasing visual function, which is obviously an urgent and serious problem.

Wet age-related macular degeneration (AMD)—also called neovascular AMD—is characterized by CNV which may result in blurred vision in the center
of the visual field, typically occurring in older people (Lim et al., 2012). It has been shown that anti-vascular endothelial growth factor (VEGF) therapy is successful in treating CNV for AMD (Cheung and Wong, 2011). Recently, Julián et al. (2011) and Iannetti et al. (2013) studied the administration of anti-VEGF agents for CNV related to MFC, with promising results. However, MFC is rare, so comparisons of the treatment outcomes between MFC and wet AMD following anti-VEGF therapy have rarely been reported.

In the present study, we aimed to examine the clinical therapeutic effect of anti-VEGF therapy on the outcomes of CNV secondary to MFC, and to compare this with its effect on wet AMD.

2 Methods

2.1 Patients with juxtafoveal CNV secondary to MFC and wet AMD

We selected 20 consecutive patients (12 males and 8 females) with juxtafoveal CNV who had attended the Eye Center at the Second Hospital Affiliated to Zhejiang University, Hangzhou, Zhejiang Province, China, between 2013 and 2015. The patients were grouped according to etiology: 10 were affected with MFC, while 10 had wet AMD. All patients were informed of the usage of the agent (ranibizumab) and its potential benefits and side effects. The study adhered to the tenets of the Declaration of Helsinki and was approved by the institutional review board.

Patients with juxtafoveal CNV secondary to MFC were recruited, and all underwent a complete ophthalmic examination. The inclusion criteria were as follows: a diagnosis of MFC, evidence of classic or occult CNV confirmed by fundus fluorescein angiography (FFA), and progressive vision loss related to the juxtafoveal neovascular manifestation after achieving strict control of intraocular inflammation with steroids and immunosuppressant treatments. The diagnosis of MFC was based on the presence of multiple chorioretinal lesions ranging in size from 50 to 350 μm, located in the posterior pole and/or the periphery zone, with the possible presence of vitreous cells and signs of anterior uveitis, as well as atrophy or peripapillary changes. The exclusion criteria were as follows: features and conditions such as AMD, pathological myopia, trauma, hereditary retinal disorders, any who previously have undergone photodynamic or anti-VEGF therapy.

Wet AMD was confirmed by FFA and optical coherence tomography (OCT). FFA was used to visualize the leakage of blood behind the macula and OCT was used to observe the neovascularization lesion. Those patients who had ever previously undergone photodynamic therapy or other retinal surgeries were excluded. All cases of MFC and wet AMD had identical investigations at baseline and follow-up visits.

2.2 Treatment approach

The decision to initiate intravitreal (IVT) injections was based on the progression of the CNV lesion and visual damage. All MFC patients had undergone strict control of intraocular inflammation—using steroids and immunosuppressant treatments—before IVT injections. However, the CNV was still present or had progressed, severely affecting visual function.

Patients in both groups received IVT injections of 0.5 mg/0.05 ml ranibizumab (Novartis Pharma Schweiz AG, Switzerland). Retreatment injections were carried out during the follow-up period when the OCT showed intra- and sub-retinal fluid and the FFA revealed leakage. The data were collected at several time points: before the initial treatment and 1, 2, 3, and 6 months after the first IVT injection. Antibiotic eye drops, such as levofloxacin, were used before and after the injections.

2.3 Outcome measurement

Slit lamp assessment, FFA, and Cirrus HD-OCT (Version 6.0; Carl Zeiss Meditec, Dublin, CA, USA) were performed for all patients before they received IVT ranibizumab and 1, 2, 3, and 6 months after the first IVT injection. Treatment success was defined as inactive CNV lesions (no leakage on FFA and shrinking on OCT). Macular edema was evaluated via OCT. Visual outcomes were evaluated using a logMAR chart, in order to determine whether visual function was decreased, maintained, or improved by treatment.

2.4 Statistical methods

All data were collected and analyzed using Statistical Package for the Social Sciences (SPSS) software, Version 18.0 (SPSS Inc., Chicago, IL, USA). They were examined for normality using the