Effect of Intravitreal Bevacizumab Injection in Central Serous Chorioretinopathy in Babol, North of Iran

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Abstract: The effect of intravitreal bevacizumab injection in patients with Central Serous Chorioretinopathy (CSCR) evaluated. All patients who referred to Ayatollah Rohani Hospital in Babol for duration of June 2014 to July 2015 were included in this retrospective study. Intravitreal injection of 1.25 mg of bevacizumab was similar for all patients. Follow-up duration was considered one month. SPSS Version 22 software and Wilcoxon test was used for statistical analysis. In this study, 57 eyes of 55 patients were examined. The mean logMAR of visual acuity was 0.80±0.36 and 0.30±0.26 before and after treatment, respectively. The mean central macular thickness (CMT) was reported 352.80±62.95 and 290.89±26.04 µm before and after treatment, respectively. There was a significant relationship between logMAR of visual acuity before and after treatment based on the history of patients who received or did not receive corticosteroid (0.04 and p<0.0001, respectively). Although, there was a significant relationship in central macular thickness in patients who received or did not receive corticosteroid (p=0.18 and p<0.0001, respectively). It was concluded that intravitreal bevacizumab injection was associated with visual improvement.

Key words: Central Serous Chorioretinopathy • Visual Acuity • Central Macular Thickness

INTRODUCTION

Central Serous Chorioretinopathy also known as central serous retinopathy, is characterized by an idiopathic serous neurosensory detachment primarily affecting the macula [1-3]. There is limited information about pathophysiology of CSCR, but causes like occlusion, ischemia, or inflammation of the inner choroid can lead to increase of choroidal vascular permeability, secondary changes of RPE and neurosensory retinal detachment [4-7]. CSCR is a self-limited disease in many patients, but in some patients, retinal pigment epithelium detachment leads to atrophy of the RPE and destruction of photoreceptors that eventually will cause irreversible anatomic and functional retina damage [8-10]. Risk factors of CSCR can be cited as type-A personality, obstructive sleep apnea, increased levels of corticosteroids and genetics [11, 12]. Photodynamic therapy, focal laser photocoagulation, corticosteroid antagonists, pharmacological medicines such as acetazolamide, ketoconazole, mifepristone and intravitreal injection of Anti-vascular endothelial growth factor (VEGF) are recommended for CSCR treatment [13, 14]. Today, photodynamic therapy and focal laser photocoagulation are used more, but there is restrictions on the use of these two types of treatment [1]. One of the recent advances in the treatment of CSCR is the use of vascular endothelial growth factor blocker drugs to prevent the progression of CSCR [15]. Vascular endothelial growth factor is one of the most important factors produced by RPE and photoreceptors of retina that causes progression of CSCR [16]. Recently, several studies showed that the injection of intravitreal bevacizumab that is included as anti-VEGF drugs is effective in the treatment of CSCR [1, 2, 14, 15, 17]. Bevacizumab is an anti-VEGF monoclonal antibody [18, 19]. CSCR involves both eyes in 18% of cases[14], we decided to examine the effect of IVB on CSCR in order to reduce signs and relapse of disease.

MATERIALS AND METHODS

All patients who referred to eye clinic of Ayatollah Rohani Hospital in Babol for duration of June 2014 to July 2015 were included in this study. Informed consent was taken from patients and the study was approved by the ethics committee of Babol University of Medical Sciences.
Then, CSCR diagnosis was performed by retina fellowship and CSCR was approved in all patients with fluorescein angiography. All patients were in the acute phase of their illness with approximately 3 month of involvement. Patients with no absolute diagnosis of CSCR and those who received systemic therapy for CSCR were also excluded from this work. All patients underwent complete ocular examination including measurement of visual acuity on the Snellen charts and fluorescein angiography and central macular thickness measurements with optical coherence tomography (OCT). All injections were performed in the operating room and with the standard method. Intravitreal Bevacizumab was injected 3 to 3.5 mm posterior to the limbus using a sterile 27-gauge needle. The injection dose for all patients was equal to 1.25 mg (0.05 ml). Patient’s information such as age, sex, chief complaint, visual acuity, involved side, corticosteroid consumption, leakage state on fluorescein angiography and central macular thickness before and after injection and pigment epithelium detachment (PED) were entered in check list. Visual acuity (VA) was studied as Logarithm of the Minimum Angle of Resolution (logMAR VA). SPSS Version 22 software and Wilcoxon test was used for statistical analysis. P-value less than 0.05 was statistically considered significant.

RESULTS

The study included 57 eyes of 55 patients who received an intravitreal bevacizumab injection. The mean age of patients was 39.60±6.20 and ranged from 25-53 years. Among all patients, 45 patients (81.8%) were men and 10 patients (18.2%) were women. Basic information of patients are shown in Table1. The right eyes of 28 patients (50.9%), the left eyes of 25 patients (45.5%) and both eyes of 2 patients (3.6%) were involved. The mean logMAR before and after treatment were 0.80±0.36 and 0.30±0.26 in the range of 0.17-1.60 and 0-1.00, respectively. The mean central macular thickness using OCT were 352.80±62.95µm (range of 240-630µm) and 290.89±26.04µm (range of 240-393µm) before and after injection, respectively. Visual acuity increased in all patients during one month after injection. There was no side effects of injection. Visual impairment was the most common complaints of patients (Figure 1).

Among 55 patients who participated in the study, 5 patients (9.1%) consumed corticosteroid. In Table 1, visual acuity and central macular thickness were studied based on receiving corticosteroid. There was a significant relationship between logMAR VA before and after treatment in patients who received and did not receive corticosteroid (0.04 and p<0.0001, respectively). The study of central macular thickness showed that there is a significant difference between central macular thickness before and after treatment in patients who did not receive corticosteroid (p<0.0001).

In this study, PED was evaluated in all patients by using OCT. 25 patients (45.5%) had PED and 30 patients (54.5%) did not. The logMAR and central macular thickness before and after treatment was statistically significant in the two studied groups (p<0.0001) (Table 2).
Table 3: Differences of the logMAR and central macular thickness before and after treatment based on the leakage of fluorescein

<table>
<thead>
<tr>
<th>Variable</th>
<th>Inkblot M±SD*</th>
<th>Diffuse M±SD</th>
<th>Smoke stack M±SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>logMAR visual acuity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>prior to treatment</td>
<td>0.62±0.27</td>
<td>1.19±0.23</td>
<td>0.62±0.26</td>
</tr>
<tr>
<td>after treatment</td>
<td>0.20±0.13</td>
<td>0.49±0.35</td>
<td>0.24±0.19</td>
</tr>
<tr>
<td>Central Macular thickness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>prior to treatment</td>
<td>329.89±40.40</td>
<td>399.06±80.73</td>
<td>338.30±37.23</td>
</tr>
<tr>
<td>after treatment</td>
<td>282.21±15.74</td>
<td>307.18±33.53</td>
<td>287.50±24.07</td>
</tr>
</tbody>
</table>

* Mean±Standard Deviation

All patients underwent fluorescein angiography before treatment. The eye leakage based on fluorescein angiography among 28 patients (50.9%) was in the form of inkblot, 17 patients (30.9%) diffuse and 10 patients (18.2%) as smokestack. Significant difference was seen before and after logMAR VA in patients with different leakage as inkblot, diffuse and smokestack (p<0.0001, 0.005 and p<0.0001, respectively). There were statistically significant difference between central macular thickness before and after treatment in patients with all three types of leakage (<0.0001, 0.01 and p=0.001, respectively) (Table 3).

**DISCUSSION**

The selection of appropriate treatment for patients who suffer from CSCR for a long time, will decrease the severity of the problems. Currently, photodynamic therapy (PDT) and focal laser photocoagulation are common treatments of CSCR. Although, photocoagulation can damage RPE and create scotoma, but it uses more than PDT [1]. Recently, due to the fact of effectiveness of PDT in treatment of CSCR, its side effects has been reported in various studies. Complications such as choroidal ischemia, secondary choroidal neovascularization and although high costs of PDT were discussed [20, 21]. VEGF is a potent factor for vascular permeability that is produced from damaged retina and choroidal cells after ischemia [22]. Bevacizumab is an anti-VEGF that is effective in reduction of neurosensory detachment [2].

According to our study, one intravitreal bevacizumab injection in all 57 studied eyes caused reduction of central macular thickness and also improvement of visual acuity after 1 month. In study conducted by Lim et al. [23], they found that intravitreal bevacizumab may reduce sub-retinal fluid leakage associated with CSCR. In study of Lim et al. [23], the number of patients were 6 cases who were followed for 3 months. After 1 month of injection, serous detachment was completely absorbed in 4 patients, decreased in 1 patient and no change 1 patient [23]. The sample size in our study was higher than Lim’s study [23] that is considered as the strength of our study. Kim et al. [2] found that after one injection of IVB among 42 studied eyes, sub-retinal fluid completely absorbed in 24% of patient in 1 month and after an average injection of 1.9 IVB in 8.6 months, sub-retinal fluid completely absorbed in 60% of patients [2]. In Lim and Kim’s study [24], after one injection, absorption of sub-retinal fluid was 57.7% over 1 month and 82.5% after 3 months [24]. This absorption rate is also higher than the study conducted by Kim. The reason of greater absorption after 3 months is unknown. In our study, follow-up period was 1 month and at this time all 57 eyes had improved visual acuity, if follow-up was 3 to 6 months, remarkable results could be obtained that is considered of our study weakness. However, various studies showed that IVB injection will cause improvement of visual acuity and absorption of sub-retinal fluid in 50 to 100% of cases [18, 19, 23, 24], but this rate is 100% in our study. In a study of Teng et al. [1], 9 eyes of 12 studied eyes respond to IVB injection. But, in remaining 3 eyes, sub-retinal fluid increased after IVB injection, the reason of this situation is uncertain. According to Teng et al. [1] study, the effectiveness of IVB injection in CSCR treatment is not permanent [1]. Mehany et al. [14] injected IVB in 20 eyes of 20 patients, at 6-month follow-up, 10 eyes with acute CSCR showed an improvement of visual acuity from 0.48 to 0.18 in log MAR. The visual acuity in 10 eyes with chronic CSCR also increased from 0.60 to 0.30 in logMAR [14]. In our study, all patients were in the acute phase and their mean logMAR VA was improved from 0.80±0.36 to 0.30±0.26.

In patients who treated with corticosteroids in last 3 months, IVB decreased central macular thickness, but this difference was not statistically significant. In all cases remarkable difference in visual acuity before and after treatment was observed according to history of
corticosteroid therapy. Wakakura et al. [25] reported that 5 patients with CSCR had history of systemic corticosteroid consumption [25-27]. Wakakura [28] found that 3.3% of studied patients with CSCR were treated with corticosteroids. He stated that receiving daily corticosteroid of 15 mg has a significant effect on the onset of CSCR. According to various studies, it is suggested that CSCR changes blood flow in the choroid and formation of clot in vessels [30, 31]. In current study, the visual acuity was increased and central macular thickness reduced in patients treated with corticosteroid after IVB injection, but it was not statistically significant. Probably, this suggests the hypothesis of non-healing in the presence of corticosteroids.

Study limitations include short duration of follow-up, lack of a control group and retrospective. Therefore, it is suggested that by eliminating these weaknesses we can realize the safety and effectiveness of IVB injection for CSCR.

CONCLUSION

According to the results of this study, intravitreal bevacizumab injection was associated with visual improvement.

REFERENCES


