



TREATMENT OF PIGMENT EPITHELIAL DETACHMENT USING BEVACIZUMAB

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ABSTRACT

Background: Pigment epithelial detachment (PED) is a pathological process in which the retinal pigment epithelium separates from its underlying membrane (Bruch). Although the PED can be spread in macular disorders, coherence of disorder with degenerative age-related macular neovascularization is impressive and can be marker of disease, disease progression and in some cases the indicator as resistance to treatment.

Objective: The aim of this study was to evaluate the effect of bevacizumab in the treatment of pigment epithelial detachment.

Methods: In this retrospective study the data of patients with detachment of pigment epithelial were studied who referred to eye clinic in Imam Khomeini hospital of Urmia, Iran and treated by bevacizumab. Variables of study included age, sex, height of PED before injection of bevacizumab and 1, 3, 6 and 12 months after injection of bevacizumab. Under sterile Conditions and after prepping and draping and setting speculum in aphakic and pseudophakic patients, injection from distance of 3.5mm of limbus and in phakic patients from distance of 4mm of limbus administrated with dosage of 1.25 mg bevacizumab.5 days after surgery, eye drop betamethasone every 4hours and tablet of ciprofloxacin 500 mg every 12 hours were administered.

Results: In this retrospective study, 30 patients with pigment epithelium detachment who have been treated by bevacizumab were studied. Age range was from 58 to 79 years and the average age of the patients was 70.16±5.99 years. In this study 16 patients were female (53.3%) and 14 patients were male (46.7%).The average height of PED before injection was compared to the average height of PED 1, 3, 4 and 12 months after injection and it was significantly different (P=0.001)

Conclusion: Bevacizumab can be an appropriate treatment for patients with pigment epithelium detachment.

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Introduction

Pigment epithelial detachment (PED) is a pathological process in which the retinal pigment epithelium separates from its underlying membrane [1, 2]. Although the PED can be spread in macular disorders, coherence of disorder with degenerative age-related macular neovascularization is impressive and can be marker of disease, disease progression and in some cases the indicator as resistance to treatment. Clinically, PED will be determined as smooth and dome-shaped height in sub-retinal area by Fundoscopy that can be associated with other symptoms of age-related macular degeneration (AMD) such as drusen, sub-retinal fluid, hemorrhage or hyperplasia of the retinal pigment epithelium (RPE). This process is rare and its rate is estimated approximately 1 in 10,000 [3].

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PED detection is usually done with fluorescence angiography. Classically, it has been detected by hyperfluency in total lesion. Choroidal neovascularization can also be seen related to PED in fluorescence angiography [4].

PED is as an important factor in predicting loss of vision in patients with age-related macular degeneration. Nearly half of newly diagnosed patients with PED have more than 3 lines of visual impairment in the follow up period of one year [5]. Four main types of PED in patients with AMD have been identified, including: drusenoid, serous, fibrovascular and hemorrhagic that each of them has distinct characteristics in the ophthalmoscopy, angiography and OCT (tomography of the eye) examination [6, 7].

Over the years, various strategies for the treatment of PED by retinal specialists have been used that they can be treated with anti-VEGF (vascular endothelial growth factor), intravitreal injection of steroids and laser by phaco. If you have smaller PED, there is high likelihood of preservation of visual acuity. According to many studies done in patients given the vast size of PED, there is no consensus on the treatment and management of PED in patients with AMD [8-12]. Most often, PED is caused in the result of laser therapy or treatment with anti-VEGF [14-13].

Little retrospective studies on the effects of anti-VEGF agents for the treatment of PED in AMD patients have done that contradictory, often have shown good results [17-15]. Bevacizumab is one of the common treatments in PED. Bevacizumab inhibits all isoforms of VEGF by blocking the interaction with membrane receptors VEGFR-1 and VEGFR-2 tyrosine kinase [18, 19]. This action cause the blockage of activation of the intracellular tyrosine kinase that inhibits cell proliferation caused by VEGF, survival and permeability and production of nitric oxide [20-23].

PED is as one of the causes of vision loss in the world is that there is no single treatment for it and one of the world's health problems is that in spite of the abundant studies, conflicting results have been reported. Given that this disease is one of the causes of loss of vision and according to some studies which the positive effects of VEGF antibodies is mentioned in the treatment of PED, but it is not considered as definitive treatment of PED, this retrospective study conducted to investigate the effect of VEGF antibodies in patients who were prescribed bevacizumab for them.

Material and Methods

In this retrospective study the data of patients with detachment of pigment epithelial were studied who referred to eye clinic in Imam Khomeini hospital of Urmia, Iran and treated by bevacizumab. Variables of study included age, sex, height of PED before injection of bevacizumab and 1, 3, 6 and 12 months after injection of bevacizumab. Under sterile Conditions and after prepping and draping and setting speculum in aphakic and pseudophakic patients, injection from distance of 3.5mm of limbus and in phakic patients from distance of 4mm of limbus administrated with dosage of 1.25 mg bevacizumab.5 days after surgery, eye drop betamethasone every 4hours and tablet of ciprofloxacin 500 mg every 12 hours were administered. The data, in case of incomplete information, were excluded.

Data analysis

The quantitative variables were reported as mean \pm standard deviation, and the qualitative variables were reported as frequency (%) in the form of the table and the appropriate charts. for comparison the average amount of dependent variables, in the case of having normal distribution, Chi-square and in case of having non-normal distribution, Mann-Whitney test were erformed. And in order to compare between the age groups (more than two), ANOVA test for normal data and Kruskal-Wallis test for non-normal data were performed. The data were analyzed using spss22 software and the level of significance was considered less than 0.05.

Results

In this retrospective study, 30 patients with pigment epithelium detachment who have been treated by bevacizumab were studied. These patients were selected using census sampling. Age range was from 58 to 79 years and the average age of the patients was 70.16 ± 5.99 years. In this study 16 patients were female (53.3%) and 14 patients were male (46.7%) (Table 1). The average height of PED before injection was compared to the average height of PED 1, 3, 4 and 12 months after injection and it was significantly different ($P=0.001$). The height of PED patients before injection, 1 month after injection, 3 months after injection, 6 months and 12 months after injections were measured (Table 2).

After measuring the average height of the PED were compared in the months before and after injection using T-test test. So that the results of these measurements 1 month after injection, 3 months after injection, 6 months and 12 months after injection were statistically significant difference in outcomes ($P<0.001$). Visual acuity of patients before and after an injection in the order of month, 1, 3, 6, and 12 were measured after injection. The average Visual acuity patients (Table 3).

After collecting the whole data, the visual acuity of patients in different months after injection were compared with the visual acuity of patients before injection using Chi-square test. The results were as following:

The visual acuity of patients 1 month after injection had significant differences with the visual acuity of patients before injection. ($P<0.001$)

The visual acuity of patients 3 months after injection had significant differences with the visual acuity of patients before injection. ($P<0.001$)

The visual acuity of patients 6 months after injection had significant differences with the visual acuity of patients before injection. ($P<0.001$)

The visual acuity of patients 12 months after injection had significant differences with the visual acuity of patients before injection. (P<0.001)

Table 1. Sex distribution of participants in this study

Sex	Frequency	Percent
Female	16	53.3%
Male	14	46.7%

Table 2. The height of PED patients before injection and after injection

The height of PED	Minimum	Maximum	Mean ± SD
before injection	100	300	207±50.18
1 month after injection	0	200	121.66±61.81
3 month after injection	0	150	59.33±51.85
6 month after injection	0	150	45.66±51.30
12 months after injection	0	150	49.59±37.66

Table 3. The visual acuity of patients before injection and after injection

Visual Acuity	Mean ± SD
Before injection	9.33±5.37
1 month after injection	18.9±5.37
3 months after injection	32.3±16.7
6 months after injection	39.6±16.5
12 months after injection	44.06±19.3

Discussion

In this retrospective study the data of patients with detachment of pigment epithelial were studied who referred to eye clinic and treated by bevacizumab. Variables of study included age, sex, height of PED before injection of bevacizumab and 1, 3, 6 and 12 months after injection of bevacizumab. In all times, differences were significant. As well as the visual acuity of patients before and after injection in each months had statistically significant difference.

In one study conducted by Eric Chen et al., in 2007 in Texas with the aim of a new treatment with vascular endothelial growth factor in the treatment of macular degeneration [24], 9 out of the 10 patients had stable or improved vision, and the results showed intravitreal bevacizumab can be considered as a treatment for patients with fibrovascular PED. In our study, also due to reduction in the average of PED after bevacizumab injection and improvement of visual acuity, it can be concluded that bevacizumab can be used in the treatment of pigmented epithelium detachment.

In the study of Bolz Matthias et al., in 2007 in Vienna of Austria, the effect of bevacizumab systemic (Avastin H) in the treatment of separation of epithelial pigment (PED) secondary to age-related macular degeneration (AMD) and to identify prognostic factors of PED and improvement in visual acuity (BCVA) was investigated [25], according to the results of this study, bevacizumab reduced the height of PED and improved the patient's vision. So that these results were consistent with our study which showed the positive effects of bevacizumab in the treatment of visual acuity in patients with pigment epithelium detachment.

In the study of Chiharo et al., in 2009 in Japan with the objective of evaluating the effect of combined treatment of photodynamic and intravitreal bevacizumab in patients with pigment epithelial detachment (PED) associated with age-related macular degeneration was done [22], after 1 year, the average height of the PED was 413 Micron compared to the primary height with 751 Micron, then it was dropped (P<0.001) and 20 eyes (91%) had improved their visual acuity.

According to the results obtained from our study, bevacizumab reduced the average height of PED and improved the visual acuity.

Conclusion

In total according to the results, Bevacizumab can be an appropriate treatment for patients with pigment epithelium detachment. It is suggested that further studies be done with large sample size and more variable in long time intervals to obtain the results with more confidence.

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Conflict of Interest:

There is no conflict of interest to be declared.

Authors' contributions:

All authors contributed to this project and article equally. All authors read and approved the final manuscript.

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