ORIGINAL ARTICLE

Effect of Intravitreal Bevacizumab for the Treatment of Diabetic Macular Edema

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ABSTRACT

Objective: Effect of intravitreal bevacizumab for the treatment of diabetic macular edema

Subjects and Methods: This multicentre study was carried out at Shaikh Zaid Hospital, Rahim Yar Khan and Allama Iqbal Memorial Teaching Hospital Sialkot from 1st June 2016 to 31st December 2016. A total of 100 cases of diabetic macular edema between 40-70 years of either gender were included. The patients were examined in detail and history was also recorded. Baseline ocular examination was done by using OCT OCT (Zeiss 4000), one week before the procedure macular thickness was recorded. Intravitreal injection of 1.25 mg/0.05ml of Bevacizumab (Avastin) was administered by using 3.5-4mm from limbus under local anaesthesia. Post procedure OCT examination was done to record macular thickness after 12 weeks of injection. Mean decrease in central macular was recorded.

Results: Out of the 100 Patients, age range was 32 to 68 years (mean age was 53.38±10.18 years, 64 were males and 36 were females. We recorded 12.54±8.78 years as mean duration of diabetes. Out of the 100 treated cases, only 29% (n=29%) had good glycemic control while remaining 71% (n=71) had poor glycemic control, mean HbA1c level was recorded as 8.21±3.14. Pre-treatment macular thickness was 378.47±27.45 µm and post Avastin OCT after 4 weeks was recorded as 318.16±28.21 and it shows 60.31±0.76 µm (P value 0.001).

Conclusion: Intravitreal bevacizumab injection is an effective agent for a significant reduction in diabetic macular edema and prolongs to 12 weeks of administration

Keywords: Diabetic macular edema, Intravitreal Bevacizumab, Efficacy

INTRODUCTION

In Pakistan, diabetes mellitus (DM) has become a major health problem in recent years and falls in top ten countries with higher rate of diabetes mellitus. In coming ten years more than 10million people may be affected with diabetes mellitus.[1] Type II diabetes mellitus is recorded in 10% approximately while this morbidity is common in people with >30 years of age.[2] Diabetics may face a serious ophthalmic disease even in absence of any symptoms and it may lead to a permanent vision loss.[3] One of the common causes of vision loss is macular edema in cases with diabetes mellitus. Un-control glycemic level may leads to capillary damage which may results in microaneurysm formation into the retina. Leakage from these microaneurysms become the cause of vision loss if the fluid involves the center of the fovea.[4]

Intravitreal Bevacizumab injection is found to be effective for the treatment of macular edema by improving vision through reducing macular thickness in cases suffering with diabetic macular edema, it is used as an initial treatment agent while in those cases not successfully treated with laser therapy may be recommended.[5-6] Due to various conditions, Avastin is being widely used off-label throughout the world. One of the reasons is its easily availability parallel to the cost-effectiveness. Even having promising outcome in choroidal neovascularization, maculuar edema and retinopathy, no authentic data is available on safety of Avastin.[7]

This study was planned with the view that previous data[8-9] is significantly variant results regarding decrease in central macular thickness, however, the results of this study may provide authentic information in our population.

MATERIAL AND METHODS

In this prospective cross sectional survey, we included a total of 100 cases of diabetic macular edema between 40-70 years of either gender. The cases having history of treatment of DME with scatter PRP and Grid laser within the prior 6 months, uncontrolled diabetes (HbA1c>7.0 assessed on laboratory), chronic renal dysfunction and hypertension and those with optic disc pathology due to chronic glaucoma were excluded from this study. This multicentre study was carried out at Shaikh Zaid Hospital, Rahim Yar Khan and Allama Iqbal Memorial Teaching Hospital Sialkot from 1st June 2016 to 31st December 2016 All patients were explained the procedure and procedure of this study, informed

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consent of the patients was also obtained in written form. The patients were examined in detail and history was also recorded. Baseline ocular examination was done by using OCT OCT (Zeiss 4000), one week before the procedure macular thickness was recorded. Intravitreal injection of 1.25 mg/0.05ml of Bevacizumab (Avastin) was administered by using 3.5-4mm from limbus under local anaesthesia. Post procedure OCT examination was done to record macular thickness after 12 weeks of injection. Mean decrease in central macular was recorded on a designed proforma.

RESULTS

Out of the 100 Patients, age range was 32 to 68 years (mean age was 53.38±10.18 years (Table 1). Sixty four were males and 36 were females (Tale 2). We recorded 12.54±8.78 years as mean duration of diabetes. Out of the 100 treated cases, only 29% (n=29%) had good glycemic control while remaining 71% (n=71) had poor glycemic control, mean HbA1c level was recorded as 8.21±3.14. Pre-treatment macular thickness was 378.47±27.45 µm and post Avastin OCT after 4 weeks was recorded as 318.16±28.21 and it shows 60.31±0.76 µm, p value was 0.001 (Table 3).

Table 1: Age distribution (n=100)

Age(in yeas)	No. of patients	%
32-50	37	37
51-68	63	63
Total	**100**	**100**
Mean±SD	**53.38±10.18**	

Table 2: Gender distribution (n=100)

Gender	No. of patients	%
Male	64	64
Female	36	36
Total	**100**	**100**

Table 3: Mean macular thickness (n=100)

Macula thickness	Mean	SD
Before treatment	378.47	27.45
After treatment	318.16	28.21
Mean difference	60.31	0.76
P value	0.0001	

DISCUSSION

Diabetic macular edema is a prognosis of diabetic retinopathy and leads to severe visual impairment. Various treatment modalities are available and under researcher, among them laser photocoagulation is considered as an effective method for reducing the risk of loss of vision.[10] However, ophthalmologists are interested in other method of treatment including pharmacologic therapy in addition with oral protein kinase C inhibitors while the intravitreal corticosteroids are also included with the fact that various laser-treated diabetic macular edema do not show desired improvements in visual acuity.[11-12] Antibodies targeted to Vascular endothelial growth factor (VEGF) also generated a significant interest and are under research.

Bevacizumab is found to be a full-length humanized monoclonal antibody which helps in binding and inhibiting all biologically active isoforms of Vascular endothelial growth factor(VEGF). Though pre-clinical experimental studies are reveal that full-length antibody may not penetrate into the internal limiting membrane of the retina, but recent trials are of the view that full-thickness penetration of retina is found within 24 hours.[13-14] According to our knowledge, no study recorded drug-related toxic effects in structure of the retina.[15-20] Intravitreal injection of bevacizumab is found to be effective for the management of wet AMD being the new management option. Presently, intravitreal bevacizumab injection in age-related macular degeneration is found to be effective in increase in visual acuity while reduction in retinal thickness.[21-22] Previous data reveal that pegaptanib treated cases had good visual acuity outcome, reduction of remarkable central retinal thickness and very few cases were in need of additional photocoagulation therapy when followed up.[23] Considering this fact, intravitreal bevacizumab injection was hypothesized with good effect while managing diabetic macular edema.

Haritoglou and othes[18] in a prospective, noncomparative case series including diabetic macular edema treated with bevacizumab (1.25 mg) and recorded a considerable decrease in macular thickness after 2 weeks of injection, (p=0.002) while the visual acuity was also improved significantly after 6 weeks of injection (p=0.02), while it could not be sustained at 12 weeks of follow-up. In the current study, we recorded a significant decrease in retinal thickness immediately after the intravitreal bevacizumab injection is administered, while this effect was prolonged to 3 months. Mean central retinal thickness was measured with by using OCT also showed a remarkable decrease from baseline to follow-up (p<0.001).

Another study in a review of clinical records in patients with diabetic macular edema reveals mean central macular thickness at baseline as 387.0±182.8 micorgram which was reduced to 275.7±108.3. They recorded no evidence of systemic or ocular events.[25]

Another study, recorded mean pre Avastin macular thickness as 384.38 ± 40.51 micrometers and post Avastin OCT after one month showed mean thickness of 323.19±32.58 micrometers showing mean decrease as 61.19+7.93 µm.[8] Another study

revealed that mean retinal thickness at baseline was calculated as 411±170 µm while after one month of Avastin it was recorded as 380±159µm, mean decrease was 31.0±11 µm.[9]

The results of our study in agreement with other studies showing that intravitreal bevacizumab injection is an effective agent for a significant reduction in diabetic macular edema and prolongs to 12 weeks of administration with no ocular or retinal side effects.

CONCLUSION

Intravitreal bevacizumab injection is an effective agent for a significant reduction in diabetic macular edema and prolongs to 12 weeks of administration

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