International Journal of Medical Research Professionals
P-ISSN: 2454-6356; E-ISSN: 2454-6364
DOI: 10.21276/ijmrp

Original Research Article.

Evaluation of Intravitreal Bevacizumab for Treatment of Diffuse Diabetic Macular Edema: An Institutional Based Study

Rajkumar Gupta

**Associate Professor, Department of Ophthalmology,
Rajshree Medical Research Institute, Bareilly, Uttar Pradesh, India.**

ABSTRACT

Background: Diabetic retinopathy (DR) is a leading cause of vision loss in working-age patients around the world. The main cause of vision impairment in diabetic patients is diabetic macular edema (DME). Hence; the present study was planned for assessing efficacy of Intravitreal bevacizumab for treatment of diffuse diabetic macular edema.

Materials & Methods: A total of 20 patients with confirmed diagnosis of presence of DME were enrolled. 20 eyes of 20 patients were analysed for the present study. All the patients were treated with at least one intravitreal injection of 1.25 mg of bevacizumab. Each patient underwent a complete eye examination, including determination of visual acuity and retinal thickness measurement. All the examination procedures were carried out at baseline and at 3 months follow-up.

Results: Mean Baseline Visual acuity was 0.79 logMAR while mean baseline central retinal thickness was 505.1 µm. After 3 months follow-up, mean Visual acuity was 0.61 logMAR while mean central retinal thickness was 416.8 µm. Significant results were obtained while comparing the mean central retinal thickness and visual acuity at final follow-up.

Conclusion: In treating patients with diffuse diabetic macular edema, intravitreal injection of bevacizumab leads to improvement of visual acuity and decrease of retinal thickness.

Key words: Intravitreal Bevacizumab, Diffuse Diabetic Macular Edema.

***Correspondence to:**

Dr. Rajkumar Gupta,
Associate Professor,
Department of Ophthalmology,
Rajshree Medical Research Institute,
Bareilly, Uttar Pradesh, India.

Article History:

Received: 02-08-2019, **Revised:** 25-08-2019, **Accepted:** 17-09-2019

Access this article online	
Website: www.ijmrp.com	Quick Response code
DOI: 10.21276/ijmrp.2019.5.5.069	

INTRODUCTION

Diabetic retinopathy (DR) is a leading cause of vision loss in working-age patients around the world. DR is related to 1% of all cases of blindness worldwide, and it may be related to 5% of blindness in some countries. The main cause of vision impairment in diabetic patients is diabetic macular edema (DME). DME may occur at any stage of non-proliferative or proliferative DR. Macular edema is divided into two types: focal and diffuse. Focal macular edema is caused by focal leakage from microaneurysms and dilated retinal capillaries with abnormal permeability. Complete or partial rings, as a circinate pattern of hard exudates, often demarcate the macular edema. In diffuse macular edema, generalized leakage from dilated capillaries is observed throughout the posterior pole. Occlusion of a portion of the capillary bed causes dilation of the patent capillaries, which tend to leak, leading to edema. The risk factors associated with diffuse macular edema are systemic hypertension, adult-onset diabetes mellitus and poor blood glucose control, cardiovascular disease, impaired renal function, increased number of retinal microaneurysms, advanced retinopathy and vitreomacular traction.[1-3]

VEGF was first isolated from guinea pig ascites. The upregulation of VEGF is associated with breakdown of the blood– retina barrier, with increased vascular permeability resulting in retinal edema, stimulation of endothelial cell growth, and neovascularization. One such VEGF inhibitor is bevacizumab (Avastin; Genentech, Inc., South San Francisco, CA), a US Food and Drug Administration–approved full-length humanized monoclonal antibody that until recently was used for the treatment of metastatic colorectal cancer.[4-6] Hence; the present study was planned for assessing efficacy of Intravitreal bevacizumab for treatment of diffuse diabetic macular edema.

MATERIALS & METHODS

The present study was planned for assessing efficacy of Intravitreal bevacizumab for treatment of diffuse diabetic macular edema at Department of Ophthalmology, Rajshree Medical Research Institute, Bareilly, Uttar Pradesh, India. A total of 20 patients with confirmed diagnosis of presence of DME were enrolled. 20 eyes of 20 patients were analysed for the present study.

All the patients were treated with at least one intravitreal injection of 1.25 mg of bevacizumab. Each patient underwent a complete eye examination, including determination of visual acuity and retinal thickness measurement.

All the examination procedures were carried out at baseline and at 3 months follow-up. All the results were recorded and analysed by SPSS software. Student t test was used for evaluation of level of significance.

Table 1: Demographic profile

Variable	Number
Mean age (years)	48.3
Males (%)	60
Females (%)	40
Mean duration of diabetes	14.8 years

Table 2: Comparison of mean visual acuity.

Visual acuity	Baseline	3 months follow-up
Mean	0.79	0.61
SD	0.16	0.12
p- value	0.00 (Significant)	

Table 3: Comparison of central retinal thickness

Central retinal thickness	Baseline	3 months follow-up
Mean	505.1	416.8
SD	59.4	51.3
p- value	0.02 (Significant)	

RESULTS

In the present study, a total of 20 patients with presence of diffuse DME were enrolled. Mean age of the patients was 48.3 years. Among these 20 patients, 12 were males while 8 were females. Mean duration of diabetes among patients was 14.8 years. Mean Baseline Visual acuity was 0.79 logMAR while mean baseline central retinal thickness was 505.1 µm. After 3 months follow-up, mean Visual acuity was 0.61 logMAR while mean central retinal thickness was 416.8 µm. Significant results were obtained while comparing the mean central retinal thickness and visual acuity at final follow-up.

DISCUSSION

Diabetic retinopathy is a common ocular complication of diabetes mellitus and is the most common cause of blindness in people of working age. Diabetic retinopathy represents a major socioeconomic problem. Approximately 90% of patients with type 1 diabetes become legally blind because of proliferative diabetic retinopathy and/or development of macular edema, despite the availability of several effective therapeutic options such as laser treatment or vitreoretinal surgery. However, especially in macular edema, laser treatment is not always beneficial. Food and Drug Administration (FDA) has approved bevacizumab (Avastin, Genentech Inc. South San Francisco, CA, USA) a fusion protein with human antibody backbone against VEGF, it binds and inhibits all the active forms of VEGF and is used in the treatment of metastatic colorectal cancer.[6- 10] Hence; the present study was planned for assessing efficacy of Intravitreal bevacizumab treatment of diffuse diabetic macular edema

In the present study, a total of 30 patients with presence of diffuse DME were enrolled. Mean age of the patients was 48.3 years. Among these 20 patients, 12 were males while 8 were females. Mean duration of diabetes among patients was 14.8 years. Mean Baseline Visual acuity was 0.79 logMAR while mean baseline central retinal thickness was 505.1 µm. Kumar A et al reported the anatomic and visual acuity response after intravitreal bevacizumab (Avastin) in patients with diffuse diabetic macular edema. Their study included 20 eyes of metabolically stable diabetes mellitus with diffuse diabetic macular edema with a mean age of 59 years who were treated with two intravitreal injections of bevacizumab 1.25 mg in 0.05 ml six weeks apart. No adverse events were observed, including endophthalmitis, inflammation and increased intraocular pressure or thromboembolic events in any patient. The mean baseline acuity was 20/494 (log Mar=1.338±0.455) and the mean acuity at three months following the second intravitreal injection was 20/295 (log Mar=1.094±0.254), a difference that was highly significant (P =0.008). The mean central macular thickness at baseline was 492 µm which decreased to 369 µm (P =0.001) at the end of six months. Initial treatment results of patients with diffuse diabetic macular edema not responding to previous photocoagulation did not reveal any short-term safety concerns.[11]

In the present study, after 3 months follow-up, mean Visual acuity was 0.61 logMAR while mean central retinal thickness was 416.8 µm. Significant results were obtained while comparing the mean central retinal thickness and visual acuity at final follow-up. Seo JW et al evaluated the effect of intravitreal bevacizumab on visual function and retinal thickness in patients with diabetic macular edema (DME). Thirty eyes of twenty-eight patients (mean age, 57.9±13.8 years) with DME were included in this study. Complete ophthalmic examination, including determination of best-corrected visual acuity (BCVA), stereoscopic biomicroscopy, and retinal thickness measurement by optical coherence tomography (OCT), was done at baseline and at each follow-up visit. All patients were

treated with a 0.05 mL intravitreal injection containing 1.25 mg of bevacizumab. All patients completed 3 months of follow-up with a mean follow-up period of 5.26±2.39 months. The mean BCVA at baseline was 0.73±0.36 logMAR, which significantly improved to 0.63±0.41 (p=0.02), 0.58±0.36 (p=0.003), and 0.61±0.40 logMAR (p=0.006) at 1 week, 1 month, and 3 months. Final BCVA analysis demonstrated that 15 eyes (50%) remained stable and 12 (40%) improved ≥2 lines on BCVA. The mean central retinal thickness was 498.96±123.99 µm at baseline and decreased to 359.06±105.97 (p<0.001), 334.40±121.76 (p<0.001), 421.40 ±192.76 µm (p=0.035) at 1 week, 1 month, and 3 months. No ocular toxicity or adverse effects were observed. Intravitreal bevacizumab injection resulted in significant improvement in BCVA and central retinal thickness as early as 1 week after injection in patients with DME, and this beneficial effect persisted for up to 3 months.[12]

CONCLUSION

From the above results, it can be concluded that in treating patients with diffuse diabetic macular edema, intravitreal injection of bevacizumab leads to improvement of visual acuity and decrease of retinal thickness. However; further studies are recommended.

REFERENCES

1. Campochiaro PA, C99-PKC412-003 Study Group. Reduction of diabetic macular edema by oral administration of the Protein Kinase C inhibitor PKC 412. Invest Ohthalmol Vis Sci. 2004;45:922–31.
2. Yang JC, Haworth L, Sherry RM, et al. A randomized trial of bevacizumab, an anti-vascular endothelial growth factor antibody, for metastatic renal cancer. N Engl J Med 2003;349: 427–34.
3. Marshall J. The role of bevacizumab as first-line therapy for colon cancer. Semin Oncol 2005;32:S43–S47.
4. Michels S, Rosenfeld PJ, Puliafito CA, et al. Systemic bevacizumab (Avastin) therapy for neovascular age-related macular degeneration: twelve-week results of an uncontrolled open-label clinical study. Ophthalmology 2005;112:1035–47.
5. Maturi RK, Bleau LA, Wilson DL. Electrophysiologic findings after intravitreal bevacizumab (Avastin) treatment. Retina 2006;26:270–4.
6. Manzano RP, Peyman GA, Khan P, Kivilcim M. Testing intravitreal toxicity of bevacizumab (Avastin). Retina 2006; 26:257–61.
7. Cunningham ET Jr, Adamis AP, Altaweel M, et al. Macugen Diabetic Retinopathy Study Group. A phase II randomized double-masked trial of pegaptanib, an anti-vascular endothelial growth factor aptamer, for diabetic macular edema. Ophthalmology 2005;112:1747–57.
8. Thapa R, Poudyal G. Short term results of Intravitreal bevacizumab for the treatment of macular edema secondary to retinal vein occlusion. Nepal J Ophthalmol. 2013;5:63–8.
9. Robert L, Avery MD, Dante J, Reramici MD, Melvin D, Rabena BS, et al. Intravitreal bevacizumab (Avastin) for neovascular Age-Related Macular Degeneration. Ophthalmology.2006;113:363–72.
10. Ozkiris A, Erkilic K. Complication of intravitreal injection of triamcinolone acetonide. Can J Ophthalmol. 2005;40:63–8.
11. Kumar A, Sinha S. Intravitreal bevacizumab (Avastin) treatment of diffuse diabetic macular edema in an Indian population. Indian J Ophthalmol. 2007;55(6):451-5.
12. Seo JW, Park IW. Intravitreal bevacizumab for treatment of diabetic macular edema. Korean J Ophthalmol. 2009;23(1):17-22.

Source of Support: Nil.

Conflict of Interest: None Declared.

Cite this article as: Rajkumar Gupta. Evaluation of Intravitreal Bevacizumab for Treatment of Diffuse Diabetic Macular Edema: An Institutional Based Study. Int J Med Res Prof. 2019 Sept; 5(5): 301-03. DOI:10.21276/ijmrp.2019.5.5.069