



## One Year Visual Results After Intravitreal Bevacizumab for Macular Edema Secondary To Branch Retinal Vein Occlusion

### KEYWORDS

academic medicine, medical students, teaching, research.

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**ABSTRACT** Purpose: To determine the effect of intravitreal bevacizumab on visual acuity in patients with macular edema secondary to branch retinal vein occlusion.

**Material and Methods:** This prospective non-randomized clinical interventional study with Convenience (Non Probability) sampling was conducted at SMHS Hospital, Srinagar; from May 2013 to June 2014. Twenty eyes of twenty patients received a single injection of Bevacizumab in a dose of 1.25 mg/0.05 ml. The visual acuity was measured pre injection and at 4, 8 and 12 weeks post injection using Snellen's visual acuity chart.

**Results:** At presentation 50% of the patients presented with best corrected visual acuity of 6/60 or worse, 35% were in between 6/60 and 6/24 where as 15 % were 6/18 or better. On the 3rd post injection follow up month 5% of the patients were with best corrected visual acuity of 6/60 or worse , 30 % were in between 6/60 and 6/24 where as 65% were 6/18 or better. The results are statistically significant (p value less than 0.05). Conclusions: Intravitreal therapy using bevacizumab appears to be an effective treatment for improvement of vision in patients with macular oedema secondary to branch retinal vein occlusion. The positive results though based on short term basis, encourage studies to be conducted on a longer follow up period.

### INTRODUCTION

Branch retinal vein occlusion (BRVO) is a common retinal vascular disease seen most frequently in individuals who are older than 50 years<sup>1</sup>. The usual complaint of the patients is sudden loss of vision or visual field defect. The vision is decreased due to complications like macular edema, retinal capillary non-perfusion and vitreous haemorrhage from neovascularisation. Macular edema is the major cause of visual disturbance in BRVO, occurring in about 60% of cases<sup>2</sup>. Only proven treatment modality for eyes with macular edema secondary to BRVO is macular grid laser photocoagulation. But after grid laser photocoagulation the visual acuity improvement is often very limited (average improvement in vision of 1.33 Snellen's lines)<sup>3</sup>. It may also be associated with several complications including sub macular fibrosis, visual field sensitivity deterioration, enlargement of laser scar and choroidal neovascularisation. This insufficient response to laser therapy has led researchers for other therapeutic options. Several studies have demonstrated the usefulness of intravitreal injection of anti-vascular endothelial growth factor (anti-VEGF) agents, such as bevacizumab and ranibizumab in dealing with macular edema due to BRVO<sup>4,5</sup>. In smaller case series, bevacizumab has been shown to improve visual acuity (VA) and decrease central retinal thickness (CRT) in macular edema secondary due to central retinal vein occlusion<sup>6</sup>.

The purpose of this study was to determine the effect of intravitreal bevacizumab on visual acuity in patients with macular edema secondary to branch retinal vein occlusion.

### MATERIAL AND METHODS

This prospective non-randomized clinical interventional study with Convenience (Non Probability) sampling was conducted in the department of ophthalmology of SMHS Hospital, Srinagar; from May 2013 to June 2014. The patients were first allotted the hospital registration number

before proceeding to the examination. Systemic history was taken and general physical examination was done. Complete eye examination was performed including Snellen's best corrected visual acuity (BCVA), intraocular pressure measurement by Goldmann's applanation tonometry, slit-lamp biomicroscopy and indirect ophthalmoscopy.

Twenty patients with acute attack of branch vein occlusion, with duration not more than a month, were selected for the study. We excluded those patients whom best corrected visual acuity was better than 6/12 on initial presentation, who had history of diabetes or nephropathy or previous treatment for BRVO and had other retinal pathologies like glaucoma, diabetic retinopathy and hypertensive retinopathy.

The study procedure and its aim were explained to all the patients before beginning the treatment and they had to sign an informed written consent form.

All intravitreal injections of Bevacizumab (1.25 mg/0.05ml) were performed under topical anesthesia in the operation theatre. Patients used topical antibiotics (moxifloxacin 0.5%, Vigamox Alcon) 4 times per day for 1 week after the injection. The patients were examined after 4, 8 and 12 weeks. On each visit routine evaluation comprising of Snellen's best corrected visual acuity (BCVA), intraocular pressure measurement by Goldmann's applanation tonometry, slit-lamp biomicroscopy and indirect ophthalmoscopy, were done.

All data were analyzed using SPSS 13.0 for windows. The paired t-test was used for comparison of preoperative and post operative BCVA and p value of <0.05 was considered statistically significant.

## RESULTS

The study was completed in period of one year and a total of 20 eyes of 20 patients. There were 11 (55%) males and 9 (45%) females with a mean and standard deviation of 57±1.3.

**Table – 1:**  
**Gender Distribution**

Gender	No. of Patients	Percentage
Male	11	55
Female	9	45
Mean ± SD	57.0 ± 1.3	

At presentation 50% of the patients presented with best corrected visual acuity of 6/60 or worse, 35% were in between 6/60 and 6/24 where as 15 % were 6/18 or better.

After one month Post injection 25% of the patients were with best corrected visual acuity of 6/60 or worse , 45% were in between 6/60 and 6/24 where as 30 % were 6/18 or better.

Follow up on second Post injection month showed 5% of the patients were with best corrected visual acuity of 6/60 or worse ,35 % were in between 6/60 and 6/24 where as 60 % were 6/18 or better.

On the 3rd post injection follow up month 5% of the patients were with best corrected visual acuity of 6/60 or worse , 30 % were in between 6/60 and 6/24 where as 65% were 6/18 or better.

BCVA	At Presentation	1 <sup>st</sup> Month Post Injection	2 <sup>nd</sup> Month Post Injection	3 <sup>rd</sup> Month Post Injection
6/60 or worse	10	5	1	1
6/60 – 6/24	7	9	7	6
6/18 or better	3	6	12	13

There was improvement of at least 2 Snellen's line in visual acuity of all the patients. After comparing the visual acuities at presentation and 3rd month post injection there was statistically significant difference of p value less than 0.05.

## DISCUSSION

Bevacizumab has been used on "off – label" basis since 2005. Intravitreal bevacizumab was first used by Pai et al<sup>7</sup> as a treatment for macular edema related to BRVO. The major stimulus for macular edema and neovascularisation seems to be hypoxia-induced production of vascular endothelial growth factor (VEGF), an angiogenic factor that promotes angiogenesis and increases vascular permeability<sup>4</sup>. The intravitreal bevacizumab has been met with great enthusiasm as an anti VEGF.

Consequently, there have been other reports of short-term beneficial effect of intravitreal bevacizumab to treat macular edema secondary to retinal vascular disease, including central retinal vein occlusion<sup>6</sup> and diabetic retinopathy<sup>8</sup>. Gunduz<sup>9</sup> reported a dramatic improvement in the visual acuity with significant macular thickness reduction after intravitreal bevacizumab injections (1.25 mg / 0.05 ml) for patients with BRVO. Jaissle et al<sup>10</sup> demonstrated for the

first time a significant long-term effect of intravitreal bevacizumab (1.25 mg / 0.05 ml) for the macular oedema due to BRVO. Their study showed a 39% reduction of the median central retinal thickness and increase of visual acuity to 6/12 at 48 weeks. The result of a prospective clinical trial carried out by Prager et al<sup>11</sup> showed that in the BRVO group after intravitreal bevacizumab (1 mg / 0.04 ml) visual acuity increased from 55 ETDRS letters at baseline to 73 ETDRS letters and central retinal thickness decreased significantly after 1 year of follow-up. In our study, we observed significant improvement in visual acuity, 30% of the patients ended up with visual acuity between 6/60 and 6/24 where as 65% with 6/18 or better. All of the patients experienced a significant increase in visual acuity from pre-operatively to a final best postoperative visual acuity with improvement of at least 2 Snellen's lines postoperatively.

Some limitations are inherent in our study, such as the small sample size, limited duration of follow-up, non-randomized trial and also as the nature of treatment was prophylactic. The effects of bevacizumab have been reported to be temporary by Gundüz<sup>9</sup> and Jaissle et al<sup>10</sup>. Other reports by Rabena<sup>4</sup> also disclosed similar results with periods ranging from 2 to 3 months from the last intravitreal bevacizumab to recurrence of macular oedema. Large prospective, randomized clinical trials are necessary to compare the long-term efficacy of intravitreal bevacizumab for patients with macular oedema associated with BRVO.

## CONCLUSION

The positive result of this short term study are very encouraging and suggests for a longer randomized study to find out long term efficacy of intravitreal bevacizumab in cases of Branch vein occlusion with macular edema.

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