

## Long-term Outcome of Laser Photocoagulation Combined with Ranibizumab Intravitreal Injection in Macular Edema Secondary to Retinal Vein Occlusion

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### Abstract

**Objective:** To investigate the efficacy of laser photocoagulation combined with ranibizumab intravitreal injection in macular edema secondary to retinal vein occlusion in long term.

**Methods:** 35 eyes with branch retinal vein occlusion (BRVO) and 37 eyes with central retinal vein occlusion (CRVO) treated with or without laser combined with ranibizumab were investigated in this retrospective study. Laser was conducted 7-10 days after the third ranibizumab injection if fluorescein angiography showed ischemic area. In BRVO, patients may receive both macular grid and local peripheral retinal laser. In CRVO, patients just received peripheral retinal laser. We estimated the changes in visual acuity, central retinal thickness (CRT), number of injections and laser over 14 months.

**Results:** Both BCVA and CRT improved significantly in BRVO ( $P < 0.05$ ) but only CRT improved significantly in CRVO ( $P < 0.05$ ) among 14 months. The mean number of injections was 4.06 in BRVO and 8.14 in CRVO. Mean number of macular grid and peripheral laser was 0.31 and 0.86 in BRVO. Mean number of peripheral laser was 0.41 in CRVO.

**Conclusion:** Laser photocoagulation was important to patients with macular edema secondary to RVO after ranibizumab injections and may reduce the number of injections relatively in long term.

### Keywords:

Laser photocoagulation; Ranibizumab; Vascular endothelial growth factor; Retinal vein occlusion; Macular edema; Efficacy; Central retinal thickness

### Introduction

Retinal vein impediment (RVO) is a typical retinal vascular issue. Macular edema is the significant confusion that can cause vision misfortune. The administration of macular edema due to RVO has changed after some time. Treatment choices for macular edema with RVO incorporate laser photocoagulation and intravitreal infusions. Laser treatment can improve oxygenation in the treated region by causing tightening of the blocked vein and the adjoining arteriole coming about diminished edema. The laser photocoagulation was viewed as the highest quality level treatment for more than twenty years. In any case, visual recuperation with laser is generally inadequate and moderate. As of late, intravitreal against vascular endothelial development factor (VEGF) specialists have demonstrated safe and adequacy which are considered the firstline treatment choice for macular edema auxiliary to RVO. Be that as it may, about half of the patients require rehash intravitreal hostile to VEGF infusion as long as 4 years in the wake of starting treatment to continue the visual increases.

Despite the fact that enemy of vascular endothelial development factors (VEGF) have proclaimed another time which demonstrates fast recuperation of vision and nature of vision, RVO patients persevered through immense money related weight particularly in creating or immature countries. We did this investigation and would have liked to look after vision, diminish number of infusions and the money related weight by laser joined ranibizumab infusion treatment.

All subjects were affirmed by the ophthalmology branch of Beijing Hospital for a definite assessment including BCVA, intraocular pressure, cut light biomicroscopy, enlarged fundoscopic assessments, optical soundness tomography and fundus fluorescein angiography (FFA) of the two eyes, and determined to have BRVO or CRVO. During each visit, they got BCVA, intraocular pressure, slitlamp biomicroscopy, enlarged fundoscopic assessments and optical

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lucidity tomography. FFA was reconducted 7-10 days after third infusions and afterward per 3 months.

Every one of them got at least 3 introductory month to month ranibizumab 0.05mg infusions. At that point if there was vision misfortune or macular edema repeat appeared on OCT because of illness action as decided by specialist, ranibizumab infusions were again regulated to the patients. Fringe laser photocoagulation right off the bat was led 7-10 days after the third infusion if FFA demonstrated a region of nonperfusion in fringe retina. Fringe laser photocoagulation was acted in the applicable territory with the back degree being 3000  $\mu$  away from the fovea. At regular intervals FFA was reconducted to assess retinal condition and if there was fringe nonperfusion region, fringe laser treatment ought to be reapplied. In BRVO, macular brace laser was initially applied if OCT indicated macular edema decline 7-10 days after the third infusion. If not, patients need ranibizumab infusion until the macular edema reduction and CRT  $\leq$  250  $\mu$ m to get macular framework treatment.

## Results and Discussion

All subjects were affirmed by the ophthalmology branch of Beijing Hospital for a definite assessment including BCVA, intraocular pressure, cut light biomicroscopy, enlarged fundoscopic assessments, optical soundness tomography and fundus fluorescein angiography (FFA) of the two eyes, and determined to have BRVO or CRVO. During each visit, they got BCVA, intraocular pressure, slitlamp biomicroscopy, enlarged fundoscopic assessments and optical lucidity tomography. FFA was reconducted 7-10 days after third infusions and afterward per 3 months.

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## References

1. <http://www.iwatani.co.jp/jpn/newsrelease/detail.php?id=1178>.
2. <http://newsroom.toyota.co.jp/jp/detail/4197769/>.
3. The Fuel Cell Commercialization Conference of Japan (2016) Commercialization Scenario for FCVs and H<sub>2</sub> Stations.
4. <http://www.honda.co.jp/environment/topics/topics88.html>.
5. US Environmental Protection Agency (2016) Fuel economy and carbon-. Related exhaust emission test procedure, CFR Title 40 Part 600. Subpart B.
6. Aoyagi S, Shirasaka T, Sukagawa O, Yoshizawa N (2004) Development of fuel economy measurement method for fuel cell vehicle. SAE Technical Paper 01: 1305.
7. Ding Y, Bradley J, Gady K, Bussineau M, Kochis T, et al. (2004) Hydrogen consumption measurement for fuel cell vehicles. SAE Technical Paper 01: 1008.
8. Kuroda E, Yano M, Hirata H, Watanabe S (2003) Test methods to measure fuel economy in direct hydrogen fuel cell vehicles. Society of Automotive Engineers of Japan Annual Congress Proceedings 19: 03: 5.
9. Yano M, Kuroda E, Watanabe S (2003) Fuel economy measurements for direct hydrogen fuel cell vehicles. The 23<sup>rd</sup> Hydrogen Energy System Society of Japan Symposium Proceedings 105.

