

# Bilateral Retinal Vein Occlusion and Rubeosis Irides: Lessons To Learn

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**Abstracts-** Uncontrolled hypertension is well-known to give rise to systemic complications involving multiple central organs. Artherosclerosis leads to damage of the retinal vessels wall, contributing to venous stasis, thrombosis and finally, occlusion. Retinal vein occlusions compromise vision through development of ischaemic maculopathy, macular oedema, and rubeotic glaucoma. Laser photocoagulation remains the definitive treatment for ischaemic vein occlusion with secondary neovascularization. Timely treatment with anti-vascular endothelial growth factor prevents development of rubeotic glaucoma. We hereby report an unusual case of bilateral retinal vein occlusion complicated by rubeosis irides, which was successfully managed to improve vision and prevent rubeotic glaucoma.

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**Keywords:** Anti-vascular endothelial growth factor; Retinal vein occlusion; Rubeosis irides

## Introduction

Ocular manifestations of systemic diseases are vast and varied. Diabetes mellitus and hypertension are very common worldwide, and the ocular complications from these systemic conditions range from mild to vision-threatening (1).

Retinal vein occlusion may result from poorly-optimized multifactorial medical conditions. Although the exact patho-mechanism is not fully understood, poorly controlled hypertension, diabetes mellitus and dyslipidaemia are the common associations. After diabetic retinopathy, retinal vein occlusion (ROV) is the most common cause for visual loss among older populations (2). Possible complications such as macular oedema, rubeosis irides and rubeotic glaucoma may occur, particularly in the ischaemic (non-perfused) type of central RVO. Vascular endothelial growth factor (VEGF) plays a major role in the development of neovascularization (3). Hence, anti-VEGF is fast becoming a treatment of choice to improve visions through reduction of macular oedema, and prevention of rubeotic glaucoma.

We hereby describe a case of bilateral retinal vein occlusion occurring within two months duration, complicated with neovascularization and unilateral severe macular oedema in a lady with hypertension,

dyslipidaemia and diabetes mellitus. The importance of this case is to highlight that early laser photocoagulation and adjunctive anti-vascular endothelial growth factor are effective in restoring useful vision in cases of ischaemic retinal vein occlusion.

## Case Report

A 42-year-old Malay lady with poorly controlled hypertension, dyslipidaemia and diabetes mellitus presented with sudden onset poor vision of the right eye. Blood pressure at presentation was 200/110 and random sugar was 11.7 mmol/l. She denied headache, limb weakness or any neurological symptoms.

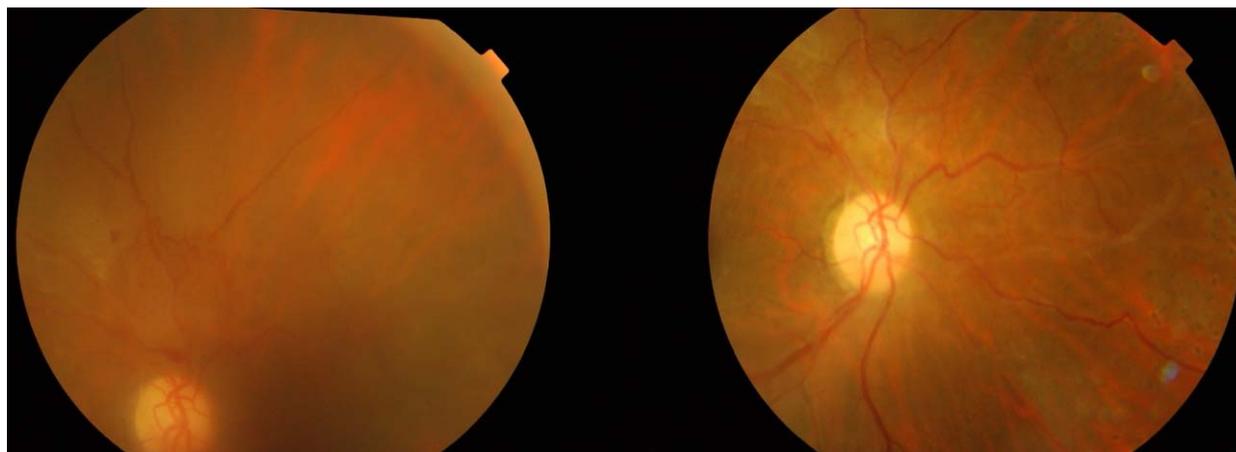
On examination, her right visual acuity was hand motions due to vitreous haemorrhage. However, retinal was flat on B-scan ultrasonography. A week later when the haemorrhage was resolving, new vessels superior to optic discs were seen. There were no other features to suggest diabetic retinopathy changes.

Investigation was negative for factor V Leiden, hypercoagulability or for any connective tissue diseases. However, she was noted to have deranged lipid profile.

A diagnosis of hemiretinal vein occlusion was made. Pan-retinal photocoagulation was performed, with eventual regression of the neovascularization. There was no macula oedema throughout the follow up (Figure 1).

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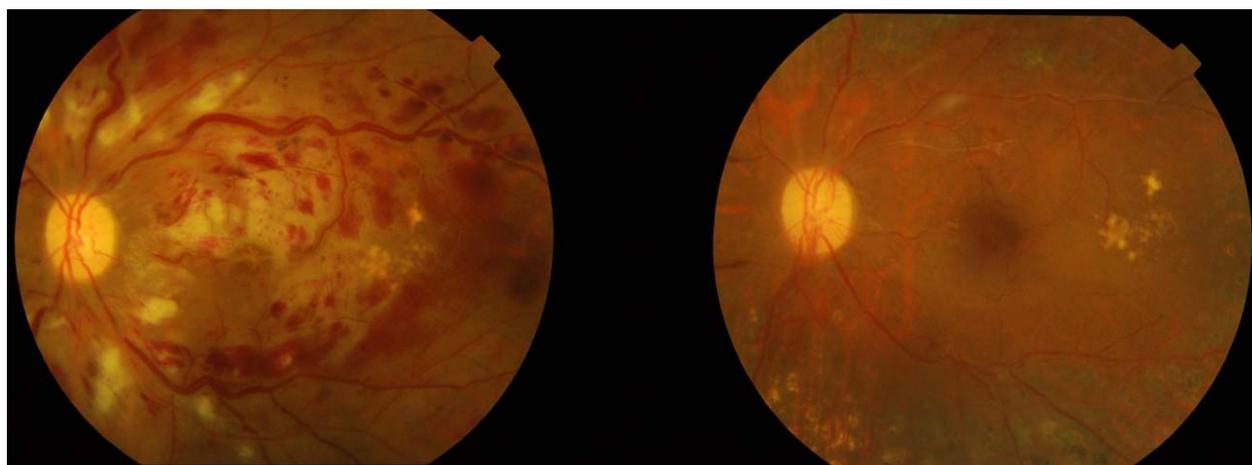
**Figure 1.** Fundus photo of the left eye showing hazy view due to vitreous haemorrhage, with new vessels at disc (left), and resolution of neovascularization following laser therapy (right).

The left eye vision was 6/9 and near vision was N6. She was referred to the physician for management of her medical conditions. On subsequent follow-up her blood pressure was still borderline high as there was compliance to medication issue.

Two months later, she complained of sudden onset of visual deterioration of the left eye. At that time, the vision on the right eye has improved to her baseline

On examination, left eye visual acuity was counting finger, due to severe macular oedema. There were flame-shaped haemorrhages and peripapillary cotton wool spots, with venous dilatation and tortuosity involving all retinal quadrants, (Figure 2) signifying ischaemic central retinal vein occlusion (CRVO).

On follow up, rubeosis irides was noted on the left eye, and full pan-retinal photocoagulation was performed. Iridocorneal angle was still open despite the neovascularization at the iris. There was persistence of macular oedema, and she was given one intravitreal Ranibizumab (Lucentis) 0.5 mg/ 0.5 ml injection at one month after development of retinal vein occlusion on the left eye. On subsequent follow up, the rubeosis irides eventually regressed and central macula thickness was much reduced. (Figure 2) Her visual acuity remained stable at 6/36 and near vision of N8 for the left eye, and 6/9, N6 for the right eye. Medically, her blood pressure and diabetic control is optimized on oral medications.



**Figure 2.** Fundus photo of the left eye showing dilated and tortuous veins, extensive flame shaped haemorrhages, cotton wool spot and severe macular oedema at presentation (left), with resolution of lesions following treatment (right).

## Discussion

Retinal vein occlusion (RVO) is an important retinal vascular disorder which may result in severe consequences to patients affected from this condition. Visual loss in the elderly secondary to RVO has a prevalence of 1 to 2 percents in those above 40 years of age (4). Although RVO is more commonly found in those over 50 years of age, it may still occur in those who are younger and without apparent risk factors. Recent advancement in the management of RVO utilizing anti-vascular endothelial growth factor offers a new hope for visual restorations in patients with macular oedema and aid in abnormal vessel regression in some cases.

Detailed history taking, careful assessment for any complications and laboratory investigations of cardiovascular risks profiles, are important evaluations to be performed for RVO cases. These measures affect the management of patients' existing medical conditions and are important preventive-management strategies. Hypertension is the strongest risk factor for development of RVO, although dyslipidaemia, diabetes mellitus and cigarette smoking have also been associated. Therefore, systemic medical conditions and other risk factors have to be identified and addressed to accordingly.

Although bilateral simultaneous retinal vein occlusion is rare (5% of cases), second eye involvement occurs in 10 % of cases over time (5). The uncontrolled hypertension in this patient most likely has led to involvement of the similar retinal vascular condition in both eyes within a short period of time. It may be taken as a warning sign for both physician and patient to be more alert of other systemic complications to vital organ from persistent hypertension.

The RVO is broadly divided into ischaemic and nonischaemic subtypes. The ischaemic CRVO carries a poorer prognosis as there is a higher risk to develop macular oedema, ischaemic maculopathy, neovascularization and eventually rubeotic glaucoma if left untreated. Anterior segment neovascularization more commonly develops than the posterior segment neovascularization in the ischaemic type of CRVO (6). The diagnosis of retinal vein occlusion is based on clinical features on fundoscopy. Poor presenting visual acuity of less than 6/60, positive relative afferent papillary defect, large confluent haemorrhages and cotton wool spots are all suggestive of the ischaemic or nonperfused type of RVO (7).

Reduction of visual acuity in RVO cases are a result of macular oedema, ischaemic maculopathy or vitreous

haemorrhage from ruptured new vessels. These complications can occur in isolation or simultaneously. If left untreated, proliferative retinopathy may eventually lead to rubeosis irides, and development of rubeotic glaucoma. Furthermore, the potentially blinding complications are both difficult and challenging to treat.

The management of RVO mainly depends on the subtype, severity and complications that ensue. Until recently, those with ischaemic RVO complicated by macular oedema carries a poor visual prognosis and little functional improvements with laser grid treatment. Although patients regain anatomical configuration of the macula, visual improvements is minimal due to macula ischaemia. The advent of anti-VEGF therapy offers a new hope for patients with ischaemic RVO complicated by neovascularization and macular oedema. In the Ranibizumab for the Treatment of Macular oedema (CRUISE) study, visual acuity improvement is clinically significant for patients receiving intravitreal Ranibizumab compared to sham injections (8). Laser photocoagulation is invariably performed for patients with iris neovascularization for prevention of rubeotic glaucoma and remains the gold-standard of management. In this case, the timely intervention with anti-VEGF was successful in inducing regression of iris neovascularization. Rubeotic glaucoma secondary to ischaemic CRVO typically occurs at 3 months after the CRVO onset, hence the term 'one hundred day glaucoma'. Anti-VEGF not only reduces VEGF production directly but also helps to reduce inflammation which accompanied vascular damage in CRVO, and further reducing the VEGF levels (9). Although patient only received one injection, laser photocoagulation further stabilize the abnormal vessels and the combination treatment ensure regression of abnormal vessels and prevent progression into rubeotic glaucoma.

This is an interesting case because retinal vein occlusion occurs bilaterally in a relatively young person. Rapid development of complication from ischaemic RVO is most likely related to uncontrolled hypertension, diabetes mellitus and dyslipidaemia. Despite the presence of rubeosis irides, development into rubeotic glaucoma was halted due to timely intervention with aggressive laser photocoagulation and intravitreal anti-VEGF therapy. The anti-VEGF injection also helps to reduce macular oedema and in restoration of vision.

The lessons to learn from this case are:

- Systemic risk factors especially, hypertension, diabetes mellitus and dyslipidaemia are important associations in retinal vein occlusion.

## Bilateral retinal vein occlusion and rubeosis irides

- Retinal vein occlusion may occur bilaterally if systemic risk factors are not optimally controlled. Therefore, its history and systemic examination completed by funduscopy are essential in comprehensive management of RVO cases.
- Multidisciplinary approach involving physicians and ophthalmologist is necessary to optimize the systemic and ocular management of RVO.
- Laser photocoagulation remains the gold standard in the management of retinal vein occlusion, in the presence of neovascularization.
- Anti vascular endothelial growth factor offers an alternative treatment for macular oedema as it has been shown to help patients regain functional vision in ischaemic CRVO with severe macular oedema.

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