American Journal of Ophthalmology Case Reports 9 (2018) 41–44

Contents lists available at ScienceDirect

American Journal of Ophthalmology Case Reports

journal homepage: www.elsevier.com/locate/ajoc

Case report

Ranibizumab-induced retinal reperfusion and regression of neovascularization in diabetic retinopathy: An angiographic illustration

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ARTICLE INFO

Keywords:
Anti-VEGF
Proliferative diabetic retinopathy
Retinal reperfusion
Ranibizumab
Protocol-S

ABSTRACT

Purpose: To report regression of neovascularization and reperfusion of ischemic areas of the retina on Wide-field Digital Fluorescein Angiography following anti-vascular endothelial growth factor injections in a patient with active Proliferative Diabetic Retinopathy.

Observations: Case report of sixty-one-year-old male patient with proliferative diabetic retinopathy and diabetic macular edema documented on wide field digital fluorescein angiography. The patient was treated with three intravitreal injections of ranibizumab given at monthly intervals. Repeat angiography after third intravitreal injection revealed complete regression of new vessels. Moreover, there was evident improvement in perfusion in the previously noted ischemic areas of the retina.

Conclusion and importance: Intravitreal anti-vascular endothelial growth factor (anti-VEGF) injections are a valuable treatment option for reversing neovascularization in eyes with proliferative diabetic retinopathy with fewer side effects when compared to standard pan-retinal photocoagulation. Additionally, we also illustrate restoration of retinal perfusion post anti-VEGF therapy indicative of pre-existingsalvageableischemic retina tissue.

1. Introduction

Proliferative diabetic retinopathy(PDR) is a leading cause of vision loss in patients with diabetes mellitus[1] and approximately 1.5% of adults with diabetes have PDR.[2] The Diabetic Retinopathy Study Research group found that almost 50% of untreated PDR eyes have severe vision loss (i.e., visual acuity of < 20/800 for at least 4 months).[3] Various features of PDR include retinal neovascularization, diabetic macular edema and fibrovascular proliferation at the vitreo-retinal interface leading to vision threatening sequelae like tractional retinal detachment.[4] Panretinal Photocoagulation (PRP) was established the gold standard treatment for PDR after Diabetic Retinopathy Study Research group demonstrated its benefits and has continued to remain so for the last 40 years.[5] Even though over the years PRP has been proven beneficial, it has its own set of complications. The multiple concerns include loss of peripheral field of vision, worsening of macular edema and traction, difficulty to perform the procedure in eyes with media opacity and also pain during laser treatment.[6] These adverse effects have prompted research into alternate therapy for PDR eyes.

The elevated intra-ocular levels of pro-angiogenic factors, especially vascular endothelial growth factor (VEGF), form the basis of pathophysiology in PDR eyes.[7] Building on the concept of anti-VEGF pharmacotherapy for neovascularization, the Diabetic Retinopathy Clinical Research network (DRCR.net) conducted a multicenter randomized clinical trial to evaluate non-inferiority of intravitreal ranibizumab compared with PRP in PDR eyes.[8] They demonstrated better visual outcomes in eyes treated with anti-VEGF therapy. As a secondary outcome, they also reported regression of neovascularization that was comparable in both the groups. However, this was assessed based on color fundus photographs only.

We report a case of early proliferative diabetic retinopathy that was treated with multiple intravitreal injections of ranibizumab based on Protocol-S of DRCR.net. On repeat widefield angiography, we demonstrate complete regression of neovascularization after three loading doses of intravitreal ranibizumab. Furthermore, we exhibit an overall improvement in retinal perfusion on widefield fluorescein angiogram.

2. Case report

A sixty-one-year-old gentleman, known case of diabetes mellitus since 3 years, presented to our vitreo-retinal clinic in September 2016 with complaints of blurring of vision in right eye (OD) since 1 year. He gave history of grid laser photocoagulation done in OD 1 year ago. At presentation, his best-corrected visual acuity was 6/12, N8. On clinical

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https://doi.org/10.1016/j.ajoc.2018.01.006
Received 18 March 2017; Received in revised form 27 December 2017; Accepted 2 January 2018
Available online 04 January 2018

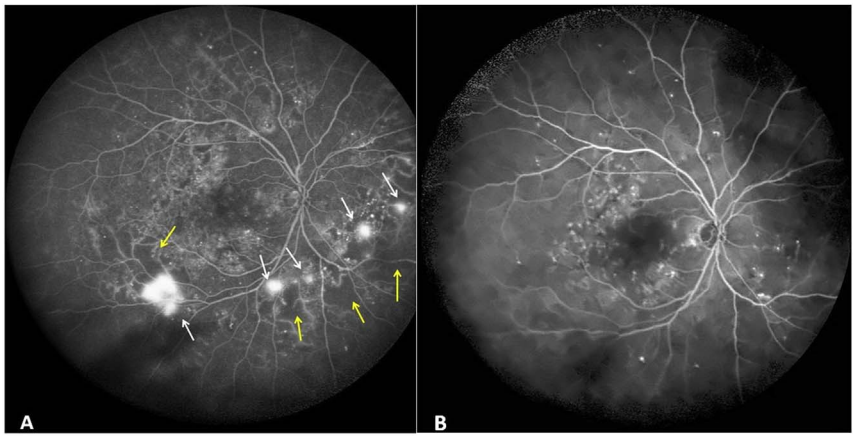

Fig. 1. Digital Wide Field Fluorescein Angiography images before and after anti Vascular endothelial growth factor therapy. **1A**: Fluorescein angiogram image at presentation showing hyperfluorescent lesions with fuzzy margins seen along the inferotemporal arcade and nasal to disc (*white arrows*) suggestive of neovascularization. Adjacent to new vessels, areas of hypofluorescence are seen with absent retinal capillaries (*yellow arrows*) suggestive of areas of capillary non perfusion. **1B**: Fluorescein angiogram image post three intravitreal anti-vascular endothelial growth factor injections showing complete regression of new vessels and reperfusion of non-perfused retina. (For interpretation of the references to color in this figure legend, the reader is referred to the Web version of this article.)

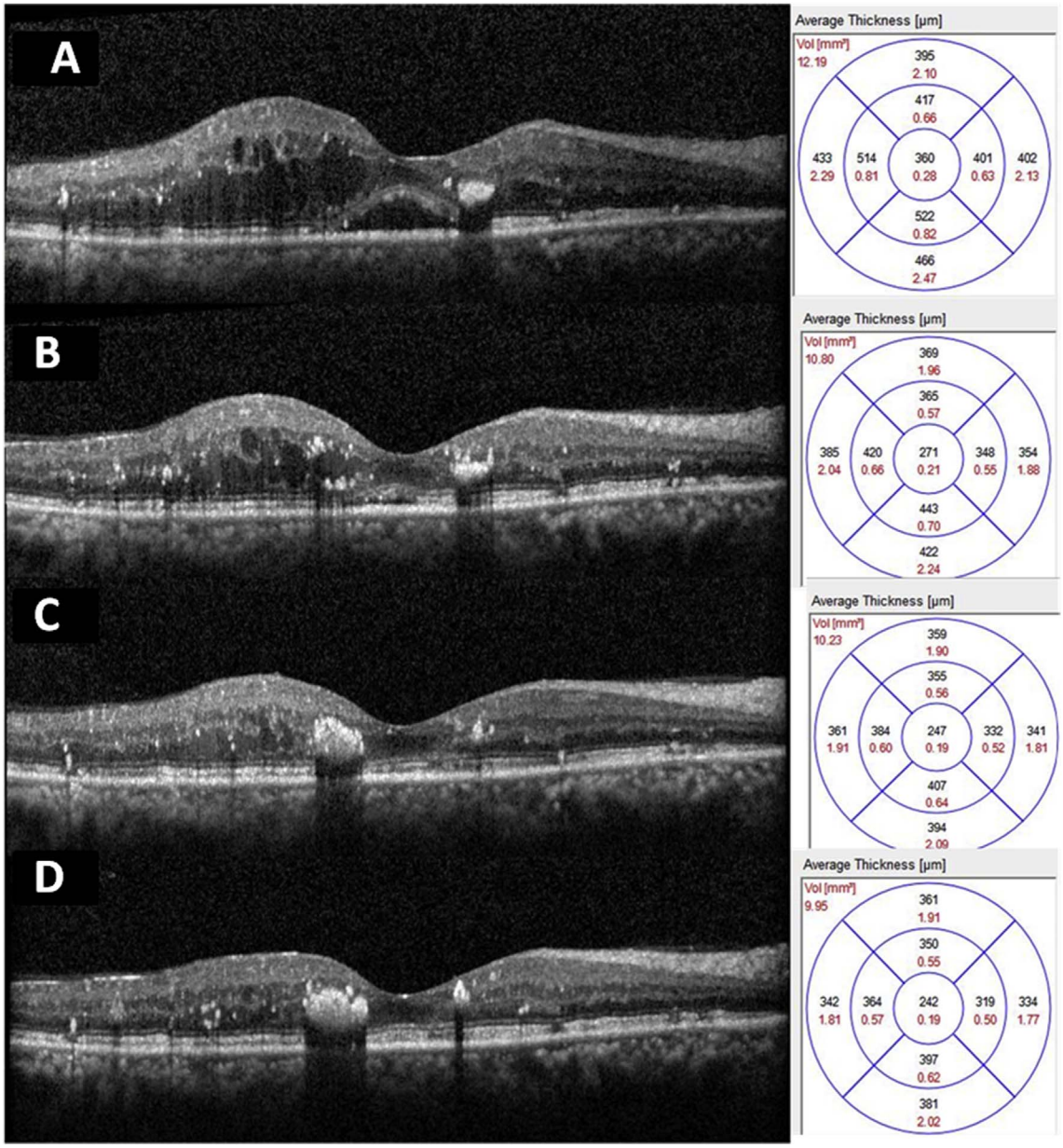

Fig. 2. Sequential spectral domain optical coherence tomography (SD-OCT) images through the fovea of right eye showing gradual reduction in macular edema. **2A**: Scan through fovea at presentation showing intraretinal cystic changes with serous macular detachment (SMD). Central macular thickness of 360 µm. **2B**: Scan through fovea showing central macular thickness of 271 µm. **2C**: Scan through fovea showing central macular thickness of 247 µm **2D**: Scan through fovea at the end of three injections of ranibizumab showing complete resolution of intraretinal edema and SMD. Central macular thickness 247 µm.