

## Case report

## Optical coherence tomography angiography showing perifoveal capillary stability 30 years after fluorescein angiography



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## ABSTRACT

**Purpose:** To report the Optical Coherence Tomography Angiography (OCTA) results as a novel non-invasive diagnostic modality which provides useful information regarding the status of blood flow in diabetic retinopathy. The current study is a long-term follow-up of eyes of patients with proliferative diabetic retinopathy managed with panretinal photocoagulation.

**Observations:** Two patients with proliferative diabetic retinopathy (PDR) were treated with panretinal photocoagulation (PRP) in both eyes in the early 1980s. Fluorescein angiography performed at the baseline visit and follow-up Optical Coherence Tomography Angiography performed at 30 years after initial PRP treatment showed remarkable stability of the perifoveal capillary network. Visual acuity initially and at last follow-up remained 20/25 or better in these patients.

**Conclusions and importance:** Fluorescein angiography and Optical Coherence Tomography Angiography demonstrated that the integrity of the perifoveal capillary network remained remarkably stable at 30 years. Similarly, the visual outcomes were stable inspite of advanced PDR at baseline.

## 1. Introduction

Diabetic retinopathy is one of the leading causes of blindness worldwide.<sup>1,2</sup> In addition to complications of proliferative diabetic retinopathy (PDR), vision loss in these patients can be associated with retinal capillary nonperfusion. Characteristic findings of diabetic retinopathy are traditionally demonstrated by fluorescein angiography (FA). Optical Coherence Tomography Angiography (OCTA) is a relatively new noninvasive imaging technique that is capable of showing the capillary perfusion status in diabetic retinopathy.<sup>3–5</sup> Purpose of the current study is to report long term imaging of retinal perifoveal capillary plexus at 30 years follow up after PRP in 2 patients.

## 2. Findings

## 2.1. Case 1

A 30-year-old male with diabetes mellitus type 1 was examined initially in 1981. Best-corrected visual acuity (BCVA) was 20/20 both eyes (OU). Dilated fundus examination showed neovascularization elsewhere (NVE) consistent with PDR but without diabetic macular edema (DME) OU. The color fundus photography and fluorescein angiography (FA) showed leaking microaneurysms but relatively intact

perifoveal capillary network [Fig. 1a and b]. The patient underwent treatment with PRP in both eyes. FA one year after PRP demonstrated stable perifoveal capillary network [Fig. 1c and d]. At the 35-year follow up examination, his BCVA was 20/25 OD and 20/20 OS. Fundus examination demonstrated full scatter PRP with regressed retinopathy and OCTA demonstrated that the integrity of the perifoveal capillary network remained relatively stable [Fig. 1e and f].

## 2.2. Case 2

A 19-year-old female with diabetes mellitus type 1 was examined initially in 1984 with BCVA of 20/20 OU. Dilated fundus examination documented by clinical examination and fundus photography was consistent with PDR. FA showed leakage consistent with neovascularization but relatively intact perifoveal capillaries without DME [Fig. 2a and 2b]. The patient underwent treatment with PRP in both eyes. One year after PRP, the color fundus photography and fluorescein angiography showed laser scars with regressed NVE, few perifoveal microaneurysms and stable perifoveal capillary network [Fig. 2c and d]. Thirty years after laser treatment, her BCVA was 20/25 OU and her fundus photography demonstrated full scatter PRP and regressed NVE. OCTA demonstrated that the integrity of the perifoveal capillary network remained remarkably intact in both eyes after 30 years of follow-

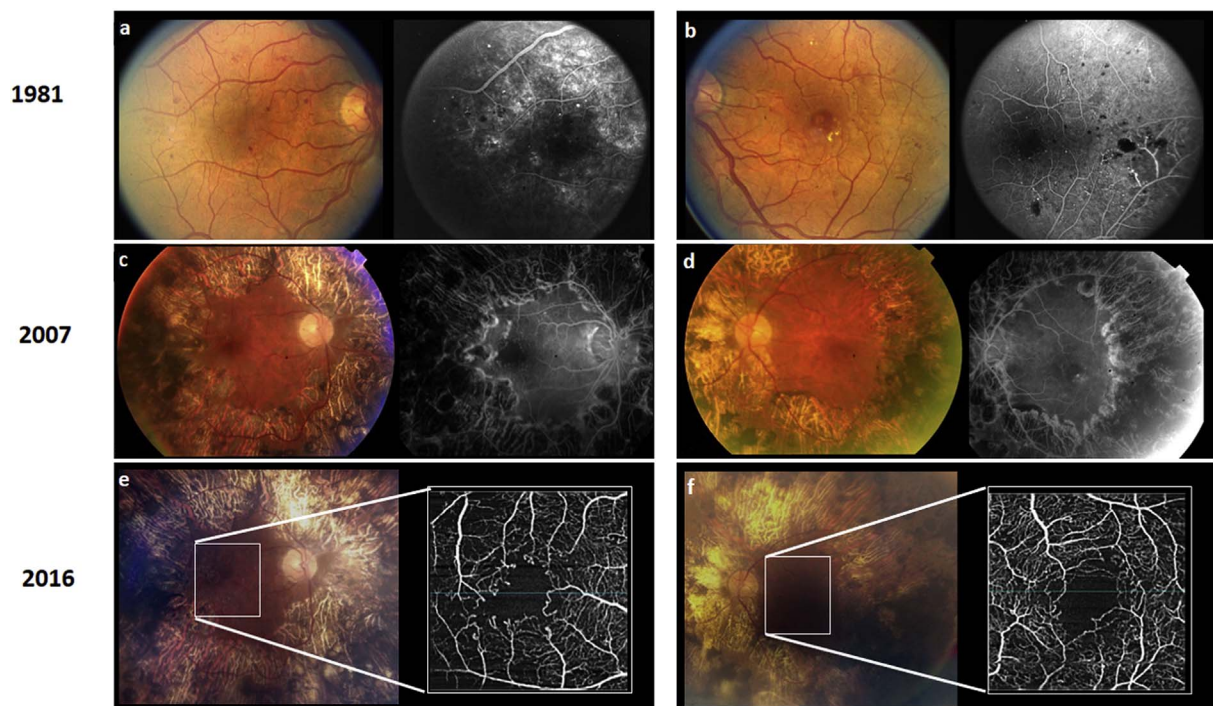
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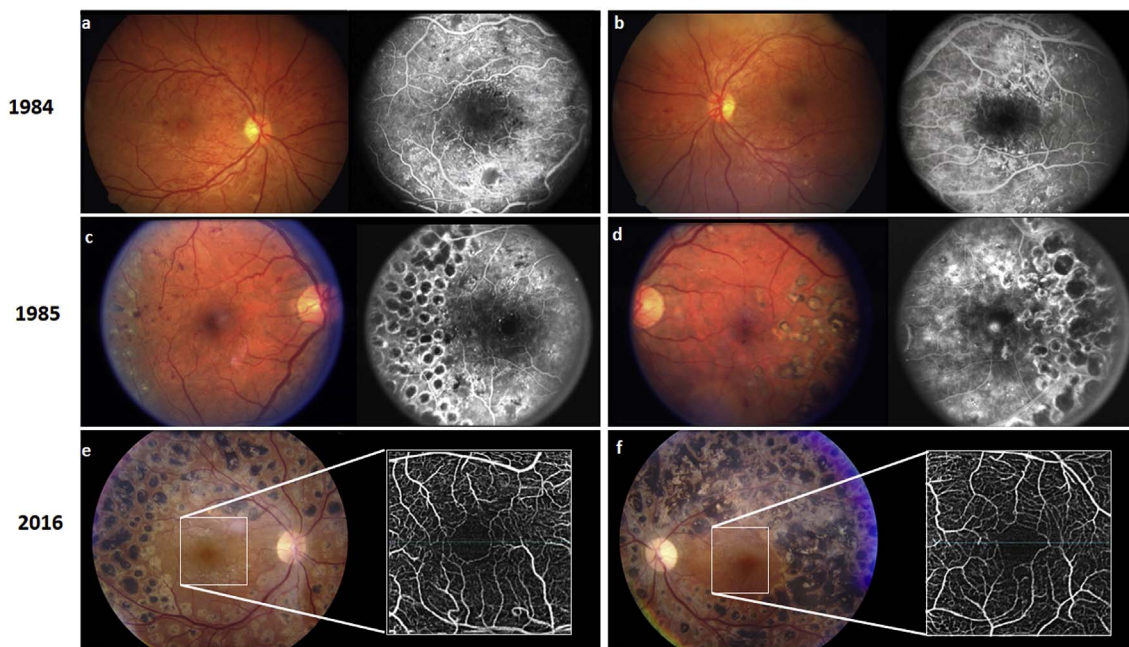
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**Fig. 1.** a, b - Fundus photography and fluorescein angiography of right and left eye respectively (1981) showing microaneurysms and relatively intact perifoveal capillary network. Visual acuity at presentation was 20/20 in both eye. c, d - Fundus photography and fluorescein angiography of right and left eye respectively (2007) showing extensive laser scars around disc and vascular arcade, and posterior pole with relatively intact perifoveal capillary perfusion. e, f - Fundus photography and optical coherence tomography angiography (OCTA - Angio-Plex) of right and left eye respectively (2016). Fundus photograph showing laser scars temporally and regressed diabetic retinopathy. OCTA of the right and left macular area demonstrates that the perifoveal capillary network remained relatively stable after 35 years of follow-up in this patient receiving PRP in both eyes. The visual acuity at last follow-up was 20/25 and 20/20 in right and left eye respectively.



**Fig. 2.** a, b - Fundus photography and fluorescein angiography of right and left eye respectively (1984) showing leaking microaneurysms and relatively intact perifoveal capillary network. Visual acuity at presentation was 20/20 both eyes. c, d - Fundus photography and fluorescein angiography of right and left eye respectively (1985) showing laser scars temporally, few perifoveal aneurysms and relatively intact perifoveal capillary network. e, f - Fundus photography and optical coherence tomography angiography (OCTA - Angio-Plex) of right and left eye respectively (2016). Fundus photograph showing laser scars temporally and regressed neovascularization elsewhere. OCTA of the right and left macular area demonstrates that the integrity of the perifoveal capillary network remaining remarkably stable after 30 years of follow-up in this patient receiving PRP in both eyes. The visual acuity at last follow-up was 20/25 both eyes.

up in this patient [Fig. 2e and f].

### 3. Discussion

In patients with PDR, PRP is an effective treatment as established by the Diabetic Retinopathy Study.<sup>1</sup> In these patients, vision loss may be secondary to DME, capillary non-perfusion involving macula or tractional maculopathies. In these 2 patients managed with PRP, good central vision was maintained and OCTA showed remarkable stability of the perifoveal capillary perfusion. OCTA is a noninvasive method of imaging blood flow in neovascularization, perifoveal capillary network.<sup>3–5</sup> OCTA is a useful non-invasive imaging modality to assess the perifoveal capillary plexus in patients with diabetic retinopathy during long-term follow-up.

#### Patient consent

Consent to publish was not obtained. This report does not contain any personal information that could lead to identification of the patient.

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#### Conflict of interest

All authors have no financial disclosures.

#### Authorship

All authors attest that they meet the current ICJME criteria for Authorship.

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