Proliferative Diabetic Retinopathy Detected by Fundus Fluorescein Angiography in a Type 1 Diabetes Patient with Unremarkable Fundoscopic Findings: Case Report

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ABSTRACT

Proliferative diabetic retinopathy (PDR) is one of the most severe complications of diabetes and, if left untreated, can lead to significant visual impairment. The disease typically presents with neovascularization and vision loss secondary to retinal ischemia. However, in rare cases, advanced-stage diabetic retinopathy may be detected by fundus fluorescein angiography (FFA) even in patients with normal visual acuity and no ophthalmic complaints. In this article, we present a case of proliferative diabetic retinopathy identified through advanced imaging in an asymptomatic patient with largely normal visual acuity and ophthalmological examination.

Keywords: Neovascularisation, proliferative diabetic retinopathy, ischemia, fundus fluorescein angiography

INTRODUCTION

Diabetic retinopathy (DR) is one of the leading causes of permanent vision loss worldwide. It imposes a significant economic burden due to its potential to cause irreversible visual impairment and the need for chronic treatment.[1] DR is classified into two categories based on morphological retinal changes: PDR, characterized by neovascularization secondary to retinal ischemia, and non-proliferative diabetic retinopathy (NPDR), in which microaneurysms, microhemorrhages, and exudates are observed without neovascularization.[2] Follow-up and treatment strategies vary according to the severity of findings, changes in visual acuity, and multimodal imaging results. Patients with type 1 diabetes should undergo a comprehensive ophthalmologic examination five years after diagnosis, whereas type 2 diabetes patients should be examined at the time of diagnosis.[3] While advanced complications of diabetes are generally detected in symptomatic individuals, it is not uncommon to encounter asymptomatic patients with advanced PDR requiring treatment. There is limited literature regarding patients with advanced PDR diagnosed despite the absence of detectable microvascular retinal pathology on fundoscopy. It has been reported that type 1 diabetes patients have a higher risk of developing DR compared to those with type 2 diabetes, and the duration of diabetes is a significant risk factor for the development of DR.[4]

CASE REPORT

A 41-year-old female patient presented to our clinic for a routine examination. She had no ophthalmologic complaints and previously diagnosed eye diseases. The patient had been diagnosed with type 1 diabetes 35 years prior, and her disease was reported to be under control. A detailed ophthalmologic evaluation was performed. Best-corrected visual acuity (BCVA), measured with a Snellen chart, was 20/20 in both eyes. Intraocular pressure was 16 mmHg in the right eye and 14 mmHg in the left. Anterior

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Received: 23.05.2025
Accepted: 29.06.2025
J Ret-Vit 2025; 34: 236-239
DOI:10.37845/ret.vit.2025.34.33

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segment examination revealed normal bilateral findings. Fundus examination following pharmacologic mydriasis revealed a suspicious appearance of neovascularization on the optic disc, retinal hemorrhages along the arcades, an intraretinal microvascular abnormalities(IRMA)-like lesion in the superotemporal quadrant, and a non-perfused vessel appearance in the inferotemporal branch. In the left eye, the optic disc appeared normal, while hemorrhages along the arcades and IRMA-like lesions were observed (Figure 1). On macular optical coherence tomography (OCT), the central macular thickness was 250 microns in the right eye and 242 microns in the left, with no pathological findings (Figure 2). FFA revealed bilateral retinal ischemia and neovascularization on the right optic disc (Figure 2). The patient had no systemic disease other than diabetes. The clinical findings were consistent with proliferative diabetic retinopathy, and panretinal photocoagulation was planned.

CONCLUSION

DR is the most common microvascular complication of diabetes worldwide.[5] It has also been identified as the leading systemic disease responsible for permanent vision loss in numerous systematic reviews and meta-analyses.[6–7] While early-stage DR progression can be prevented through metabolic control, the emergence of PDR findings necessitates more complex and costly interventions such as intravitreal injections or laser photocoagulation. Therefore, early and appropriate rehabilitation before the manifestation of DR signs is critical in diabetic patients. Despite efforts to implement regular consultation protocols, many patients with diabetes do not seek ophthalmologic care until visual symptoms arise. Studies conducted in Turkey and neighboring countries on the clinical characteristics of newly diagnosed DR patients suggest a greater need for routine ophthalmologic consultations.[8–9] An important consideration in diabetic patient management is the assessment of visual function parameters beyond visual acuity. Some studies suggest that changes in visual function tests may precede anatomical findings of DR.[10]

In this case, the patient's bilateral visual acuity and macular OCT findings were within normal limits, and the posterior pole appeared largely unremarkable. If the suspicious neovascularization on the right optic disc had been overlooked and FFA had not been performed, the widespread ischemia and optic disc neovascularisation could have gone undetected. An additional key point is

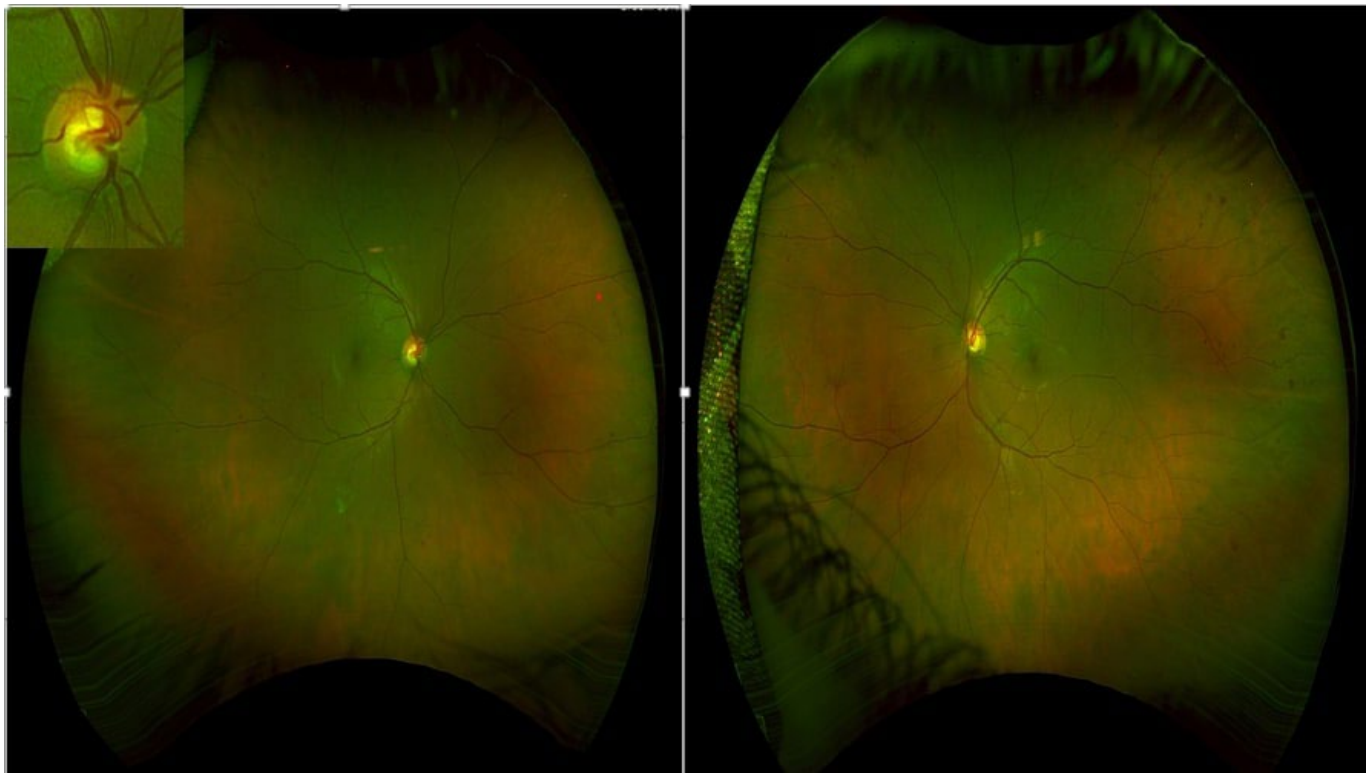

Figure 1: *Retinal vascular structures appear normal in both the right and left eyes on fundus photography.*

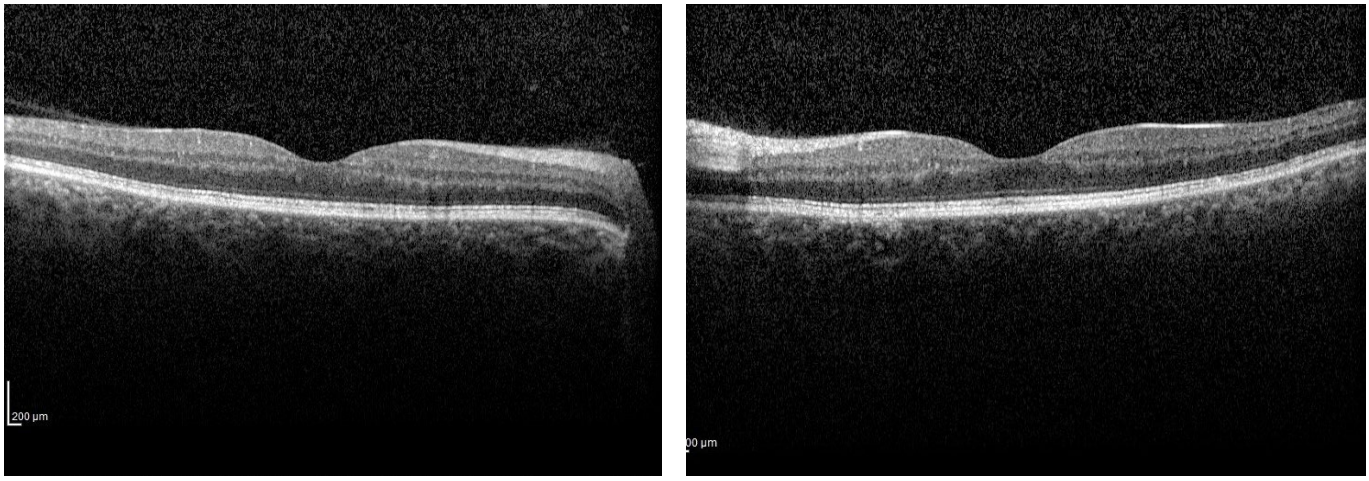

Figure 2: *Macula OCT images of the patient's right (top) and left (bottom) eyes appear normal.*

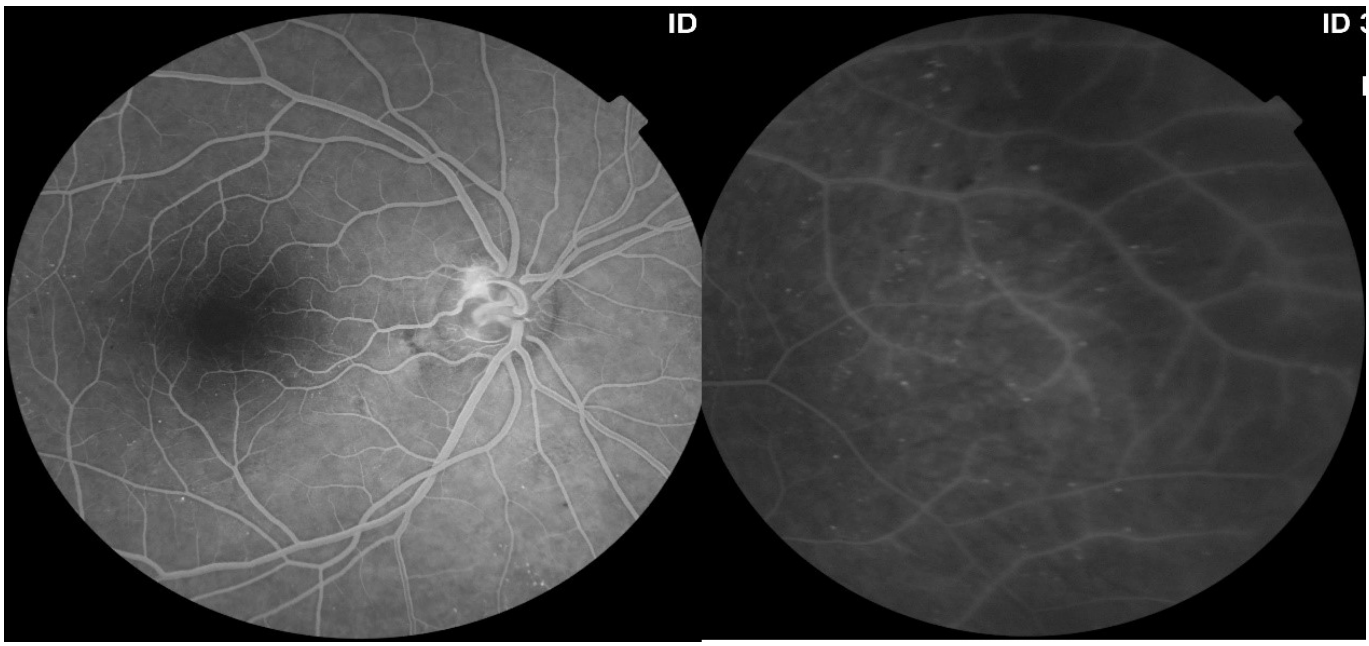

Figure 3: *On fundus fluorescein angiography (FFA), neovascularization is detected at the optic disc in the right eye, while areas of peripheral retinal ischemia are observed in the left eye.*

the differentiation of neovascularization of the disc from optociliary shunt vessels, which are generally thicker, more tortuous, and do not exhibit leakage on FFA.[11] In our case, the right eye exhibited irregular and fine neovascularization over the optic disc, with evident leakage on FFA. In busy clinical settings, targeted and thorough examinations should be conducted even in the absence of visual complaints. Moreover, as demonstrated in this case, even in the absence of fundoscopic findings, FFA may provide critical diagnostic and therapeutic insights, particularly in patients with a long duration of disease or additional risk factors. Although FFA is commonly reserved for symptomatic DR or when apparent vascular abnormalities are observed on fundoscopy, several studies have shown that FFA can detect DR features not visible during clinical fundus evaluation.[12] Additionally, Protocol AA, a pivotal study highlighting the significance of FFA demonstrated that peripheral retinal lesions identified through ultra-widefield FFA are associated with a poorer prognosis in diabetic retinopathy.[13] In our case, wide-field fluorescein angiography could not be performed due to insufficient technical resources. This case highlights a silent, advanced-stage PDR that could be easily missed without comprehensive examination and advanced imaging.

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