



# Unilateral Optic Disc Neovascularization in a Patient with Optic Disc Pit Depending on Proliferative Diabetic Retinopathy

## Optik Pitli Bir Olguda Proliferatif Diyabetik Retinopatiye Bağlı Unilateral Optik Disk Neovaskülarizasyonu

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### ABSTRACT

Optic disc pit is an excavation of the optic disc that usually develops congenital or rarely acquired, mostly located in the inferotemporal part of the disc. It is usually asymptomatic but sometimes might be symptomatic with maculopathy development. It is not well known at how much the optic pit influences the optic nerve structure or how it leads to other pathologic susceptibilities. In this case report, a patient with diabetic retinopathy who had unilateral optic pit and advanced disc neovascularization in the same eye was examined.

**Keywords:** Optic disc pit, diabetic retinopathy, neovascularization

### ÖZ

Optik pit, konjenital veya nadiren edinsel olarak gelişen, çoğunlukla optik diskin inferotemporalinde yer alan, genelde asemptomatik seyreden, fakat bazen makülopati gelişimi ile semptom verebilen bir optik disk ekskavasyonudur. Optik pitin optik sinir yapısını ne derece etkilediği ya da optik diske ait başka patolojilere yatkınlığa ne ölçüde öncülük ettiği tam olarak bilinmemektedir. Bu olgu sunumunda tek taraflı optik piti olan ve aynı gözde ileri derecede disk neovaskülarizasyonu gelişen diyabetik retinopati bir hasta irdelenmiştir.

**Anahtar Sözcükler:** Optik disk piti, diyabetik retinopati, neovaskülarizasyon

### Introduction

First described as “optic disc depression” in a 62-year-old female patient in 1882, the optic pit is an oval, gray-white colored pit that develops congenital or is rarely acquired, and mostly located inferotemporal of the optic disc. Its incidence is less than 1/10000, and the incidence of co-occurrence in both eyes is 10-15% (1). Gender does not affect the incidence of the optic pit. Although mostly sporadic, unilateral cases have also been suggested to be autosomal dominant inherited (2). In most of the cases, the diagnosis is made during routine ophthalmologic examination.

The frequency of maculopathy seen as serous retinal detachment, cystoid macular edema, or schisis in the inner retinal layers in patients with optic pit varies between 25% and 75% in various publications (3,4). It is not known exactly to what extent the optic pit affects the optic nerve structure or to what extent it predisposes to other pathologies of the optic disc. In this case report, a patient with diabetic retinopathy (DRP) with unilateral optic pit and disc neovascularization (NV) in the ipsilateral eye will be discussed.

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## Case Report

In the routine control examination of a 55-year-old female patient with known type II diabetes for 10 years and followed in our clinic for DRP for two years, her visual acuity was 10/10 in both eyes. Examination findings of anterior segment, intraocular pressure, eye movements, pupillary reactions and color vision were normal. In the fundus examination, retinal changes consistent with DRP were observed (Figure 1). In addition, optic pit located in the temporal part of the optic disc in the left eye and abnormal vascularization at the optic disc of the same eye (at the normal optic disc tissue, just below the pit region) were observed (Figure 1B). There wasn't abnormal vascularization in the optic nerve head of the right eye (Figure 1A). Bilateral DRP findings were detected in fluorescein angiography performed on the same day. Ischemic areas close to each other were observed in the nasal and temporal quadrants of both eyes (Figure 2). In addition, there was prominent disc NV in the left eye, and leakage from these neovascular vessels into the vitreous was occurring in the late phase of angiography (Figure 2D). While NV was not observed in the retinal areas other than the disc in the left eye, NV was not found on the disc or any other retinal area in the right eye (Figure 2C, D). Macular sections evaluated by optical coherence tomography (OCT) were normal in both eyes, and no accompanying diabetic maculopathy or optic pit maculopathy was detected.

## Discussion

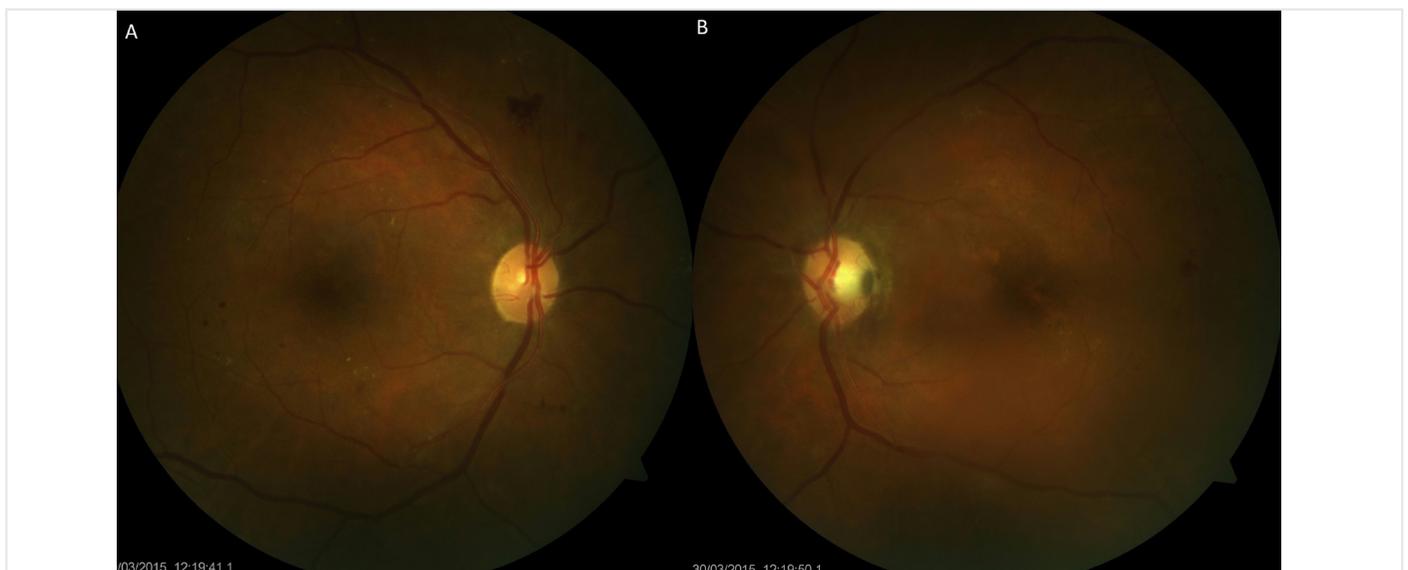
Optic pit is generally asymptomatic, it is one of the cavitory disc anomalies such as optic coloboma and morning glory syndrome. It is an optic disc excavation that can give symptoms with the development of maculopathy in the last decade. Optic pit, which is a pathology which, formation mechanism is still not clearly explained, has been accepted as a subgroup of optic

colobomas for many years and has been attributed to the inability of the optic fissure to close completely during development (1). This opening has also been shown to be associated with the subarachnoid space. However, the fact that optic pits have not been shown to form in the inferonasal part, that they are usually unilateral and sporadic, that iris and choroidal colobomas are not accompanied, are the weak points of the hypothesis that the optic fissure does not close. Histologically, optic pit is a herniation of the dysplastic retina from a defect in the lamina cribrosa to the subarachnoid space.

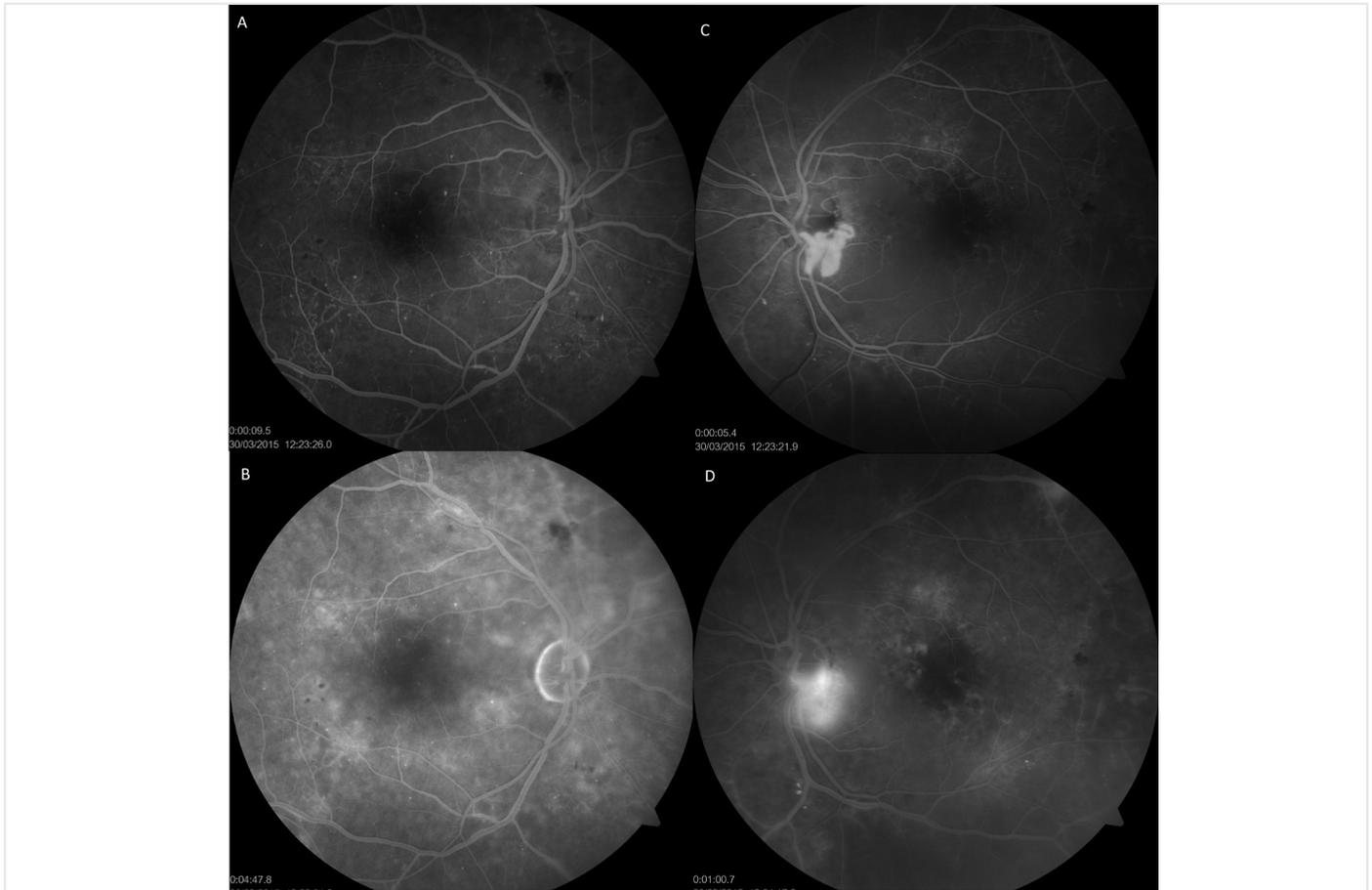
Depending on the structure of the pit, it may have a direct connection with the subretinal space or the subarachnoid space. Hypotheses about the source of subretinal or intraretinal fluid in optic pit maculopathy also provide clues about the connection between the optic pit and the subretinal or subarachnoid space. In a recent study with spectral domain OCT, direct passage of fluid from the optic pit to the subretinal area has been demonstrated (5).

It is thought that the optic pit may affect the disc structure and may lead to other disc pathologies related to this. The most well-known of the innocent changes caused by the optic pit in the optic disc is the wider optic disc in 85% of optic pit cases (6). In some cases, choroidal atrophy is observed. It has been suggested that these peripapillary changes are a predisposing factor for peripapillary choroidal NV (7). Optic pit cases accompanied by peripapillary subretinal NV have been reported in the literature (8). However, to the best of our knowledge, the association of disc NV and optic pit, which is a sign of proliferative DRP, has not been defined.

The development of NV in DRP occurs as a result of the shift of the angiogenic/antiangiogenic factor balance in favor of angiogenesis. Angiogenesis is associated with the severity of



**Figure 1.** Fundus photographs of the patient's right (A) and left (B) eyes with diabetic retinopathy are shown. Neovascular vessels at peripapillary region and optic pit are seen in the left eye



**Figure 2.** Fluorescein angiography images of the patient's right (A,B) and left (C,D) eyes are given. A and C belong to early phase, B and D belong to late phases. Hyperfluorescence of neovascular vessels is observed at early and long phases in the left eye

retinal ischemia (9). Accordingly, similar rates of disc NV are expected in eyes with a similar degree and amount of ischemic area on both sides. Although retinal ischemia was observed at similar rates angiographically in our case, disc NV developed only in the eye with optic pit. Lin et al. (10) showed that the incidence of DRP decreased in patients with high myopia. It has been shown that thinning of the vessels in this region due to the increase in axial length explains the negative relationship between DRP and high myopia in these patients. In our case, the localized increase in axial length in the optic pit region would be expected to have prevented the development of NV in this eye, similar to myopic patients. However in our case, NV was observed in the eye with optic pit without NV in the other eye. This may be due to the fact that the vessels in the optic pit region are thinner than normal and cause more severe localized ischemia in the normal region just below.

This case suggests that the optic pit may have a facilitating effect on the development of disc neovascularization, both anatomically and histologically.

#### Ethics

**Informed Consent:** Informed consent was obtained.

#### Authorship Contributions

Surgical and Medical Practices: A.Ş., C.E.A., Concept: A.Ş., C.E.A., H.Ö., Design: A.Ş., H.Ö., Data Collection or Processing: A.Ş., C.E.A., Analysis or Interpretation: A.Ş., C.E.A., H.Ö., Literature Search: C.E.A., Writing: A.Ş., C.E.A.

**Conflict of Interest:** No conflict of interest was declared by the authors.

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