Subtotal retinal detachment associated with vitreomacular traction: A case report with multimodal imaging findings

Eyupcan Sensoy[1], *Berrak Sekeryapan Gediz*[1], *Melike Vanlioglu*[1], *Yasemin Ozdamar Erol*[1]

ABSTRACT

Posterior vitreous detachment is a physiological process that occurs due to complex changes in the vitreous configuration with age. As the posterior hyaloid membrane cannot be separated from the fovea, it may cause anatomical changes in the retina, a condition called vitreomacular traction (VMT). Vitreomacular traction can cause complications such as macular holes, pseudocysts, and tractional retinal detachment. Consequently, this article aims to present a case of subtotal retinal detachment secondary to VMT with multimodal imaging findings and surgical results.

Keywords: Posterior vitreous detachment, subtotal retinal detachment, tractional retinal detachment, vitreomacular traction.

INTRODUCTION

The posterior vitreous comprises a dense collagen matrix and adheres to the retina along the entire internal limiting membrane (ILM).[1] Posterior vitreous detachment (PVD) occurs after complex events, such as vitreous liquefaction and the reduction of vitreomacular adhesion with age. Posterior vitreous detachment often begins in the perifoveal macula.[2]

Vitreomacular traction (VMT) is a vitreomacular interface disease that results from incomplete PVD. Changing the retinal morphology can instigate symptoms such as metamorphopsia and vision loss.[3] This process may result in retinal distortion, macular hole formation, and macular detachment.[4] Very rarely, cases with peripheral retinal detachment secondary to VMT have also been reported.[5,6]

In this article, we present a case of subtotal tractional retinal detachment (TRD) accompanied by retinoschisis secondary to VMT with multimodal imaging findings and its successful surgical outcome.

Case Report

A 61-year-old male patient was referred to our clinic for the treatment of retinal detachment in the left eye. The duration of the sudden vision loss was one week. The patient had no known systemic disease or trauma history. His best-corrected visual acuity (BCVA) was 0.4 in the right eye, with hand motions in the left. The intraocular pressure was 14 mm Hg, and an anterior segment examination presented grade-two nuclear cataracts in both eyes. A fundus examination showed epiretinal membrane (ERM) formation in the macula of the right eye and subtotal retinal detachment without a peripheral retinal tear in the left eye. Additionally, an optic disc hyperemia accompanying the appearance of a macular hole was remarkable in the left eye (Figure 1a and 1b). Fundus fluorescein angiography revealed normal findings in the right eye and optic disc head staining and leakage were present in the left eye (Figure 1c and 1d). Optical coherence tomography (OCT) revealed ERM with a lack of foveal depression in the right eye and tractional macular detachment secondary to VMT in the left eye, accompanied by retinoschisis-like cavitations in the outer nuclear layer. There was also minimal ERM formation in the left eye (Figure 2). A diagnosis of TRD secondary to VMT in the left eye was made based on these findings. A combined pars plana vitrectomy (PPV) with cataract surgery was performed.

1- Ophthalmology Department, Etlik City Hospital, Ankara, Türkiye

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Correspondence author:
Eyupcan Sensoy
Email: dreyupcansensoy@yahoo.com

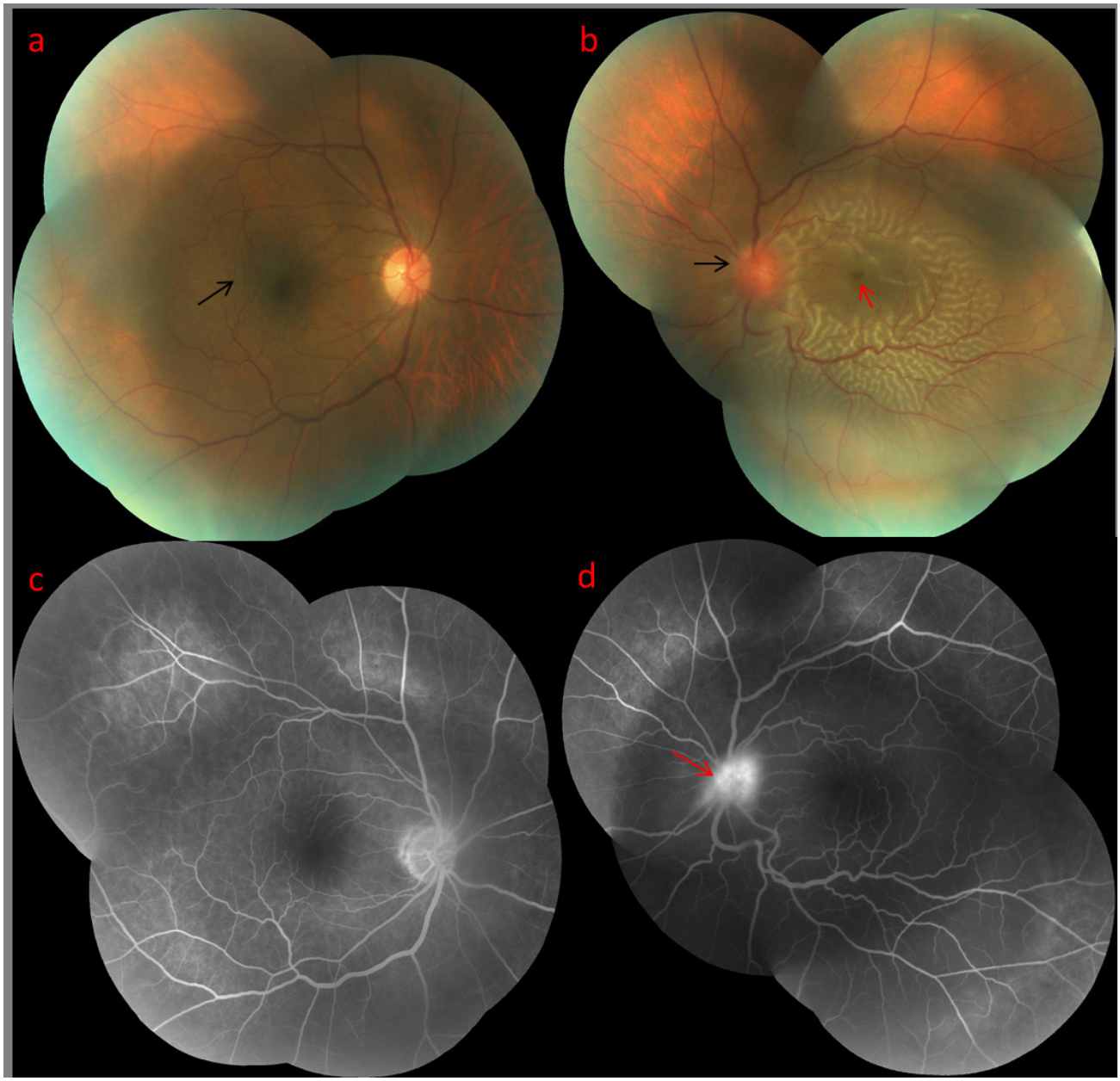

Figure 1: *a and b) Color fundus photograph shows epiretinal membrane (ERM) in the macula (black arrow) in the right eye and subtotal retinal detachment in the left eye without a peripheral retinal tear. Macular hole appearance (red arrow) and optic disc hyperemia (yellow arrow) are seen in the left eye. c and d) Fundus fluorescein angiography (FFA) imaging shows normal findings in the right eye and optic disc head staining and leakage (yellow arrow) in the left eye.*

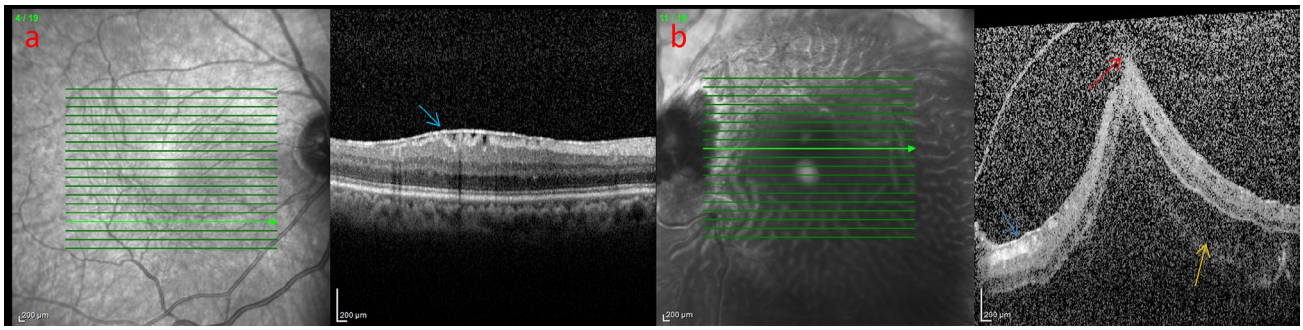

Figure 2: *Optical coherence tomography (OCT) shows a) loss of foveal depression due to ERM (blue arrow) in the right eye. b) In the left eye; minimal ERM (blue arrow), tractional macular detachment secondary to vitreomacular traction (VMT) (red arrow), and retinoschisis-like cavitations in the outer nuclear layer (yellow arrow) are seen.*

The central part of the vitreous was excised with a vitreous cutter. Strong adhesions between the retina and the vitreous were removed by carefully peeling the posterior hyaloid body with microforceps. During surgery no full-thickness macular hole was observed. Epiretinal membrane and ILM peeling were performed and the surgery was terminated with C3F8 gas tamponade. One month after surgery, BCVA improved to 0.1 and the retina was completely attached. OCT showed that most of the detachments regressed and the retinoschisis-like appearance disappeared completely, but there was inner retinal surface irregularity (Figure 3). In the second month of follow-up, BCVA improved to 0.4. On fundus examination, pale, mottled lesions were observed around the macula (Figure 4a). Fundus autofluorescence (FAF) imaging showed minimal hyperfluorescent lesions corresponding to pale mottled areas (Figure 4b). These hyperfluorescent spots were evaluated as un-resorbed lipofuscin residues. On OCT, almost all of the serous fluid was resorbed and the foveal contour began to form (Figure 4c). The patient's follow-up continues.

DISCUSSION

With the advent of spectral-domain OCT, it has become possible to visualize and define the posterior vitreous in detail, with adhesion areas between the retina and vitreous, superficial deterioration in the retina, and intraretinal and subretinal changes.[7] Posterior vitreous detachment is a natural process that occurs as the vitreous ages, develops, and is completed from the posterior adhesion pole to the equator.[8] In the case of incomplete PVD, there may be no change in the macular anatomy, called vitreomacular adhesion. Alternatively, VMT may develop, which causes anatomical changes, such as tractional detachments, pseudocysts, and retinal holes.[4,9]

The incidence of VMT is around 1% for people between the ages of 40–89. It is thought that the main cause of complications in VMT, considered to be induced by anteroposterior and tangential retraction, is that a smaller adhesion area creates a stronger retraction.[10] Tractional retinal detachment is one of the rarest and most serious complications of VMT.[5] Melberg et al.[5] published a study on the largest series of patients with tractional macular

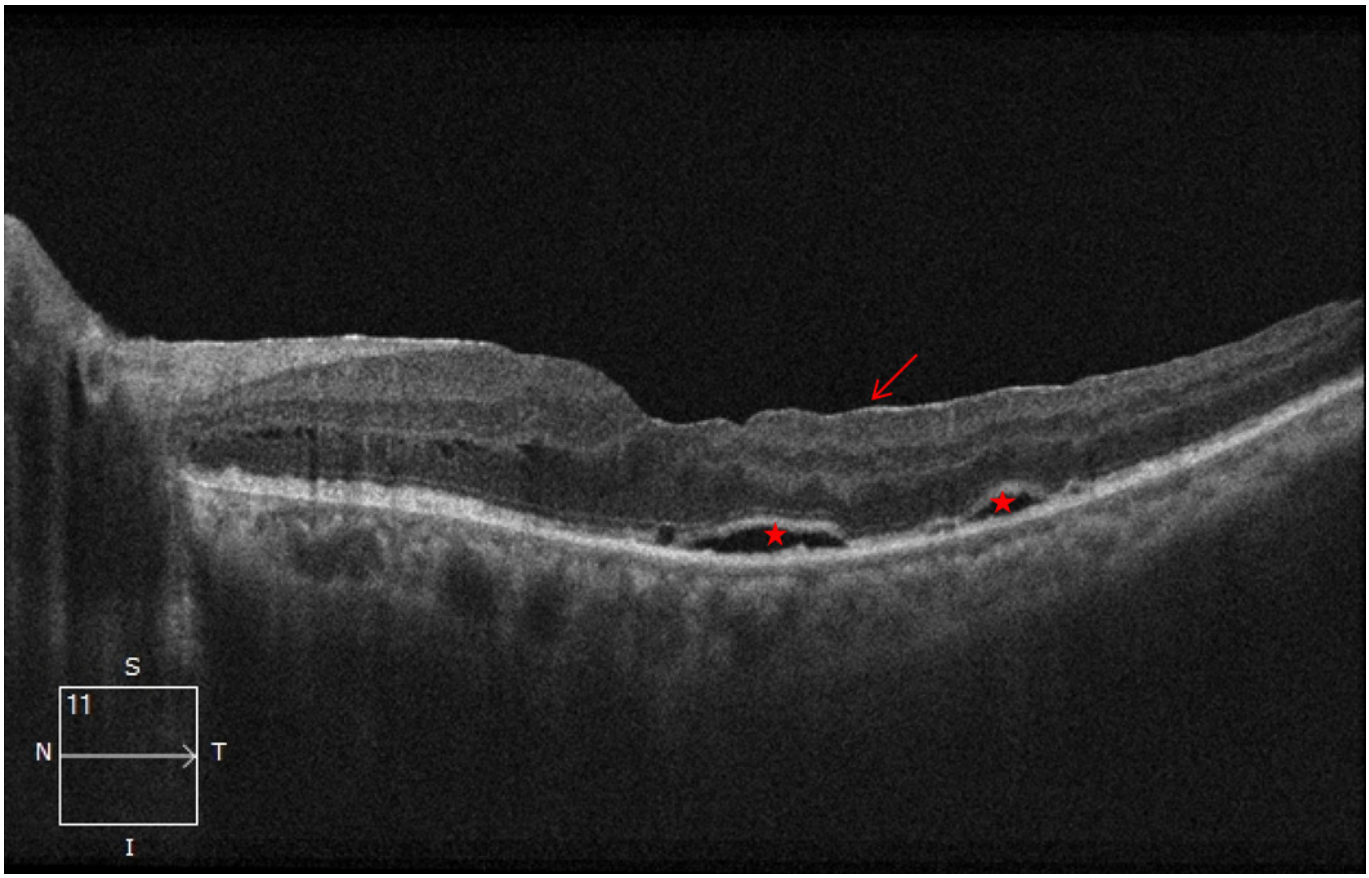

Figure 3: *Optical coherence tomography (OCT) shows that most of the tractional retinal detachment has regressed and minimal subretinal fluid remains (red star), the retinoschisis-like appearance has completely disappeared, but the inner surface of the retina is irregular (red arrow).*

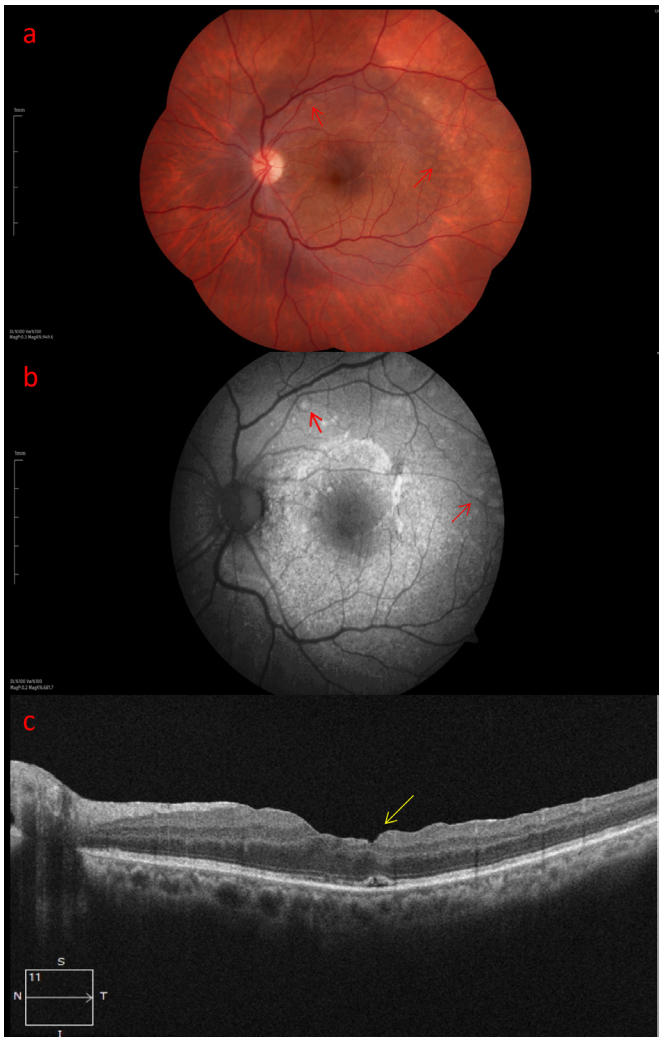

Figure 4: *a) Color fundus imaging shows pale, mottled lesions (red arrow) around the macula. b) Fundus autofluorescence (FAF) imaging shows minimal hyperfluorescent lesions (red arrow) corresponding to pale mottled areas. c) Optical coherence tomography (OCT) shows that almost all of the serous fluid has been resorbed and the foveal contour has begun to form (yellow arrow).*

detachment caused by VMT in 1995. They described the clinical characteristics and peroperative and postoperative findings of nine patients. Although all patients underwent PPV for tractional macular detachment, the detachment was extended in the superior or inferior arcades in five patients. After PPV, the macula was reattached in seven eyes, and visual acuity increased in four patients.[5] Although the contribution of Melberg et al.[5] study to the literature is important, notably, imaging findings are insufficient due to the date it was conducted.

Another report by Watanabe et al.[6] described a case of TRD in a patient with Gaucher disease. They observed intraoperatively that the vitreous adhered strongly to the retina. Thus, posterior vitreous detachment had failed to occur, with the resulting traction by the vitreous body causing the retina to detach completely. After PPV, the retina was reattached despite persistent nasal retinal detachment.[6]

In our case, in addition to TRD in the left eye, there was ERM formation in both eyes. The commonly accepted view regarding the formation of idiopathic ERM, which is one of the vitreomacular interface diseases, is that defects develop in the ILM as a result of traction during the development of PVD and that this structure develops as a result of the migration and subsequent proliferation of retinal glial cells.[11,12] Another alternative view is that hyalocytes that remain attached to the retina as a result of abnormal AVD cause ILM contraction by stimulating the Müller cells.[13] The presence of ERM in both eyes and VMT in the left eye may indicate that our patient had a vitreomacular interface problem.

We achieved almost complete retinal attachment and an increase in visual acuity after early surgery in our case. In addition, the schisis-like cavities and almost all the subretinal fluid that we detected in the preoperative OCT image had disappeared. When the literature is examined regarding the source of this liquid, there are opinions that the negative pressure caused by the traction force applied by the posterior vitreous causes fluid transfer from the RPE to the subretinal space, with retinal detachment and retinoschisis-like cavitations. With PPV, anatomical abnormalities are corrected, negative pressure is eliminated because of decreasing anteroposterior traction forces, and retinal vascularity is stabilized. Accordingly, rapid fluid resorption and anatomical restoration occur.[14,15] We also support this hypothesis. Because of the removal of anteroposterior traction, a rapid improvement in intraretinal and subretinal fluid, including anatomical restoration, was observed in our patient, who underwent surgery. Nearly complete fluid resorption was detected in the second month.

CONCLUSION

Tractional retinal detachment secondary to VMT is a rare complication. In surgery, strong adhesions between the retina and the vitreous should be removed by carefully peeling the posterior hyaloid body with a vitreous cutter and/or microforceps. Multimodal imaging is important in diagnosing the disease, elucidating its pathophysiology, and ensuring accurate diagnosis and follow-up. Among these tools, OCT has a special importance. It plays an important

role in making the differential diagnosis of the case, better understanding its relationship with the posterior hyaloid, and monitoring postoperative anatomical attachment.

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