

Effects of a Triple Procedure-Intravitreal Tissue Plasminogen Activator and Bevacizumab Injection Along with Pneumatic Displacement- in the Treatment of Submacular Hemorrhage Secondary to Age-Related Macular Degeneration: A Case Report

Yaşa Bağlı Makula Dejenerasyonuna Bağlı Submaküler Hemorajide Üçlü Tedavinin Etkisi; Pnömotik Yer Değiştirme ile Birlikte İntravitreal Doku Plazminojen Aktivatörü ve Bevasizumab Enjeksiyonu: Olgu Sunumu

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Summary

We present the effect of pneumatic displacement therapy used along with intravitreal tissue plasminogen activator (t-PA) and bevacizumab injection in the treatment of massive submacular hemorrhage associated with exudative age-related macular degeneration. Sequential intravitreal injections of bevacizumab (0.05 ml) and t-PA (50 µgr in 0.1 ml) with pneumatic displacement were performed in a patient with submacular hemorrhage related to choroidal neovascular membrane. Submacular hemorrhage was totally displaced extramacularly after one week from the triple procedure and no complications were noted. Visual acuity was improved one week after treatment. Our findings demonstrated that intravitreal injections of bevacizumab, t-PA, and gas are effective and safe procedures that can improve and accelerate visual recovery in age-related macular degeneration patients with submacular hemorrhage, although final visual outcome is often limited by the progression of the underlying pathology. (*Turk J Ophthalmol* 2011; 41: 49-51)

Key Words: Bevacizumab, pneumatic displacement, submacular hemorrhage, tissue plasminogen activator

Özet

Bu çalışmada yaş tip yaşa bağlı makula dejenerasyonuna bağlı geniş submaküler hemorajide pnömotik yer değiştirme ile birlikte kullanılan doku plazminojen aktivatörü ve intravitreal bevacizumab enjeksiyonunun etkisi sunulmaktadır. Neovasküler membrana bağlı geniş submaküler hemorajili olguya birbiri takiben intravitreal bevasizumab (0,05 ml) enjeksiyonu ve doku plazminojen aktivatörü (0,1 ml.'de 50 mikrogram) ile birlikte pnömotik yer değiştirme uygulandı. Üçlü tedavi sonrası birinci haftanın sonunda hemoraji tamamen makula dışına yer değiştirdi ve komplikasyona rastlanmadı. Görme derecesi tedavi sonrası birinci haftanın sonunda arttı. Altta yatan patoloji nedeni ile görme artışı kısıtlanmasına rağmen, sonucumuz göstermektedir ki intravitreal gaz, doku plazminojen aktivatörü ve bevasizumab enjeksiyonu geniş submaküler hemorajisi olan yaşa bağlı makula dejenerasyonlu hastalarda görmeyi arttıran güvenli ve etkili bir uygulamadır. (*Turk J Ophthalmol* 2011; 41:49-51)

Anahtar Kelimeler: Bevasizumab, pnömotik yer değiştirme, submaküler hemoraji, doku plazminojen aktivatörü

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Introduction

Submacular hemorrhage (SMH), may occur secondary to some ophthalmologic disorders such as choroidal neovascular membranes (CNVM), ocular trauma, arterial macroaneurysms and pathological myopia.¹⁻³ It leads to irreversible damage to the photoreceptor outer segments by the shearing effect of the clot, apart from the mechanical obstruction to metabolic exchange between the retinal pigment epithelium and the outer retina. Iron released from the haemoglobin may also cause outer retinal cell toxicity.¹⁻³

Submacular hemorrhage is frequently associated with poor visual outcome. In the treatment, early displacement of the SMH is critical to minimize its damaging effects. Early diagnosis and treatment of the underlying cause is the key factor in improving the final visual outcome.

Patients with SMH without subretinal neovascular membranes had a better visual improvement rate.² The visual outcome in submacular hemorrhage due to CNVM is relatively poor. The size and thickness of the hemorrhage have a negative effect on the natural prognosis.^{1,4}

In this report, we present the case of a patient with SMH associated with age-related macular degeneration (AMD) who was treated successfully with a triple procedure-intravitreal t-PA, gas and bevacizumab injection.

Case Report

An 80-year-old female presented to our clinic with sudden vision loss in the left eye during the last 3 days without any history of ocular trauma. The best-corrected visual acuity (BCVA) was counting fingers in the affected eye. Fundus examination showed a thick submacular hemorrhage of 7 disc diameters within the arcades of the macula in the left eye (Figure 1). Fundus fluorescein angiography (FFA) demonstrated blockage of the choroidal fluorescence in the area of hemorrhage. Optic coherence tomography (OCT) revealed a highly reflective membrane suggesting a CNVM on the foveal region. The right eye had evidences of dry type AMD. The patient was diagnosed with SMH related to AMD in the left eye. It was decided to assess the efficacy of a triple procedure - intravitreal t-PA, gas and bevacizumab (Avastin™, Genentech Inc. San Francisco, California, USA) injection.

The procedure was performed in the operating room. Bevacizumab (1.25 mgr/ 0.05 ml) was injected

3.5 mm behind the limbus with 30 gauge needle through the vitreous. One day after the bevacizumab injection, intravitreal injections of t-PA (50 micrograms/ 0.1 ml) and sulphur hexafluoride (SF₆) (0.4 cc) were applied. The patient was advised to maintain a prone position for 2 days.

The patient was examined daily during the first 3 days after the treatment and then followed weekly during the first month. BCVA measurement (BCVA) and fundus examination were performed at each visit. FFA and OCT were done monthly. Additional intravitreal injections of bevacizumab were applied 4 and 8 weeks after the procedure. The last follow-up was 3 months after the procedure.

As seen in Figure 2, SMH was subtotally displaced to an extramacular area in three days and totally displaced after 1 week from the triple procedure. FFA showed an ill-defined subfoveal choroidal neovascular membrane after 1 week and was treated with repeated bevacizumab injections. At follow-up visits, the BCVA improved from fifty centimeters to two meters of count-

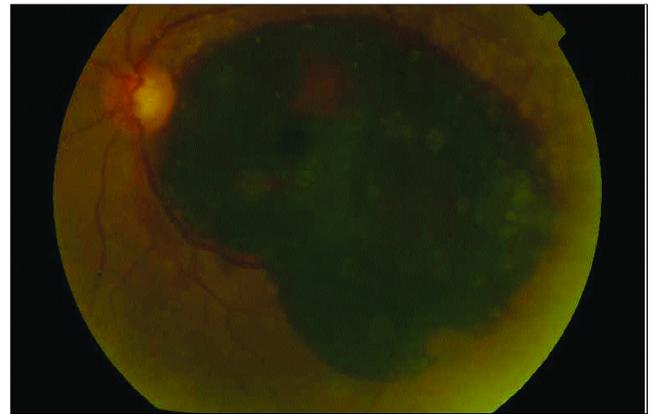


Figure 1. Colour fundus photography is showing the thick submacular hemorrhage covering about 7 disc areas within the macular region in the left eye



Figure 2. Colour fundus photography is showing that the blood totally disappeared in the left eye after one week follow-up

ing fingers after 1 week, and to five meters of counting fingers after 1 month. At the final visit, the BCVA remained the same. In fundus examination, a scar was detected over the macular lesion. No local or systemic adverse events of the treatment were seen in the patient.

Discussion

Submacular hemorrhage usually causes a significant and permanent loss of vision in the affected eye. Although the treatment is challenging, SMH secondary to CNVM should be treated with pneumatic displacement with or without t-PA injection⁴. Intravitreal injection of gas and t-PA displaces the hemorrhage apart from the macular area and helps to visualize the primary pathology.^{4,5} Early removal of SMH is an important aspect in the treatment and allows better visualization of the underlying pathology and decreases the toxic effects of the hemorrhage to the photoreceptors. In our clinic we generally prefer the treatment of pneumatic displacement along with intravitreal t-PA injection in patients with SMH due to AMD. However, with the widespread use of bevacizumab injection for wet AMD, we decided to use that early and combined therapy including intravitreal bevacizumab, SF-6 and t-PA injections to decrease the edema and scar formation and to improve the visual acuity in patients with SMH related to CNVM. In literature, a few reports demonstrated the efficacy of the triple procedure in the treatment of SMH.^{6,7} Meyer et al.⁶ performed and recommended the triple procedure in the treatment of patients with acute SMH related to AMD. They demonstrated favorable results in their retrospective case series. Chawla et al.⁷ reported four cases of SMH sec-

ondary to CNVM treated with the triple procedure and found early visual rehabilitation with the treatment of bevacizumab combined with t-PA and gas. Similar with these reports, we achieved a good result with the triple procedure in our patient.

In conclusion, intravitreal bevacizumab combined with pneumatic displacement and t-PA injections may help to remove the hemorrhage from the macula, decrease the macular edema and to treat the underlying membrane. Better visual outcome can be achieved with this treatment in SMH secondary to CNVM.

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