TRAUMATIC SUBMACULAR HEMORRHAGE TREATED WITH rt-PA AND SF$_6$

HEMORRAGIA SUBMACULAR TRAUMÁTICA TRATADA CON rt-PA y SF$_6$

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ABSTRACT

Case report: This patient was afflicted by a traumatic submacular hemorrhage. A posterior vitrectomy was performed and intravitreal rt-PA and SF6 were administered. Four weeks later, the visual acuity had increased from 0.1 to 0.8. No complications due to the treatment with rt-PA were reported.

Discussion: It is known that waiting for the spontaneous blood removal in such cases results in a poor visual acuity recovery due to a toxic effect of the blood products. Both rt-PA and the SF$_6$ are useful for the treatment of submacular hemorrhages secondary to age-related macular degeneration, and this case report has shown they are also useful to lyse traumatic blood clots, thus contributing to a better recovery of visual acuity (Arch Soc Esp Oftalmol 2007; 82: 517-520).

Key words: rt-PA, submacular hemorrhage, ocular trauma, tissue plasminogen activator, subfoveal blood.

RESUMEN

Caso clínico: Paciente que presenta hemorragia submacular de origen traumático. Se realiza vitrectomía posterior y administración intravítrea de rt-PA y SF$_6$. A las cuatro semanas la agudeza visual había pasado de 0,1 a 0,8. El paciente no presentó ninguna complicación derivada del tratamiento con rt-PA

Discusión: Debido a que la sangre es tóxica para la retina esperar a su reabsorción espontánea comporta una pobre recuperación visual. El rt-PA administrado junto al SF$_6$ es útil para el tratamiento de hemorragias submaculares secundarias a degeneración macular asociada a la edad, pero también puede ser útil para la lisis de coágulos hemáticos traumáticos favoreciendo la recuperación de la agudeza visual.

Palabras clave: rt-PA, hemorragia submacular, traumatismo ocular, activador tisular del plasminógeno, sangre subfoveal.
INTRODUCTION

Since blood is toxic in the retina, waiting for its spontaneous reabsorption may imply a poor visual recovery (1-3). The recombinant tissue plasminogen activator (rt-PA) is useful in the treatment of subfoveal hemorrhages secondary to age-related macular degeneration (AMD) (1,3), as well as in the lysis of subretinal hematic clots caused by ocular trauma, promoting the recovery of visual acuity (VA).

CASE REPORT

A 25-year-old male reporting macular hemorrhage secondary to ocular trauma (fig. 1). VA is .4 and intraocular pressure is 15 mmHg. Since the size of the hemorrhage is not too large, treatment is prescribed with topical and oral corticoids and cycloplegic agents. The following week, he exhibited a decrease in VA down to .1 and increased hemorrhage (fig. 2), so that a posterior vitrectomy was performed in an attempt to move the hemorrhage with perfluoropropane without success; .1 ml of rt-PA at 50 µg/.1 ml was administered directly on the retina, filling up the eye globe with gas (30% SF 6) and performing a decubitus prone positioning during one week. Four weeks after this procedure, VA was .8, the macular hemorrhage had disappeared, but once the blood was reabsorbed the existence of a juxtafoveal choroidal rupture became apparent (fig. 3). Six months later, VA was 1.0.

DISCUSSION

The presence of blood inside the retina is toxic for photoreceptors and for the pigment epithelium (RPE), resulting in their degradation (2). The subretinal blood serves as a barrier preventing the metabolic exchange between photoreceptors, the RPE and the choroids (1,3), the high iron content and the presence of inflammatory cells in the subretinal blood (1,3). Most importantly, the organiza-

Fig. 1: Initial appearance of the eye fundus and OCT. The existence of a retinal edema may be observed in both the image of the eye fundus and the OCT. Furthermore, the OCT reveals the presence of subretinal fluid.

Fig. 2: Appearance of the eye fundus one week after trauma. Retinal blood has increased and the macular OCT reveals a hemorrhagic detachment of the pigment epithelium.
tion and retraction of the clot with retinal traction (2) explain these retinal injuries. Thus, it is necessary to eliminate the subretinal blood in order to favor visual recovery (1-3).

In 1996, a technique was developed that consisted in applying an intravitreous injection of rt-PA and gas to move and promote the lysis of the macular hemorrhage, a procedure which attempted to replace the submacular aspiration of blood (1-3).

The rt-PA is a fibrinolytic agent of proven efficacy in the lysis of blood clots. When administered in the posterior pole, this drug is capable of reaching the subretinal space and tapping the existence of retinal microinjuries caused by bleeding (1,3).

Attempts to move the blood have been made resorting exclusively to gas injections, but the visual recovery achieved is lower when associated with the administration of rt-PA, since the shifting of the clot without prior lysis results in irreversible damage along the photoreceptors layer (1,3).

The most relevant prognosis factor for the visual recovery of patients suffering from macular hemorrhage and treated with rt-PA is the time of progression. Thus, Hattenbach (1), in a study focused on patients suffering from AMD and subfoveal hemorrhage, noticed that 67 percent of the eyes presenting hemorrhages with less than 14-day duration exhibited an improvement of VA, compared to 30 percent whose hemorrhage lasted more than 14 days, while no relation was found between the size of hemorrhages and final VA. A study performed on cats holangiotic retinas revealed that the presence of blood in the subretinal space led to a massive degeneration of photoreceptors between day 7 and 14 (2).

In 27 percent of cases, the main complication arising is the haemorrhage’s vitreous rupture (1). Another complication to keep in mind is the toxic damage caused by rt-PA itself. This damage results from the administration of doses greater than 100 µg, either through a single injection or after reinjecting smaller doses (1,4,5), in such a way that the rt-PA’s toxicity would be cumulative and dose-dependent (1,4,5). Toxicity is caused by the L-arginine, the commercial vehicle for rt-PA (1,4,5), since L-arginine is similar in terms of structure to lysine, an aminoacid of proven retinal toxicity (5). The eye fundus should reveal the presence of mottle in the RPE and the likelihood of developing an exudative retinal detachment (1,4,5). The factors decreasing the rt-PA’s toxicity are not clear yet; supposedly, the increase in vitreous volume, as in the case of myopic patients, decreases retinal toxicity since rt-PA concentration inside the eye globe would decrease together with the vitreous liquefaction, and the rt-PA could be diluted more easily, thus decreasing its toxicity (1,5). Nevertheless, despite the fact that in this case rt-PA was administered directly on the retina and the eye was filled with gas, no toxicity was observed in this patient after six months.

The administration of rt-PA and SF 6 could be effective in macular hemorrhages caused by trauma.

REFERENCES


