PHOTODYNAMIC THERAPY IN ANGIOID STREAKS
TERAPIA FOTODINÁMICA EN ESTRÍAS ANGIOIDES

ELÍAS-DE-TEJADA M1, CALVO-GONZÁLEZ C1, RECHE-FRUTOS J1, DONATE-LÓPEZ J1, GARCÍA-SÁNCHEZ J2

ABSTRACT

Objective: To evaluate the efficacy and safety of photodynamic therapy in choroidal neovascularization associated with angioid streaks.

Methods: We performed a retrospective study of eleven eyes (eight patients) with subfoveal, juxtafoveal or extrafoveal neovascularization, which received at least one session of photodynamic therapy. Treatment efficacy was evaluated by visual acuity (VA) testing, color photography and fluorescein angiography. The mean follow-up was 13.2 months.

Results: Ten eyes presented subfoveal neovascularization, one eye presented juxtafoveal and another eye extrafoveal neovascularization. VA was unchanged in two patients, increased in one patient, and decreased in eight patients following photodynamic therapy. Treatment efficacy was evaluated by visual acuity (VA) testing, color photography and fluorescein angiography. The mean follow-up was 13.2 months.

Conclusion: Photodynamic therapy in choroidal neovascularization related to angioid streaks does not appear to alter the course of this disease, but it does slow its progression (Arch Soc Esp Oftalmol 2007; 82: 741-746).

Key words: Angioid streaks, photodynamic therapy, choroidal neovascularization.

RESUMEN

Objetivo: Evaluar la eficacia y seguridad de la Terapia Fotodinámica (TFD) en la neovascularización coroidea (NVC) asociada a estrías angioides (EA).

Métodos: Se realiza un estudio retrospectivo de ocho pacientes (once ojos) diagnosticados de EA, que presentan neovascularización subfoveal, yuxtafoveal o extrafoveal, tratada al menos una vez con TFD. Se obtiene la mejor agudeza visual corregida (MAVC), retinografía así como angiografía con fluoresceína (AFG), antes y después del tratamiento para valorar su eficacia. El seguimiento medio fue de 13,2 meses.

Resultados: Diez ojos presentaban membranas subfoveales, un ojo yuxtafoveal y otro extrafoveal. Tras la TFD, la AV se mantuvo igual en dos pacientes, aumentó en un paciente y disminuyó en ocho pacientes. En cuanto a la respuesta angiográfica, nueve ojos presentaron respuesta fibrótica tras una sesión de TFD, mientras que en dos ojos persistió exudación. Hubo tres casos de recidiva de la NVC.

Conclusiones: La TFD en la NVC asociada a EA no parece alterar el curso de esta enfermedad, sólo ententece su progresión.

Palabras clave: Estrías angioides, terapia fotodinámica, neovascularización coroidea.
INTRODUCTION

The purpose of this paper is to assess the efficiency and safety of Photodynamic Therapy (PDT) in the treatment of choroidal neovascularization associated to angioid streaks (AS).

AS’s are ruptures of Bruch’s membrane which appear in funduscopy as grayish or orange strips around the optic disc, as this is the point at which extrinsic eye muscles exert greater traction and extend radially outward from that point (fig. 1). A number of pathologies are associated to the development of AS’s such as elastic pseudoxantoma, Paget’s disease, cutaneous senile elastosis and hyperplastic fibrodisplasia or Ehlers-Danlos syndrome.

The importance of AS’s resides in the late development of choroidal neovascularization (CNV), giving rise to mostly classical subfoveal membranes. The pathogenesis of the development of these membranes is similar to that of the CNV in myopic retinopathy, i.e. through ruptures in Bruch membrane which penetrate the vessels of the choroids towards the retina’s pigmentary epithelium (RPE) and the subretinal space.

When CNV develops, patients begin to have symptoms with visual acuity reduction and metamorphopsia. The campimetry shows a central scotoma and in chromatic vision tests the blue-yellow axis is altered (1).

Fluorescein angiography (FAG) plays an important role in the diagnostic of AS’s. In addition it helps to protect the appearance of CNV.

There are different therapeutic possibilities for CNV associated to angioid streaks, such as photocoagulation with argon laser, macular surgery and PDT.

Argon laser photocoagulation of the new vessels is utilized in the juxtafoveal and extrafoveal membranes. A high number of relapses is associated, as well as the development of large central scotomae secondary to the damage suffered by the healthy tissue, as this is a non-selective laser (2).

In turn, surgery consists in the extraction of the neovascular membrane and macular translocation, associated to a high percentage of complications (3).

Photodynamic Therapy (PDT) with verteporfin has been utilized in CNV secondary to ARMD, pathological myopia and other causes.

The object of this study is to assess the efficiency of PDT in CNV secondary to AS’s.

SUBJECTS, MATERIAL AND METHODS

This paper presents a retrospective study of eight patients (eleven eyes) with angiographically active choroidal neovascular membranes associated to AS’s.

In all cases, the diagnostic of CNV was made with FAG, classifying the membranes on the basis of the angiographic pattern as classic or hidden and, according to their location, in extrafoveal, juxtafoveal or subfoveal. The study diagnosed nine classical and two hidden membranes, of which nine were subfoveal and the two remaining were extra- and juxtafoveal respectively (fig. 2).
The best corrected visual acuity (BCVA) before the treatment ranged between 20/200 and 20/40, with a mean value of 20/80.

PDT was applied according to the conventional protocol, consisting in Verteporfin (Visudyne®; Novartis Ophthalmic, Hettlinger, Switzerland), diluted in balanced saline solution and dextrose at 5% to obtain a drug dosage of 6 mg/m2 of bodily surface and a total infusion volume of 30 ml. The solution was administered intravenously at a rate of 3 ml/min for approximately ten minutes. The laser was applied 15 minutes after beginning the infusion. The size of the laser spot was determined on the basis of the larger axis of the lesion, to which 1,000 mm were added. The time for administering 50 J/cm2 ofer was of 83 seconds.

The patients were assessed every 12 weeks, and in each assessment the VA was determined according to the ETDRS (Early Treatment Diabetic Retinopathy Study). In addition, a retinography and AFG were performed to analyze the CNV activity. If exudation appeared in the membrane, and additional session of PDT was given. The number of PDT sessions in our series ranged between one and three, with a mean of 1.33 sessions.

The mean follow-up time was of 13.2 months (range between 3 and 24 months).

RESULTS (table I)

Eight patients were studied (three men and five women) with a mean age of 56.87 years (range, 43-78). The mean BCVA pretreatment was of 20/80 (range 20/200-20/40).

Fig. 2: Case 1. Retinography and angiography prior to PDT, showing subfoveal choroidal neovascularization in both eyes.
After the treatment, the BCVA was maintained in two cases (18%), it reduced in eight cases (73%) and increased in one case (9%). The final mean VA was of 20/200 (finger counting range -20/60).

CNV exudation after PDT fell or disappeared in all cases after a PDT session. A fibrotic response was observed (fig. 3) in nine eyes (82%), three of which (27%) evidenced a reactivation of the lesion (fig. 4) in one eye, relapse appeared one year after treatment, and in the other two six months after the PDT session. In the three cases, after a second PDT session the CNV exudation disappeared.

Exudation persisted in only two eyes (18%), which made necessary an additional PDT session.

DISCUSSION

Even though uncommon, the impact of CNV associated to angioid streaks is large because it causes central scotomae, and even though patients (mostly young) exhibit good peripheral vision, their labor activity is jeopardized. Without treatment, these lesions rapidly progress towards blindness.

Argon laser photocoagulation for juxtafoveal and extrafoveal CNV associated to AS’s, with remission of exudation but also large scotomae and relapses in a high percentage of cases. At any rate, this treatment modality was not a recommendable in subfoveal CNV (2).

The use of PDT for the treatment of subfoveal membranes in myopia and age related macular degeneration (ARMD) with satisfactory results, particularly in classic membranes, opened up new horizons for the treatment of this pathology.

PDT consists in the injection of a light sensitivity enhancing agent (verteporfin) followed by activation with a non-thermal ofer light at 690 nm at the absorption peak. When the agent is excited it generates oxygen radicals and other products which cause damage in the endothelial membrane of new vessels, causing the thrombosis thereof.

In patients with CNV is secondary to ARMD, it was observed that the exudation recurred 12 weeks after a PDT session. However, the TAP group (Treatment of Age-related macular degeneration with Photodynamic Therapy) published that the relapse prevalence of CNV was lower in successive PDT sessions (4).

In our work we found a VA loss of 58% and a persistence of angiographically determined exudation of 17%. Similar results have been observed in several studies (5-7), while other authors present more optimistic results without post-treatment VA reduction and lack of CNV activity after one PDT session (8).

In conclusion, PDT in CNV associated to angioid streaks does not improve the final VA of patients or modify the damage caused by CNV. However, it seems to slow down the progression of the disease by reducing membrane exudation.

Relapses of choroidal neovascularization after PDT have been described ago in lower percentages than with argon laser photocoagulation.

REFERENCES


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