Short communication

Acute glaucoma in a patient with an Artisan® due to trabecular blockage after combined intravitreal treatment for macular oedema

A. Valverde-Megías a,*, J. Donate-López a, R. Torres-Imaz a, D. Díaz Valle b, P. Arriola-Villalobos b, M. Jiménez-Santos a, J. García-Feijoo c

a Departamento de Retina, Hospital Clínico San Carlos, Madrid, Spain
b Departamento de Superficie e Inflamación Ocular, Hospital Clínico San Carlos, Madrid, Spain
c Departamento de Glaucoma, Hospital Clínico San Carlos, Madrid, Spain

A R T I C L E   I N F O

Article history:
Received 15 December 2011
Accepted 3 February 2012
Available online 8 May 2013

Keywords:
Artisan®
Macular oedema
Triamcinolone
Avastin®
Acute glaucoma

A B S T R A C T

Case report: We present a 71-year-old patient with an Artisan® implant and macular edema associated with unsatisfactory response to repeated intravitreal corticosteroids. An intravitreal Trigon® and Avastin® combined injection was given, and acute glaucoma developed. Anterior chamber washout was performed to resolve the rise in intraocular pressure. In spite of an excellent macular response, this was only temporary, and the corneal endothelium, which had remained competent so far, suffered irreversible damage.

Discussion: The combination of both treatments, along with the particular anatomic features in these patients may have been precipitating factor in this unfortunate outcome.

© 2011 Sociedad Española de Oftalmología. Published by Elsevier España, S.L. All rights reserved.

Glaucoma agudo en paciente con Artisán® por bloqueo trabecular tras tratamiento combinado intravitreo por edema macular

R E S U M E N

Caso clínico: Presentamos el caso de un varón de 71 años con Artisán® y edema macular asociado con insuficiente respuesta a corticoides intravitreos. Se decidió tratamiento combinado con Trígón® y Avastin® intravitreos y desarrolló un glaucoma agudo, que resolvió tras lavado urgente de cámara anterior. A pesar de la excelente respuesta macular, ésta fue únicamente transitoria y el endotelio corneal, competente hasta ese momento, sufrió daños irreversibles.

Discusión: La combinación de ambos tratamientos junto con la anatomía especial en estos pacientes pudieron ser factores precipitantes de este desafortunado resultado.

© 2011 Sociedad Española de Oftalmología. Publicado por Elsevier España, S.L. Todos los derechos reservados.

* Corresponding author.
E-mail address: dramegara@yahoo.es (A. Valverde-Megías).
Introduction

Iridian fixation lenses are a valid solution for aphakia after complicated cataract surgery.\textsuperscript{1} Frequently, macular edema occurs in these patients, which could be related to the complicated phacoemulsification. The standard treatment for minimizing edema is periocular or intravitreal corticoids, or antiangiogenic agents. The combined use of both drugs has also been described\textsuperscript{2} and studied in diabetic macular edema.\textsuperscript{3} The usual dosage is 1.25 mg of bevacizumab (Avastin\textsuperscript{®}, Genentech, San Francisco, USA) and 2 mg of Trigon\textsuperscript{®} depot (triamcinolone acetonide, TA, Bristol-Myers Squibb, Madrid, Spain). This paper presents a case of secondary glaucoma produced by the entry of Trigon\textsuperscript{®} into the anterior chamber. This effect has not been published so far.

Case report

The patient is a 71-year-old male who underwent vitrectomy with Artisan\textsuperscript{®} lens implant in the left eye 2 months after complicated cataract surgery. During the one-year follow-up, the corneal endothelium maintained an adequate cell count and the cornea remained transparent and stable even though it developed progressive macular edema. Intravitreal Trigon\textsuperscript{®} was proposed and the patient signed the informed consent. The edema partially remitted during 2 months. Relapses were retreated with 3 additional injections of Trigon\textsuperscript{®} at three-month intervals. Intraocular pressure (IOP) remained normal and symmetric vis-à-vis the contralateral eye. At that stage it was proposed to combine intravitreal Avastin\textsuperscript{®} and Trigon\textsuperscript{®} to minimize the persistent edema. The patient signed the corresponding informed consent and the procedure took place without complications.

Twelve hours later the patient went to the emergency section due to painless reduction of vision (hand movements). The exploration revealed hypophagoma, retrokeratic whitish precipitates and turbidity in the aqueous humor and vitreous chamber (Fig. 1), which concealed the macular profile in the optic coherence tomography (OCT). Intraocular pressure was of 12/12. Twenty-four hours later, IOP was 50 mmHg and the eye clearly exhibited corneal edema. It was decided to wash the anterior chamber and take aqueous humor samples. The analysis thereof revealed TA particles but was negative for inflammatory cells and bacteria.

![Fig. 1 – Anterior pole 12 h after the combined injection of Avastin\textsuperscript{®} and Trigon\textsuperscript{®}. Hyposphagma, hypopion and marked aqueous humor turbidity due to triamcinolone.](image)

The following day, IOP recovered normal values, precipitates disappeared and vision improved as compared to before the combined injection. OCT was successfully performed (Fig. 2) and revealed a strictly normal macular profile. Even though IOP remained within normal values without requiring treatment in the follow-up period, corneal edema persisted and evolved, while the macular edema reappeared. Nine months later, intravitreal Avastin\textsuperscript{®} with peribulbar Celestone\textsuperscript{®} (betamethasone acetate and betamethasone sodium phosphate, Schering-Plough) was applied. Even though IOP and anterior segment remained unchanged, on this occasion the macular response was poor.

Discussion

Published literature on the combined use of Avastin\textsuperscript{®} and Trigon\textsuperscript{®} describes that IOP increases in up to 20% of patients, with some cases requiring filtrating surgical procedures. The
most frequent pattern of expression is after the seventh day but in our patient the symptoms appeared in less than 24 h. The fact that the patient did not develop hypertensive peaks in the 4 previous Trigon® injections and the short time interval up to the onset of symptoms discarded the possibility of a reaction to corticoids.

In vitro stability studies determine that the association of bevacizumab with triamcinolone is less stable than the principles on their own. The mean size of these particles reaches 17 μm. Inter-trabecular spaces in a subject vary between 10 and 75 μm, therefore involving a potential risk of mesh obstruction. The entry of TA into the anterior chamber around Artisan® and through iridectomy was probably enhanced by the larger volume of the combined injection. IOP increases up to said levels could significantly deteriorate the condition of the corneal endothelium, particularly in these patients.

In summary, the beneficial effects on the macula were temporary whereas the adverse effects, increased by altered anatomic conditions, were prominent. More research is required to confirm the relationship of combined treatments with said adverse effects in this group of patients.

**Funding**

Funding was provided by Red Temática de Investigación Cooperativa (Cooperative Research Thematic Network).

**Conflict of interests**

No conflict of interests has been declared by the authors.

**REFERENCES**