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Short communication

Transcorneal oxygen therapy for persistent hyphema in a patient with sickle cell disease☆

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ABSTRACT

Clinical case: The case concerns a 10-year-old boy of African origin, who suffered a mild ocular trauma to the left eye. Upon examination, the best visual acuity was 0.2 using the Snellen scale, with a 1 mm height hyphema, intraocular pressure (IOP) of 12 mmHg on left eye, with an increase up to 20 mmHg within 72 h. With a positive test for sickle cell disease, it was decided to treat medically with transcorneal oxygen therapy. Clearing of the anterior chamber was achieved, with an improvement in the best visual acuity to 0.8, and lowering of IOP to 8 mmHg.

Discussion: In the context of patients with persistent hyphema with sickle cell trait, transcorneal oxygen therapy is an effective alternative therapy. Achieving immediate and favorable results by lowering the IOP and improving the clearing of the anterior chamber.

Oxigenoterapia transcorneal como tratamiento de hifema persistente en un paciente con anemia de células falciformes

Palabras clave:
Hifema
Presión intraocular
Drepanocitosis
Oxigenoterapia

RESUMEN

Caso clínico: Paciente varón de 10 años, de raza negra, con antecedente de traumatismo leve en ojo izquierdo; presenta agudeza visual corregida de 0,2 en escala de Snellen, hifema con altura de 1 mm, presión intraocular (PIO) de 12 mmHg en ese ojo, con incremento de PIO a 20 mmHg a las 72 h. Con el resultado positivo del estudio de drepanocitos, se decide tratamiento médico con oxigenoterapia transcorneal. Se logra el aclaramiento de la cámara anterior, con agudeza visual corregida de 0,8 y la reducción de la PIO a 8 mmHg.

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Discusión: En los pacientes con hifema persitente en el contexto de una drepanocitosis, la oxigenoterapia transcorneal es una buena alternativa terapéutica. Se obtienen resultados satisfactorios inmediatos con la disminución de la PIO y el aclaramiento de la cámara anterior.

Introduction

Sickle cell disease is an autosomal recessive genetic disease characterized by the presence of sickle hemoglobin (Hb) in erythrocytes. Individuals that are heterozygous or carry sickle Hb have the so-called "sickle cell trait" (AS phenotype). This hemoglobin is characterized by losing an oxygen molecule from its structure, which causes an alteration in the shape and elasticity of the red blood cell.[1]

The sickle hemoglobinopathies of greater ocular importance are those in which S or C mutant hemoglobins are inherited as alleles of normal Hb. Sickle cell disease C and sickle thalassemia may be associated with severe retinopathy.

The ocular lesions are caused by 2 main phenomena: ischemia and difficulty in the elimination of the red blood cells.

Ischemic lesions comprise hemorrhages secondary to vascular injury and development of neovessels.

Patients with sickle cell disease differ in the evolution and response to treatment in comparison with a patient without this history. If, for any reason, bleeding occurs in the eye's anterior chamber, the acidity of the stagnant aqueous humor triggers and maintains the sickle cell phenomenon. The hardly flexible sickle erythrocytes exhibit great resistance to pass through the trabecular mesh; therefore, hyphema persists longer and ocular hypertension becomes unresponsive to treatment. In addition, patients with the particular predisposition of the sickle cell disease to hypoxia leads to occlusion of the central retinal artery or damage to the optic nerve with lower intraocular pressure (IOP) values than in healthy individuals.[2,3]

The present study describes the unusual technique of transcorneal oxygen therapy for treatment of persistent hyphema in patients with sickle cell disease.[4,5]

Clinical case

Male patient, 10 years old, of African origin with antecedent of a direct low impact hit with a wood splinter in the left eye (LE).

Two days after this trauma, the patient consulted in Ophthalmology Emergencies due to blurred vision. Ophthalmological examination showed corrected visual acuity (VA) of 0.2 on the Snellen scale, lower peripheral mild corneal erosion and hyphema with a height of 1 mm. Eye fundus without pathological findings in both eyes. IOP was 12 mmHg while in the right eye (RE) it was 8 mmHg.

Initial treatment included postural practices at home, topical treatment with dexamethasone 0.1% (Alcon, El Masnou, Barcelona, Spain) every 6 h and atropine 1% (Alcon, El Masnou, Barcelona, Spain) every 12 h.

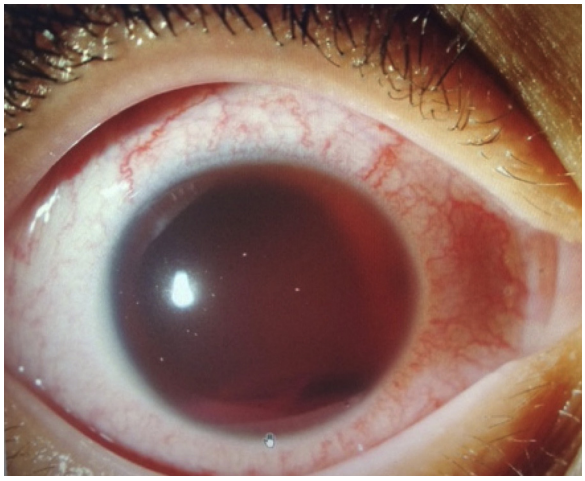

Fig. 1 – Biomicroscopy: hyphema 2 mm high, in second consultation.

Five days after the trauma, in the following checkup, an increase in the height of the hyphema was observed of 2 mm with abundant blood cells in the anterior chamber and IOP of 20 mmHg with slight epithelial edema (Fig. 1).

In addition, a complete blood count and smear study was carried out, which confirmed a sickle cell disease, since it was found to carry Hb S in 36% of the total Hb, so treatment was continued in the hospital and topical beta-blockers were added for IOP control.

On the second day of hospitalization, IOP persisted at 20 mmHg, associated with signs of high ocular tension such as increased epithelial edema. As IOP could not be controlled only with beta-blockers, a treatment considered safer,[6] it was decided to start medical rescue therapy with transcorneal oxygen therapy.[7]

Two sessions of transcorneal oxygen therapy were performed with a pediatric oxygen mask, at 3 L/min, humidified. The duration of this therapy was 2 h for each session, with an interval of 24 h between sessions. During the entire process, corneal lubrication remained constant by means of artificial tears (Fig. 2).

Two hours after the first session, hyphema diminished to 0.7 mm and IOP decreased to 17 mmHg, with disappearance of the epithelial edema.

On the third day of hospitalization a second session was performed, with which an IOP of 10 mmHg with a hyphema