Short communication

Predictive value of optical coherence tomography on the outcome of lung adenocarcinoma with choroidal metastases

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ABSTRACT

Clinical case: A 59-year-old male, with the diagnosis of lung adenocarcinoma stage IV, following palliative systemic chemotherapy treatment. He was referred to our department due to bilateral blurred vision. In the eye-fundus we observed: bilateral choroidal metastases with macular involvement, and in optical coherence tomography (OCT): neurosensorial detachment in both eyes. This neurosensorial detachment showed improvement with chemotherapy before the clinical and radiologic improvement.

Discussion: OCT could be a great tool in order to predict the response to systemic treatment in cases of lung adenocarcinoma associated with choroidal metastases.

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Valor predictivo de la tomografía de coherencia óptica en la evolución del adenocarcinoma pulmonar con metástasis coroideas

RESUMEN

Caso clínico: Varón, 59 años, con adenocarcinoma pulmonar estadio IV, en tratamiento paliativo con quimioterapia sistémica. Acude a nuestro servicio por visión borrosa bilateral. En el fondo de ojo se observan metástasis coroideas bilaterales con compromiso macular, y en tomografía de coherencia óptica (OCT) desprendimiento neurosensorial en ambos ojos. Este se reduce drásticamente con el tratamiento quimioterápico, anticipándose a la mejora clínica y radiológica del paciente.

Discusión: La OCT puede ser una buena herramienta para vaticinar la respuesta al tratamiento sistémico en casos de adenocarcinoma pulmonar asociado a metástasis coroideas.

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Introduction

Choroidal metastases are the most frequent malign intraocular tumors. The primary tumor which most frequently originates as ocular metastasis is breast carcinoma in females and lung carcinoma in males. They tend to locate in the posterior pole and are bilateral in 25% of cases. They can cause visual acuity loss, scotoma, metamorphopsiae and photopsiae. Approximately 25% of the patients diagnosed for the first time with disseminated breast and lung cancer (stage IV) exhibit metastases in the choroids.

Clinical case

A male, 59 years of age, visited the emergency service of our hospital due to coughing and hemoptoic expectoration beginning 2 months earlier. A chest X-ray revealed consolidation in the upper right lobe; for this reason, the patient was admitted for filiation. A thorax and abdominal computerized action tomography (CAT) was taken (Fig. 1), and aspiration with fine needle (PAAF) of the lesion with a diagnosis of stage IV lung adenocarcinoma (WHO grade: 0), with liver and spleen metastases, peri-pancreatic adenopathy as well as blastic implants in the spine.

Due to the advanced stage of the patient, palliative chemotherapy treatment was initiated within the TITAN protocol with cisplatinum 145 mg + taxotere 145 mg.

One week after beginning chemotherapy, the patient visited our practice due to bilateral blurred vision and myodesopsiae.

The ophthalmological examination evidenced a best corrected visual acuity (BCVA) of 0.25 (decimal notation) in both eyes. Anterior pole biomicroscopy and intraocular pressure were normal. Ocular fundus examination evidenced predominantly inferior leopard-skin raised choroidal masses involving the macula, compatible with bilateral choroidal metastasis (Fig. 2).

Spectral domain optic coherence tomography (OCT) (Cirrus HD-OCT, Carl Zeiss Meditec, Germany) revealed submacular hyporeflective area corresponding to neurosensory retina detachment, which was broader in the left eye (LE) as well as irregularities in the choriocapillary retina pigment epithelium complex (RPE) in both eyes. In addition, the NDA evidenced small hyper-reflective areas inside the hyporeflective subretinal space, possibly related to tumor cells. Similarly, the right eye (RE) evidenced small intraretinal splits or separation areas, predominantly from nasal to the fovea. Also a small initial epiretinal membrane (ERM) was observed in both eyes (Fig. 3).

Two months after beginning chemotherapy, the patient visited the practice again for examination, referring subjective VA improvement.

BCVA was 0.4 in RE and 0.6 in LE. Anterior pole biomicroscopy remained unchanged. Funduscopy was similar to the previous examination and did not evidence signs of progression. However, posterior pole OCT evidenced significant improvements with neuroepithelium detachment reduction in both eyes (Fig. 4), which seemed to correlate with said VA functional improvement.

The patient concurrently visited the Oncology Service for examination, evidencing clinical and radiologic improvement (Fig. 5), and for this reason chemotherapy was continued.

Ten months after beginning the therapy the patient again visited our service, exhibiting a BCVA of 0.7 in RE and 0.8 in
LE. The ophthalmoscopic appearance of the choroidal lesions did not present variations although OCT revealed complete disappearance of the subretinal fluid, with persistence of RPE-choriocapillary complex irregularities in both eyes (Fig. 6), as well as ERM progression in LE, with onset of macular pseudohole. Fifteen days after the ophthalmological examination the patient visited the Oncology practice, exhibiting slight improvement in radiologic terms and absence of progression signs at other levels.

The patient remained 6 additional months in stable condition, without evidencing progression at the systemic or ocular level. After 24 months from diagnosis the patient died due to severe acute respiratory insufficiency derived from a sudden progression of the disease in the lungs.

**Discussion**

Even though historically intraocular metastasis was considered a rare finding, nowadays metastatic carcinoma in the choroids is recognized as the first cause of intraocular neoplasia. In contrast, metastases in the retina and the optic nerve are much less frequent.

Primary lesions are most frequently located in breasts in females and in lungs in males. Other less frequent locations are the kidneys, gastrointestinal tract, testicles, prostate, pancreas, fibroids and the skin.

Said metastases can arise at any age but are more frequent in patients between the fourth and seventh decade of life.

**Fig. 3 –** Optic coherence tomography at diagnosis. (A) Right eye: (1) hyporeflective space corresponding to neuroepithelium detachment; (2) intraretinal split or separation; (3) pigment epithelium alterations and (B) left eye: (1) sensory detachment; (2) subretinal hyper reflective points (arrow).

**Fig. 4 –** Optic coherence tomography (OCT, Cirrus Spectral-Domain), 2 months after beginning chemotherapy: neuroepithelium detachment reduction. (A) Right eye and (B) left eye.

**Fig. 5 –** Computerized axial tomograph showing significant reduction of tumor mass size (arrow), 2 months after beginning systemic treatment.
life. Onset symptoms are variable, with blurry vision and ocular pain being the most frequent symptoms in the majority of series. There is a small predominance in females, possibly because the primary breast tumor is that which most frequently originates as choroidal metastasis.

Choroidal lesions may or may not precede the diagnosis of the tumor, with percentage differences depending on the location of the primary tumor. In any case, the presence of choroidal metastases is a poor prognostic sign. However, its diagnosis does not necessarily involve ocular treatment as occurred in this case. The therapeutic approach is generally systemic, focused on treating the primary tumor, with ophthalmological exploration being used to monitor the response to the therapy.

Even though OCT is not useful for assessing choroidal lesions it does allow for analyzing secondary to retinal changes such as alterations in the RPE and neurosensory retina and accordingly assess the response to treatment. Some authors have postulated that these changes could signify retinal compromise due to malignant cells.

To conclude, spectral domain is a valuable tool for following up patients with choroidal metastasis due to the ability of correlating tomographic with functional improvements in the patient in what concerns VA. Likewise, OCT can have predictive value for assessing the existence of tumor progression and poor response to systemic treatment, directly correlating it with the clinical and radiological evolution of the tumor disease.

Conflict of interests

No conflict of interests has been declared by the authors.

REFERENCES