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JIM Journal of Interdisciplinary Medicine

CASE REPORT

OPHTALMOLOGY // RADIOLOGY

Uveal Tumor with Retinal Detachment – Case Report of a Rare Malignancy

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ARTICLE HISTORY

Received: July 5, 2021
Accepted: August 20, 2021

ABSTRACT

Introduction: Melanoma, a type of tumor originating from melanocytes, can have different anatomic locations. Ocular melanoma represents about 5% of total melanomas and is a rare condition, with an overall incidence rate of 5.1 cases/million/year. The most frequent location of uveal melanoma is the choroid (90%), followed by the ciliary body (6%) and the iris (4%). The most frequent symptoms of choroidal melanoma are blurred vision and photopsia. The therapeutic approach of uveal melanoma can be classified into two main categories: globe preservation treatments and enucleation. **Case presentation:** We present the case of a male patient diagnosed at the age of 72 years with right choroidal melanoma, who had a preexisting condition of visual impairment due to the presence of right mature cataract. The diagnosis was delayed in the course of the disease, as retinal detachment had already been installed. The patient was treated with local radiotherapy. **Conclusion:** Uveal melanoma is a malignancy in which a novel therapeutic approach, including magnetic resonance imaging is needed in order to improve the outcome of these patients, preserve vision and prevent systemic extension of the disease.

Keywords: uveal tumor, choroid melanoma, retinal detachment, radiotherapy, magnetic resonance imaging

INTRODUCTION

Melanoma, a type of tumor originating from melanocytes, can have various anatomic locations including the skin, mucous membranes, and the ocular region. The eye origin of melanoma represents about 5% of total melanomas, with 83% of them being located in the uveal region, 5 % in the conjunctiva, and 10% in other ocular sites.[1]

Uveal melanoma is a rare condition, with an overall incidence of 5.1 cases/million/year, according to an analysis conducted by the United States National Cancer Institute over a 36-year period,[2] and of 1.3–8.6 cases/million/year, according to a European Cancer Registry-based study.[3]

This condition is diagnosed more frequently in the elderly, with a peak incidence rate at 70 years, being rarely discovered in children.[1] Men are considered

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to be more affected than women, and Caucasians have a higher incidence rate than African Americans, with a ratio ranging from 1:15 to 1:50, according to different studies.[4–6] Regarding location, the tumor is most frequently located in the choroid (90%), followed by the ciliary body (6%) and the iris (4%).[7]

Risk factors for developing uveal melanoma can be divided into two main categories: those related to the patient, and environmental factors.

Patient-related factors include:

1. *hair, skin color, and tan ability* (blond hair, fair skin, and difficulty to tan), which are considered to be risk factors for developing melanoma;[8]
2. *choroidal, iris, and cutaneous nevus* – increases the risk to develop ocular melanoma up to 4.36 to 10.4 times;[1]
3. *oculodermal melanocytes* – a congenital pigmentary abnormality that leads to slate-grey pigmentation of the uvea, sclera, orbit, meninges, palate, tympanic membrane, and periocular skin, which substantially increases the risk to develop uveal melanoma. It is usually unilateral and is linked to a lifetime risk of uveal melanoma.[9,10]

Environment-related factors include:

1. *sunlight exposure* – there is no general agreement on the correlation between direct exposure to sunlight and the risk of developing melanoma, and studies show contradictory results.[11]
2. *intermittent exposure to artificial ultraviolet light* – there is no clear proof regarding ultraviolet light exposure from occupational activities being an independent risk factor for uveal melanoma.[12]

Clinical symptoms depend on the anatomical location of uveal melanoma. The symptoms of choroidal or ciliary body melanoma include blurry vision (38%), photopsia (9%), floaters (7%), loss of visual field (6%), visible tumor (3%), and pain (2%); up to 30% of patients may be asymptomatic. Choroidal melanoma rarely presents in a diffuse manner (6%), being usually a dome-shaped mass (75%), pigmented in about 55% of cases, non-pigmented in about 15%, and mixed in about 30% of cases. This type of uveal melanoma is associated with intraocular hemorrhage and with retinal detachment (71%).[1]

Iris melanoma is usually diagnosed at a younger age than choroidal or ciliary body melanomas and can be circumscribed (90%) or diffuse (10%). It is associated with heterochromia (change of iris color), corectopia (pupil distortion) or secondary glaucoma due to compression or invasion of the anterior chamber angle, leading to outflow obstruction.[1] It has a better prognosis than ciliary body or choroidal melanomas, with 5 to 10 times lower mortality rates.[7]

Gonioscopy, fundus examination, conventional ultrasonography, anterior-segment optical coherence tomography (AS-OCT), magnetic resonance imaging (MRI), ultrasound biomicroscopy (UBM), and fine-needle aspiration biopsy, are all tools used to diagnose uveal tumors.[1]

The differential diagnosis of uveal melanoma is complex and depends on its anatomical location. Choroidal or ciliary body melanomas must be differentiated from choroidal nevus, congenital hypertrophy of retinal pigment epithelium, circumscribed choroidal hemangioma, or age-related macular degeneration.[1] Circumscribed iris melanomas must be differentiated from iris nevus, leiomyoma, iris cyst, metastasis, and inflammatory conditions, whereas diffuse iris melanomas must be differentiated from pigmentary glaucoma, hemosiderosis, melanocytomalytic glaucoma, or congenital heterochromia.[1]

The treatment of uveal melanoma depends on several factors: type and location of the tumoral process, tumor size and extension, visual acuity at diagnosis, and the presence or absence of systemic involvement.

The therapeutic approach can be classified into two main categories: globe preservation treatments (radiotherapy, laser therapy, surgery) and enucleation. There are different modalities of radiotherapy (photon-based external-beam radiation, brachytherapy) with excellent results regarding local control of the tumor and globe preservation, but with associated long-term vision loss.[13] The most frequent complications associated with radiotherapy are radiation-induced retinopathy (45–67%), neovascular glaucoma (28.3%), cataract (44%), and macular edema (24.5%). As far as surgical therapy is concerned, enucleation is the most common surgical approach for patients with large tumoral size, extensive extraocular growth, circumferential tumor invasion, and vision loss.[1]

CASE PRESENTATION

We present the case of a male patient, aged 72, who was referred to the ophthalmologist due to vision problems and was diagnosed with mature cataract of the right eye and incipient cataract of the left one. The ocular fundus examination revealed left retinal angiosclerosis, while the right eye fundus could not be properly appreciated. The patient was sent to surgery and right intracapsular cataract extraction was performed. During surgery, the ophthal-

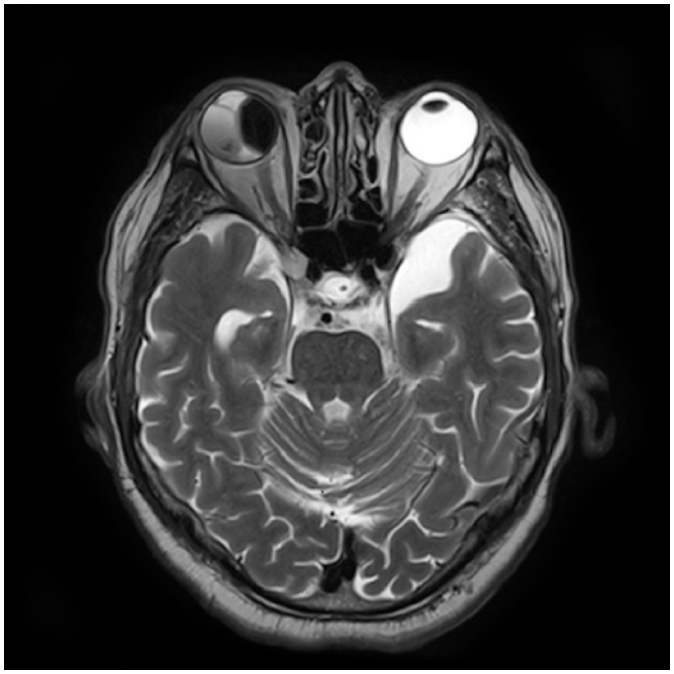

FIGURE 1. Axial MRI T2 – right hypointense subretinal mass lesion associated with retinal detachment

mologist noticed a hyperchrome mass in the nasal region of the right eye, with apparent intravitreal extension and vascularization of the pupillary area. Craniocerebral MRI was indicated for proper evaluation of the case.

MRI examination of the brain and orbits revealed the presence of an expansive process of 19 × 12 × 21 mm in the medial portion of the right eye, located in the uveal tract, more precisely at the choroidal level, with associated right retinal detachment (Figure 1). The described lesion presented T1 and T2 hyposignal and intense contrast enhancement, the MRI aspect being suggestive for increased melanin concentration at this level, and led to the diagnosis of uveal melanoma, located in the right choroidal region (Figure 2).

Severe cerebral atrophy with associated vascular lacunes and periventricular leukoaraiosis, left temporal arachnoid cyst, right frontal subcutaneous lipoma, frontal and ethmoidal sinusitis, and bilateral mastoiditis completed the imaging report.

The patient was treated with local radiotherapy in order to preserve his ocular globe and will be further monitored, both clinically and using imaging methods, for early detection of any additional visual impairment or systemic dissemination of the melanoma.

DISCUSSION

Uveal melanoma is a rare malignancy, the median age at diagnosis is 62 years with a peak of incidence between 70 and 79 years, and men are more frequently diagnosed with this pathology.[13]

Early diagnosis, although achieved in numerous cases, is

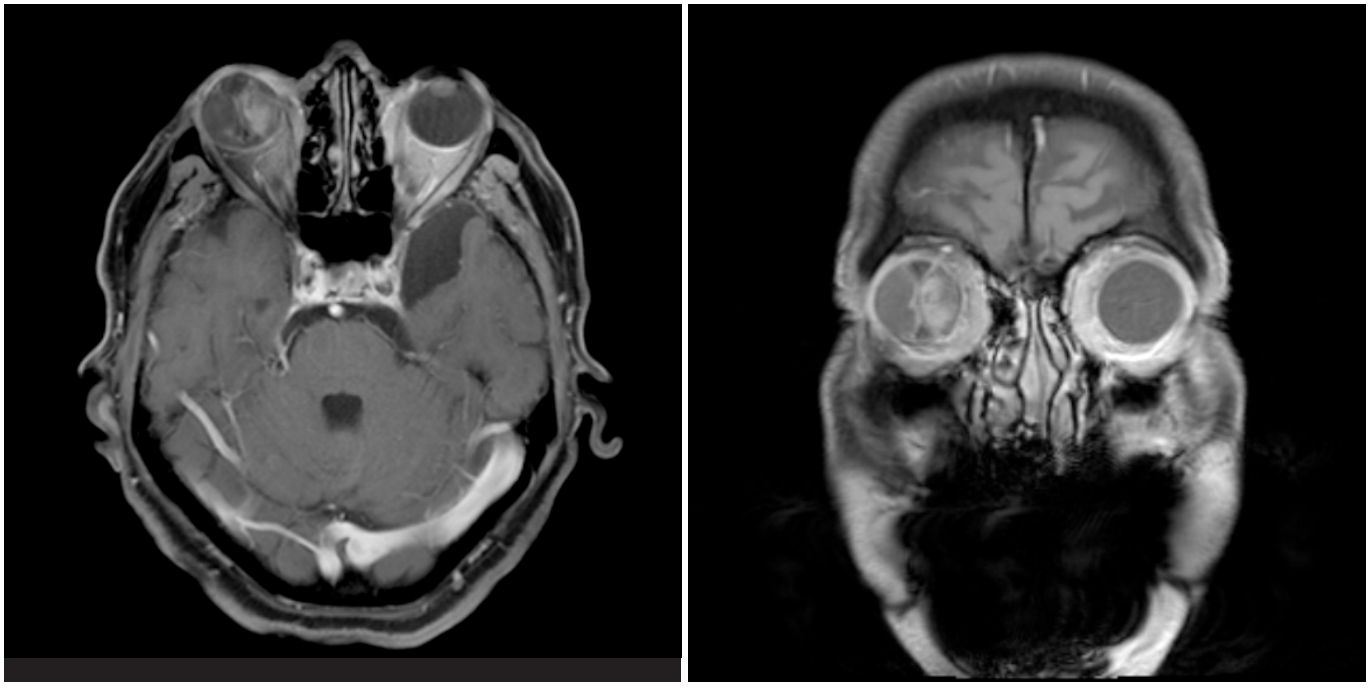

FIGURE 2. MRI T1 contrast enhanced axial (**A**) and coronal (**B**) – right subretinal mass lesion enhancing contrast with characteristic hyperintense signal

not sufficient for a good prognosis of these patients due to associated visual morbidity and metastatic dissemination. The appearance of metastases leads to a median survival of only 6–12 months, better for those patients who received treatment for metastasis than for those who did not.[13]

External beam radiation therapy performed pre-enucleation is not recommended, as its use did not show any certain benefits. In cases of patients who refuse enucleation as a therapeutic approach, there are other solutions, like transscleral or transretinal resection, which are, however, surgeon- and site-dependent and cannot be performed everywhere. Although they preserve the globe and the patient's vision, these techniques are associated with important complications including retinal detachment (21%), ocular hypertension (21%), and submacular hemorrhage (16%).[13]

One of the most important topics to consider is that although current treatment options achieve local control in a great number of cases, they are frequently associated with vision loss and systemic metastases. Therefore, novel therapeutic approaches are needed. Several studies concluded that systemic adjuvant therapy may prevent the appearance of metastases to some extent but has little effect on improving outcomes.

Innovative therapeutic strategies, such as heparin sulfate proteoglycans, are currently being developed. Gene expression and epigenetic modifying agents like DNA methyltransferase inhibitors will be studied in future studies.[13] High expression of insulin growth factor receptor 1 (IGF-1R) is associated with lower survival rates. This association is thought to be explained by the liver production of IGF-1, the liver being also the most affected organ by metastatic spreading. According to this finding, it is thought that the blockage of IGF-1R may be a future therapeutic approach of uveal melanoma. Further studies are needed in order to fully understand these topics.[14]

Optimal post local treatment follow-up is still under research. It is considered that MRI examination performed twice a year has greater predictive value for detecting metastases than other imaging techniques (abdominal ultrasonography, computed tomography scans, or positron-emission tomography imaging) and is also radiation-free.[15]

We presented the case of a male patient diagnosed at the age of 72 years with a right uveal melanoma, located at the choroid level. This pathology had developed in a patient with a preexisting condition of visual impairment due to mature cataract. This had led to a delayed diagnosis which allowed the development of the tumoral process, as retinal detachment was already installed. This case raises awareness on the importance of periodic ophthalmological examination in the elderly population, as it is the most affected group by tumoral processes of the uveal region. Complex imaging techniques are needed for a proper diagnosis and monitoring of this disease, with its local and systemic involvement.

CONCLUSIONS

Uveal melanoma is a malignancy in which novel therapeutic approaches are needed in order to improve the outcome of these patients, to preserve vision, and to prevent systemic extension of the disease. More research is necessary in order to find the best therapeutic approach for this type of rare malignancy.

CONFLICT OF INTEREST

Nothing to declare.

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