

# Pseudomelanoma at a Referral Center in Iran

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**Purpose:** To report the diagnoses of lesions initially misdiagnosed as ocular melanoma.

**Methods:** This retrospective study included all new patients who were referred with a presumptive diagnosis of choroidal melanoma to the ocular oncology clinic at Farabi Eye Hospital from January 2009 to December 2012. Each patient underwent a full ocular examination and B-scan ultrasonography by an ocular oncologist. The final diagnosis was made based on a combination of clinical features, fluorescein angiography, indocyanine green angiography, optical coherence tomography, neuroimaging and biopsy when necessary.

**Results:** Out of a total of 194 patients referred with a preliminary diagnosis of choroidal melanoma, 73 (37.6%) subjects actually had pseudomelanoma. Mean age in this subgroup was 46.5±23.1 (range, 1.5-85) years. The most common entities simulating a choroidal melanoma were vasoproliferative tumors (12 cases), choroidal metastasis (11 cases), peripheral exudative hemorrhagic chorioretinopathy (10 cases), lymphoproliferative infiltrative lesions (6 cases) and melanocytoma (5 cases).

**Conclusion:** A wide range of lesions may mimic ocular melanoma; a correct diagnosis may be made by a combination of clinical examination and imaging modalities.

**Keywords:** Choroidal Melanoma; Pseudomelanoma; Uveal Melanoma

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## INTRODUCTION

Ocular melanomas are the second most common type of malignant melanomas following cutaneous melanomas. The rate of misdiagnosis among ophthalmologists outside specialist ocular oncology centers has decreased but the problem persists since Shields and Zimmerman's description of "pseudomelanotic" lesions of the eye.<sup>1,2</sup> However, unnecessary enucleation or radiation therapy due to an incorrect diagnosis of choroidal melanoma is rare at specialized oncology centers.<sup>3-5</sup>

The current study aimed to evaluate the rate and type of lesions misdiagnosed as choroidal

melanoma among patients referred to our ocular oncology center over a four year period.

## METHODS

This retrospective study included all new patients referred with a preliminary diagnosis of choroidal melanoma from January 2009 to December 2012.

Each patient underwent a full ocular examination with complete fundus examination together with A and B-scan ultrasonography by an ocular oncologist (FG). The final diagnosis was made by ancillary tests including fluorescein angiography (FA), indocyanine

green angiography (ICG), optical coherence tomography (OCT), neuroimaging, and fine needle or incisional biopsy, if necessary. Data was analyzed using SPSS, version 16.0.

## RESULTS

During the study period, a total of 194 patients were referred to our center with an initial diagnosis of choroidal melanoma. Only patients with posterior segment involvement were included in this study. A total of 73 (37.6%) patients with mean age of  $46.5 \pm 23.1$  (range, 1.5-85) years including 33 (45.2%) male subjects had pseudomelanoma.

The most common causes of choroidal pseudomelanoma were vasoproliferative tumors (VPTs), choroidal metastasis and peripheral exudative hemorrhagic chorioretinopathy (PEHCR) which were implicated in 16.4%, 15.1% and 13.7% of patients respectively. The actual diagnoses of patients with a presumptive diagnosis of choroidal melanoma are detailed

in Table 1. Bilateral involvement was present in 12 patients and included lymphoproliferative disorder in 4 cases, choroidal metastasis in 3 subjects, and VPT, retinal pigment epithelium (RPE) hyperplasia, Vogt-Koyanagi-Harada (VKH) syndrome, uveal effusion syndrome and sarcoidoma each in one case.

One of our patients who had a prephthical eye and hazy media was referred because of a suspected melanoma like mass on B scan echography.

## DISCUSSION

Pseudomelanomas are a heterogeneous group of lesions which simulate the ophthalmoscopic appearance of uveal melanoma. In the Collaborative Ocular Melanoma Study, the misdiagnosis rate was 0.48%.<sup>3</sup> During recent years, an increasing diagnostic accuracy has been reported among ophthalmologists practicing outside oncology centers in the United States.<sup>1</sup> Khan et al reported that 31.5% of suspected

**Table 1.** Etiologies of pseudo-melanoma

Diagnosis	Number	Percent (%)	Comment
VPT	12	16.4	
Choroidal metastasis	11	15.1	3 breast carcinomas, 2 lung adenocarcinomas 2 prostate carcinoma, 1 osteosarcoma 1 thyroid carcinoma, 2 unknown primary
PEHRC	10	13.7	
Lymphoproliferative disorders	6	8.2	
Melanocytoma	5	6.8	
Disciform scar	4	5.5	
CSR	3	4.1	
Localized suprachoroidal hemorrhage	3	4.1	
Osteoma	3	4.1	
RRD	3	4.1	
Astrocytoma	2	2.7	
	1	1.4	
	1	1.4	
Choroidal nevus	1	1.4	
Choroidal hemangioma	1	1.4	
Prephthical eye with mass-like lesion	1	1.4	
VKH	1	1.4	hypertrophic subretinal gliosis
Choroidal effusion syndrome	1	1.4	
Vortex vein varix	1	1.4	
RPE adenoma	1	1.4	
RPE hyperplasia	1	1.4	
Sarcoidoma	1	1.4	

VPT, vasoproliferative tumor; PEHRC, peripheral exudative hemorrhagic chorioretinopathy; CSR, central serous retinopathy; RRD, rhegmatogenous retinal detachment; MNFL, myelinated nerve fiber layer; VKH, Vogt-Koyanagi-Harada syndrome; RPE, retinal pigment epithelium

melanoma lesions were not melanoma and they reported a concerning rate of unsuspected melanomas in three (10.7%) of 28 patients who were referred with a diagnosis of benign posterior segment lesions.<sup>6</sup> A wide range of pseudomelanoma rates ranging from 1.4% to 75% has been reported in other series.<sup>1,2,7,8</sup> In studies from Finland and San Francisco, respectively 29% and 37% rates were reported for lesions being confused with melanoma.<sup>7-9</sup> In the study by Shields, the frequency of pseudomelanoma was 14%.<sup>2</sup> In the current series, 37.6% of cases were pseudomelanoma lesions.

Differentiation between melanoma and pseudomelanoma is possible with various methods one of which is clinical features, with an accuracy of up to 98% when performed by an ophthalmic oncologist.<sup>3,7</sup> Other modalities including FA, ultrasonography findings, ultrasound biomicroscopy, single photon emission computerized tomography (SPECT), and positron emission tomography (PET) may add more accuracy.<sup>7,10-12</sup> High sensitivity and specificity (85.7% and 99% accordingly) by a combination of digital color, red-free and red light photography was reported in a study by Saari.<sup>7</sup> For ultrasonography, an accuracy of 95% for the diagnosis of melanoma has been reported.<sup>13</sup> In our study, the most frequent methods of differentiating melanoma from pseudomelanoma were a detailed ocular examination, and A and B-scan echography by an ophthalmic oncologist. A few patients required other modalities consisting of OCT, FA, ICG, neuroimaging and biopsy.

A wide spectrum of lesions has been known to present as pseudomelanoma. The most common diagnosis in pseudomelanoma in the study by Stoffelens et al<sup>14</sup> was age related macular degenerations (AMD, 34%) and choroidal nevi (31%). In another study, spontaneous subretinal hemorrhage and VPTs were the most common diagnosis.<sup>15</sup> Shields et al<sup>16</sup> reported choroidal nevi (26.5%) as the most prevalent pseudomelanoma. The prevalence of choroidal nevus is 1-6% in the general population among Caucasians.<sup>17</sup> Saari et al reported choroidal nevi (64.7%) and disciform lesions (5.4%) as the most common conditions in patients with suspected melanoma.<sup>7</sup> Metastasis

and infiltrative lesions were most common followed by hemangioma in the report by Mithal et al.<sup>13</sup> Our study indicated that secondary VPT was the most frequent pseudomelanoma (16.4%) followed by choroidal metastasis (15.1%) and PEHCR (13.7%). Mean age in our patients was 46.5 years which is younger than other studies, i.e. 62 years<sup>6</sup>, 61 years<sup>2</sup> and 72.5 years.<sup>15</sup>

Other conditions reported to mimic melanoma include melanocytoma, congenital RPE hypertrophy, choroidal detachment and effusions, metastatic carcinoma, choroidal hemangioma, RPE hyperplasia, retinal macroaneurysm, orbital tumor, posterior scleritis, combined hamartoma of the retina and RPE, hematoma, RPE adenoma, tuberculoma, nonspecific inflammatory masses, macular cysts or retinoschisis, Coat's disease and osteoma.<sup>13,14,18,19</sup> Gupta et al reported a case of herpetic keratitis associated with a melanoma like mass as a result of recurrent inflammation confirmed by histopathology.<sup>20</sup> One of our patients suffered from uveal effusion syndrome with a ring like lesion in the periphery mimicking ring melanoma. This syndrome could be differentiated from melanoma by ultrasound characteristics.<sup>21</sup>

In summary, although there was a wide range of pseudomelanomas, lesions most commonly misdiagnosed as posterior segment melanoma in the present study were VPT, choroidal metastasis and PEHCR.

### Conflicts of Interest

None.

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