호흡곤란과 시력저하로 내원한 환자에서 동시에 진단된 폐선암과 맥락막 전이 종양

Visual Loss due to Choroidal Metastasis Simultaneously with the Diagnosis of Lung Adenocarcinoma

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Purpose: To report a case with choroidal metastasis simultaneously diagnosed with lung adenocarcinoma in a 63-year-old male patient who was admitted for severe dyspnea and visual loss in the right eye.

Case summary: A 63-year-old male patient was referred to the ophthalmology clinic due to visual deterioration of the right eye over 3 months. He was admitted to the department of pulmonology due to severe dyspnea. Best-corrected visual acuity (BCVA) was perception of hand movement in the right eye. Fundus examination showed a creamy white choroidal mass involving the macula in the right eye. Fluorescein angiography showed a hypofluorescent lesion corresponding to the choroidal mass in the early phase and heterogeneously hyperfluorescent in the late phase. Indocyanine green angiography showed hypofluorescence throughout the phases, with an underlying isofluorescent background. Spectral domain optical coherence tomography showed an irregular, bumpy anterior surface of the choroidal mass and subretinal fluid. B-scan ultrasonography showed medium-high reflectivity of the subretinal mass. Under the impression of choroidal metastasis, we performed systemic work-up for his severe dyspnea, resulting in diagnosis of lung adenocarcinoma with brain metastasis. One month after systemic chemotherapy, BCVA was improved to 20/40. Subretinal fluid was nearly resolved, with flattening of the choroidal mass. With systemic chemotherapy, BCVA in the right eye was maintained for 3 months, and subretinal fluid was completely resolved. However, the patient died 3.5 months after diagnosis.

Conclusions: Choroidal metastasis can be associated with visual deterioration and may be diagnosed before or concurrently with diagnosis of primary lung cancer.

Keywords: Choroidal neoplasm; Lung adenocarcinoma; Metastasis

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Introduction

Metastatic cancer is the most common intraocular malignancy [1,2], and the choroid is the most common site of intraocular metastasis, accounting for 90% or more of cases [3-6]. The estimated prevalence of choroidal metastasis ranges from 2.3% to 9.2% in patients with cancer and from 4.0% to 10.7% in postmortem examinations [1,3-6]. The majority of patients with choroidal metastasis already have primary cancer; however, about one-third of those patients have ocular symptoms without previous history of cancer [6]. In such cases, exact diagnosis of choroidal metastasis and correlation to systemic evaluation are essential to reduce morbidity and mortality due to cancer. We report a recent experience with a patient with significant visual loss due to choroidal metastasis concurrent with diagnosis of lung adenocarcinoma.

Case Report

A 63-year-old male patient visited the emergency department for severe dyspnea and visual deterioration of the right eye

over 3 months. He reported that he visited an ophthalmology clinic at the onset of visual deterioration and was diagnosed with macular degeneration in the right eye. Best-corrected visual acuity (BCVA) was perception of hand movement in the right eye and 20/50 with Snellen visual acuity in the left eye. Anterior segment was normal in both eyes by slit lamp examination. Fundus examination after pupillary dilation showed a yellowish, subretinal, mass-like lesion with overlying retinal wrinkling involving the macula in the right eye (Fig. 1A).

Multi-modal imaging analysis was performed including fluorescein angiography (FA), indocyanine green angiography (ICGA), fundus autofluorescence (FAF), and spectral domain-optical coherence tomography (SD-OCT). FA and ICGA were performed using a Heidelberg Retina Angiograph system (HRA-2; Heidelberg Engineering, Heidelberg, Germany), with a confocal scanning laser ophthalmoscope. SD-OCT was performed by a Spectralis instrument (Heidelberg Engineering) with an enhanced depth imaging modality.

The FAF image showed a hyper-autofluorescent lesion corresponding to the choroidal mass and multiple hypo-autofluorescent spots within the lesion (Fig. 1B). FA showed

Figure 1. (A) Creamy white choroidal mass involving the entire macula, with subretinal fluid and overlying retinal wrinkling in the right eye. (B) Fundus autofluorescence image shows a diffuse hyper-autofluorescent lesion corresponding to the choroidal mass, with multiple hypo-autofluorescent spots. (C) Fluorescein angiography shows a hypofluorescent lesion corresponding to the choroidal mass in the early phase that (D) changed to heterogeneously hyperfluorescent in the late phase. In addition, pinpoint leakages from the temporal area to the fovea and diffuse leakage are shown in the late phase. Indocyanine green angiography shows hypofluorescence throughout phases, with an underlying isofluorescent background (E, early phase; F, late phase). (G) Spectral domain-optical coherence tomography shows an irregular, bumpy anterior surface of the choroidal mass and subretinal fluid (arrows). (H) B-ultrasonography shows medium-high reflectivity of the choroidal mass (arrow).

a hypofluorescent lesion corresponding to the choroidal mass in the early phase (Fig. 1C) that was heterogeneously hyperfluorescent in the late phase (Fig. 1D). Pinpoint leakages from the temporal to foveal areas corresponded to the hypo-autofluorescent lesions in FAF images (Fig. 1D). ICGA showed hypofluorescence throughout phases, with an underlying isofluorescent background (Fig. 1E, F). OCT showed an irregular, bumpy anterior surface of the choroidal mass and subretinal fluid (Fig. 1G). Diffuse photoreceptor disruption and turbid exudative materials were also noted. Corrugation of the inner retinal surface and multiple hyper-fluorescent dots were observed throughout the retinal layers. B-scan ultrasonography showed medium-high reflectivity of the choroidal mass (Fig. 1H).

Under the impression of choroidal metastasis, we correlated our findings with systemic work-up for severe dyspnea. The results concluded diagnosis of lung adenocarcinoma with multiple metastatic lesions in the brain (Fig. 2). Brain magnetic resonance imaging showed increased intensity of the choroidal mass in the right eye, to about 17.4×5.1 mm (Fig. 2). Under diagnosis of lung adenocarcinoma with multiple metastases, systemic chemotherapy and radiation therapy for brain metastasis were started.

One month after chemotherapy, BCVA slightly improved to 20/40 in the right eye. Fundus examination showed regression of choroidal metastasis with flattening of the choroidal mass and resolution of retinal folds (Fig. 3A). On SD-OCT, subretinal fluid with turbid exudates was nearly resolved along with flattening of the anterior choroidal surface (Fig. 3B). Corrugation of the inner retinal surface was also improved. However, diffuse photoreceptor ellipsoid zone disruption was noted. There was also a retinal pigment epithelium (RPE) tear inferior to the fovea (Fig. 3C). Systemic chemotherapy was continued, and the BCVA in the right eye was maintained as 20/40 for 3 months after initiation of chemotherapy. The choroidal metastatic lesion was flattened, and subretinal fluid was completely resolved. However, the patient died of cancer 3.5 months after initiation of chemotherapy.

Discussion

Choroid is the major site of intraocular metastasis, possibly due to its highly vascularized structures [7]. One study

hypothesized that the short posterior ciliary arteries are the preferential route for tumor embolic cells [3,8]. Abundant blood supply from posterior ciliary arteries to the posterior choroid may be one of the causes for predominant involvement of a macular location of choroidal metastasis [3,8].

The most common primary cancer is breast cancer, followed by lung cancer in overall patients with choroidal metastasis [5,6]. Together, breast cancer and lung cancer account for 71% to 92% of choroidal metastases [5,6]. Breast cancer is the most common primary cancer in females, as lung cancer is in males [5,6].

One study has investigated the clinical characteristics and treatment outcomes in patients with choroidal metastasis from lung cancer [9]. Among 374 choroidal metastases for primary lung cancer in 229 eyes of 194 patients, choroid was the most common site, accounting for 88%, followed by ciliary body and iris [9]. The mean age at diagnosis of lung cancer was 60 years, and the most common ocular symptom

Figure 2. (A) Magnetic resonance imaging (MRI) of the chest shows probable primary lung cancer in the right upper lobe (arrow) and multiple metastasis in both lungs. (B) Positron emission tomography shows increased fluorodeoxyglucose (FDG) uptake in the lung mass in the right upper lobe (white arrow), suggesting lung cancer. In pleura, multiple lesions with increased FDG uptake (yellow arrows) are noted. (C) Brain MRI shows multiple enhancing masses and nodules in the cerebrum, cerebellum, and pons, suggesting brain metastases (arrows). (D) Brain MRI also shows a high-intensity choroidal metastatic lesion in the right eye, about 17.4 mm base and 5.1 mm height (arrow).

Figure 3. (A) One month after chemotherapy, regression with flattening of choroidal metastasis and resolution of retinal folds are observed. (B) Spectral domain-optical coherence tomography shows resolution of subretinal fluid and flattening of the anterior choroidal surface. (C) There is also a retinal pigment epithelium tear inferior to the fovea (arrow).

at presentation was blurred vision [9]. Among the patients, 56% had a history of lung cancer prior to choroidal metastasis; however, diagnosis of choroidal metastasis preceded, leading to systemic investigation and subsequent diagnosis

of lung cancer in 44% of the patients [9].

In this case, the patient had both severe dyspnea and visual loss in the right eye at the time of presentation. Systemic evaluation and ocular examination were performed concurrently, leading to diagnosis of lung adenocarcinoma with metastases to the brain and choroid. At the time of presentation, vision was severely deteriorated, with a huge choroidal metastatic mass involving the entire macula. However, systemic chemotherapy led to resolution of subretinal fluid, reduced choroidal mass, and concurrent visual improvement. Although an RPE tear developed, BCVA was maintained for 3 months with continuous systemic chemotherapy.

This case is consistent with previous reports that choroidal metastasis can precede or be concomitantly diagnosed with lung cancer [5,6,9]. Previous studies have reported visual outcome after systemic chemotherapy and/or combination therapy for choroidal metastasis, with 33% of patients in one study showing visual improvement [9], and 75.5% of patients in another study showing improved or stable vision [10]. This case also showed rapid visual improvement after systemic chemotherapy, suggesting that prompt diagnosis and proper treatment can lead to good treatment outcome in choroidal metastasis from lung cancer as well as visual improvement. Choroidal metastasis can precede the diagnosis of primary cancer, complicating cancer detection. In one study, about 62% of the patients with choroidal metastasis was misdiagnosed initially [11]. Choroidal metastasis can be initially misdiagnosed as other diseases such as retinal detachment, choroidal melanoma, central serous chorioretinopathy, choroidal hemangioma, and endophthalmitis [11]. In the present case, the patient visited an ophthalmology clinic 3 months prior to visiting our hospital, and there might have been signs suggesting macular degeneration. Although we could not obtain images from that time, early appearance of choroidal metastasis seemed to be misdiagnosed as macular degeneration. Thus, clinicians should be aware of the possibility of choroidal metastasis when presented with patients with macular change.

Although choroidal metastasis can be treated with conventional chemotherapy or other adjunctive treatment modalities such as radiotherapy, brachytherapy, or transpupillary thermotherapy [6,10], presence of choroidal metastasis usually implies poor prognosis, with a 5-year survival rate of 16% [12]. Several studies calculated life expectancy after diagnosis of choroidal metastases, and the results varied: 12 months

[9], 7.5 months [13], and 1.9 months if asymptomatic [14] and 13 months if symptomatic [15]. This variation may be due to an advanced stage of lung cancer with multiple metastases and overlooked ocular symptoms due to poor general condition. We cannot be sure that a diagnosis of lung adenocarcinoma 3 months earlier would have prolonged patient survival in the presented case, though it is a possibility.

This case demonstrates concurrent diagnosis of primary lung adenocarcinoma and choroidal metastasis in a patient with severe dyspnea and visual deterioration. Systemic chemotherapy lead to improvement of choroidal metastasis and vision, although the patient died 3.5 months after initial diagnosis. If choroidal metastasis is suspected in patients with no history of primary cancer, systemic evaluation is important to detect primary cancer.

Conflicts of Interest

The authors declare no conflicts of interest relevant to this article.

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