Right visual loss due to choroidal metastasis of a papillary adenocarcinoma of the lung: a case report

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Abstract
The symptomatic choroidal metastasis is a rare manifestation of lung cancer. The aim of this study was to present a clinical case of choroidal metastasis associated with multiple intracerebral metastases from a papillary adenocarcinoma of the lung diagnosed simultaneously with its metastases. We present the case of a 40-year-old male patient, smoker, admitted to the Neurosurgery Clinic II, “Prof. Dr. Nicolae Oblu” Emergency Hospital, Iassy, Romania, for right hemiparesis, headache, right visual loss, dysphonia and swallowing disorders occurring six days earlier. Previous medical history showed that he was diagnosed with a stage IV cancer located in the lower lobe of the left lung a week before. Ophthalmoscopic examination of the right eye revealed total secondary serous retinal detachment. Contrast cranial–cerebral computed tomography (CT) scan revealed multiple lesions compatible with the diagnosis of supratentorial intracerebral metastases in the left hemisphere, as well as an intraocular choroidal metastasis. The rolandic brain tumor was surgically removed and the cytological and histopathological exam established the diagnosis of an intracerebral metastasis from a papillary adenocarcinoma of the lung. After a week, the patient was referred to an oncology unit for the initiation of oncology and palliative care. We emphasize the importance of an ophthalmological screening of patients with intracerebral metastases in order to eventually identify a choroidal metastasis, as the recognition and early treatment of this entity could improve the quality of patient’s life.

Keywords: choroidal metastasis, adenocarcinoma of the lung, intracerebral metastases.

§ Introduction
The first case of choroidal carcinomatous metastasis was reported in 1872 by the German pathologist Max Perls (1843–1881) [1]. There are many series, literature reviews and case reports according to which uveal metastases are the most common intraocular malignancies; yet, in practice choroidal metastases are less frequently encountered than uveal melanomas, probably because they are often asymptomatic, and if they become symptomatic, given the macular involvement, not all patients address to an ophthalmologist due to their poor clinical condition [2, 3].

In 1936, Lemoine & McLeod [4] reviewed the literature and found 230 reported cases with this pathology, and in 1944, in a survey of 8712 patients with non-ocular and ocular cancers, Godtfredsen identified choroidal metastases in only six patients (0.07% of cases) [5], demonstrating that the uvea is a rare location for carcinomatous metastases.

On the other hand, Eliassi-Rad et al. (1996) [6] conducted a postmortem macroscopic and microscopic study and found that the frequency of ocular involvement was 6.1%. They examined the eyes of all patients who died of cancer. Of the 510 cases diagnosed with carcinoma, only 1.2% presented macroscopic choroidal metastases, and in 12.6% of cases, choroidal metastases were identified only at histopathological exam.

Even though in the last 30 years the number of articles published on this topic has increased, the data are somewhat contradictory. In clinical studies, the incidence of choroidal metastasis ranges between 2% and 9% [7, 8].

Barak et al. (2007) [9] conducted a study in a medical center in Tel Aviv, Israel, on 92 patients with advanced lung cancer, found only two cases of choroidal metastases and demonstrated a much lower incidence (2.17%) compared with other studies. Therefore, choroidal metastases from lung carcinoma are rare and occur in the end stage of the disease, when mean survival is not expected to be more than six months [10, 11]. Other authors suggested that the incidence of choroidal metastases might increase due to the improved control rate of systemic cancers and to more sophisticated identification means [3]. Choroidal metastases are usually identified only after at least two other organs are affected by metastases. The choroid is the sixth most common site for metastasis, although its carcinomatous seeding is rare [2]. Most patients with intraocular metastatic seeding have a known primary cancer, but 25% of patients with...
secondary intraocular metastasis develop this condition as the first manifestation of their malignancy [3].

We present a case of a choroidal metastasis associated with multiple intracranial metastases from a papillary adenocarcinoma of the lung diagnosed simultaneously with its metastases.

Case report

We report the case of a 40-year-old male patient, smoker, who came with right hemiparesis, headache, right visual loss, dysphonia and swallowing disorders occurring six days earlier. The medical history revealed that a week earlier the patient was referred to the Hospital for Lung Diseases, from Iassy, Romania, with the chief complaints of cough and hemoptysis, occurring one year earlier. Contrast chest computed tomography (CT) showed a tumor located in the left lower lobe, with imprecise boundaries (Figure 1), and cytopathology examination of bronchial brushing specimens revealed non-small-cell lung carcinoma, but the pathologist recommended a second biopsy or immunohistochemical investigations in order to establish a certain diagnosis.

Based on the above investigations, a stage IV left lower lobe lung cancer was diagnosed. Due to the onset of headache and hemiplegia, the patient was transferred to the Neurosurgery Clinic II, “Prof. Dr. Nicolae Obiu” Emergency Hospital, Iassy.

On admission, the physical examination showed a consumptive syndrome, the patient reporting a weight loss of 14 kg over the last two months.

Visual acuity of the right eye showed no light perception. Slit lamp examination of the anterior segment showed grayish appearance of the pupil (Figure 2). Ophthalmoscopy of the right eye revealed total secondary serous retinal detachment.

The patient had a poor clinical condition and his family refused ocular ultrasound and needle-puncture aspiration biopsy of the choroidal lesion. Ear-nose-and-throat examination showed right vocal cord paralysis but with preserved mobility of the left vocal cord. A secondary dysphagia was also present. Laboratory tests were within normal ranges except for elevated erythrocyte sedimentation rate (34 mm/one hour). Psychological examination showed that the patient presented temporal and spatial disorientation, slightly diminished cognitive and executive functions, slightly diminished working memory, attention deficit, and speech with no aphasic changes.

Contrast cranial–cerebral CT scan performed on admission revealed many intracerebral supratentorial lesions with non-homogeneous contrast uptake, some of them with polycyclic appearance, with relatively necrotic hypodense core. They were located in the left cortico-subcortical frontal area (3.1/2.1 cm), left parieto-insular area (1.7/1.5 cm) (Figure 3) and deep left thalamic area (1.0/1.3 cm) with possible infiltration into the ventricular trigone. All these lesions were compatible with the diagnosis of supratentorial intracerebral metastases in the left hemisphere.

Another lesion (0.6/2.1 cm), situated in relation to the choroid and being spontaneously moderately hyperdense and intensely enhanced, was located at the right eyeball posterior pole – retina and vitreous and was compatible with a secondary determination. Due to the presence of the choroidal secondary lesion, a total retinal detachment could be also identified (0.7/1.7 cm thickness) (Figure 4).

In the intraorbital tissue, other lesions could not be found. Based on these imaging features and the loss of vision in the right eye, the differential diagnosis of the intraocular tumoral mass was taken into consideration. We suspected a choroidal melanoma of the right eye with multiple secondary dissemination to the brain or an intraocular metastasis within the metastatic disease due to a lung cancer.

During his hospitalization, the patient underwent microscopic total resection of the left rolandic brain metastasis with intraoperative ultrasound and electrical stimulation motor evoked potential monitoring. Intraoperative cytopathological examination revealed nests of uniform malignant epithelial cells with distinct nuclear structure and finely granular cytoplasm. The cytopathological diagnosis was brain metastasis of an adenocarcinoma (Figure 5).

The removed gray-brown, friable tumoral tissue was processed according to standard histological techniques: fixation in 10% formalin, paraffin embedding, sectioning at 3 μm, and staining with Hematoxylin–Eosin (HE).

The histopathological exam revealed the presence of tumoral anaplastic epithelial cells settled on fibrovascular cores, which were infiltrated with some lymphocytes (Figure 6).

Some tumoral papillae presented on their surfaces rare micropapillae without their own central fibrovascular core (Figure 7).

The final pathological diagnosis was intracerebral metastasis from a papillary adenocarcinoma of the lung, with micropapillary features. The postoperative contrast cranial–cerebral CT scan showed a complete removal of the left rolandic metastasis. Patient’s postoperative evolution was favorable with complete resolution of right hemiparesis. After a week, the patient was referred to an oncology unit for the initiation of oncology and palliative care.
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Discussion

The literature is quite rich in studies on choroidal metastasis from lung carcinoma. However, so far only three articles on choroidal metastasis have been published by Romanian authors [12–14], all of them being case reports, suggesting their rarity in Romanian clinical practice, probably because they occur in widespread metastatic disease when the patient is in a poor clinical condition and no longer seeks eye care.

Studies in English medical literature show that choroidal involvement is more common than clinically diagnosed, as quite often intraocular metastases remain undiagnosed [15].

The most common site of intraocular metastases is the uveal tract [10]. The choroid is often the most affected (89%) followed by the iris (9%) and ciliary body (2%) [16]. Given its rich vascular supply, the choroid is a common site for the seeding of lung cancer cells [17]. In women patients, choroidal metastasis could have its origin in breast, lung or gastrointestinal cancer and in a malignant melanoma. In male patients, it originates in lung, gastrointestinal, pancreas, prostate or kidney cancer [2, 18]. One to three metastases can develop intraocularly, and the average is two metastases. Also, in 20% of cases multiple bilateral foci were diagnosed [16]. Choroidal metastases show no preference for either the right or left eye [16, 19]. The most common symptom of choroidal metastasis is the progressive decrease in visual acuity [18]. Other ocular signs and symptoms are: photophobia, diplopia, palpebral ptosis, blepharitis, exophthalmos, secondary glaucoma, retinal detachment and uveitis [16, 18, 20, 21], but our patient presented right visual loss due to total secondary serous retinal detachment. The diagnosis of an intraocular choroidal metastasis is based on clinical examination (slit lamp examination and ophthalmoscopy) and additional imaging studies: ultrasound, fluorescein angiography, orbit CT scan, optical coherence...
tomostereology (OCT), nuclear magnetic resonance (NMR) and puncture-aspiration biopsy.

Very important in diagnosis is the cranial–cerebral CT scan, as 22% of the cases with intraocular metastases are associated with brain metastases [22]. The above presented clinical case had numerous intracerebral metastases associated with an intraocular choroidal metastasis. On ophthalmoscopic examination, choroidal metastasis usually appears as a solid mass with the appearance of a mottled, yellowish-brown or bright yellow placard. Metastases from lung and renal carcinoma have a characteristic orange color.

Ophthalmoscopic examination of the patient with choroidal metastasis reveals single or multiple lesions associated with total secondary serous retinal detachment [21], as that seen in our patient.

The differential diagnosis of choroidal carcinomatous metastasis includes primary malignant choroidal melanoma, amelanotic nevus, retinitis, reactive lymphoid hyperplasia, choroidal hemangioma, lymphoma, posterior scleritis, choroidal osteoma, hemorrhage, choriditis, hemangioma, inflammatory granuloma and Harada disease [2, 10, 16–23]. Choroidal metastasis may be the first sign of systemic dissemination of a known lung carcinoma [24] or may be the first sign of a pulmonary malignant tumor initially unknown but identified in a metastatic stage [25–27], situation that requires close monitoring to detect other systemic metastases. When choroidal metastases occur, they are often accompanied by brain metastases [28] and also by cutaneous, liver, or bone metastases. In our patient, lung cancer, intraocular metastasis and multiple intracerebral metastases were diagnosed simultaneously. Moreover, histopathological exam identified micropapillae, which are a sign of poor prognosis. Indeed, our patient had already metastatic disease and even a rare metastatic site, the choroid. Loss of vision in the right eye occurred because of a total secondary serous retinal detachment due to the choroidal metastasis. This event occurs almost simultaneously with intracranial hypertension symptoms (hemiplegia and headache) caused by multiple intracerebral metastases.

Anyway, the presence of choroidal metastasis indicates the end-stage of lung cancer, the prognosis of these patients being extremely poor, most patients dying within months [10, 21]. Kreusel et al. (2008) [29] reviewed a series of 22 patients diagnosed with lung cancer and found that median survival after the diagnosis of symptomatic choroidal metastasis was 13 months, compared to two months in lung cancer patients with choroidal metastasis identified in an ocular screening study.

The management of intraocular metastases depends on the clinical status of the patient. The therapeutic arsenal in ocular metastases is palliative and consists of enucleation, exenteration, transpupillary thermotherapy, photocoagulation, photodynamic therapy, chemotherapy and orbital irradiation [10, 20, 30]. As cancer survivorship continues to improve and the incidence of orbital metastases increases, these treatments may play an important part in the future management of these metastases [30].

**Conclusions**

Diagnosis and treatment selection of the patients with metastatic lung cancer require an interdisciplinary collaboration of the pulmonologist, neurosurgeon, radiologist, pathologist, ophthalmologist and oncologist. We emphasize the importance of an ophthalmological screening of patients with intracerebral metastases in order to eventually identify a choroidal metastasis, as the recognition and early treatment of this entity could improve the quality of patient’s life.

**Conflict of interests**

The authors declare that they have no conflict of interests.

**References**


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