



## Case report

# Large choroidal metastasis with exudative retinal detachment as presenting manifestation of small cell lung cancer: A case report

Giulio Vicini<sup>\*</sup>, Cristina Nicolosi, Giulia Pieretti, Cinzia Mazzini

Unit of Ocular Oncology, Neuromuscular and Sense Organs Department, Careggi University Hospital, Florence, Italy



## ARTICLE INFO

The manuscript has not been presented at any meeting.

## Keywords:

Choroidal metastasis  
Small cell lung cancer

## ABSTRACT

A 64-year-old man, diagnosed with a retinal detachment of his left eye, was sent to our hospital to evaluate vitreoretinal surgery. Left eye best-corrected visual acuity was hand motion. Fundus examination showed a voluminous slightly pigmented choroidal neof ormation with secondary retinal detachment. Ultrasonography revealed a large hyperechogenic choroidal mass with retinal detachment, initial choroidal excavation, and low-to-medium internal reflectivity. The clinical-instrumental aspects of the lesion suggested a primary malignancy. The patient underwent chest radiography, which showed a large mass located in the right lung. Contrast-enhanced computed tomography of chest and abdomen showed a voluminous lung lesion, another gross lesion of the liver, and other abdominal localizations. The patient underwent biopsies of the pulmonary and hepatic lesions and both samples showed an epithelial malignancy with neuroendocrine differentiation, compatible with metastatic small cell lung cancer. The patient's clinical condition declined within one month from presentation. In the interim, a contrast-enhanced brain computed tomography documented the presence of cerebellar metastases. The patient was admitted to the oncology department and started chemotherapy and supportive care, but unfortunately he died during the course of the treatment, 5 months after his initial presentation. This case is peculiar both for the unusual presentation of small cell lung cancer and for the morphological appearance of the choroidal lesion that suggested a primary tumor.

## 1. Introduction

Metastatic cancer is the most common malignancy of the eye in the adult population with the lung being the second most prevalent primary site of disease (20–29% of cases) after the breast (40–53% of cases) [1]. The most commonly affected part of the eye is the choroid in 88–89% of cases, and less frequently the iris (9%) or ciliary body (2%); isolated involvement of the retina, optic disc, or vitreous is extremely rare [2,3]. Choroidal metastases (CM) are the first sign of systemic malignancy in up to a third of patients with cancer and are a sign of advanced disease and poor prognosis [3]. The increasing occurrence of CM may be explained by the longer survival rates of cancer patients [1,2]. However, the occurrence of CM is likely even higher than reported due to underdiagnosis among patients with advanced stage disease and declining health [2]. Systemic cancer is known at the time of CM diagnosis in the majority of patients; however, in 8–30% of cases CM are identified before the primary tumor diagnosis. Among these cases, subsequent work-up most frequently identifies lung cancer (35–59%), followed by

breast cancer (7–15%) [2–4]. Since CM may be the earliest disease manifestation, the ophthalmologist can play an important role for a prompt systemic work-up to correctly identify the primary malignancy.

Herein, we report a case of small cell lung cancer presenting as a choroidal mass with secondary retinal detachment as the initial manifestation of the disease.

## 2. Case report

A 64-year-old male patient presented to the emergency department of another hospital with a two week history of painless severe loss of vision in his left eye. The patient was diagnosed with a retinal detachment and then sent to our hospital to evaluate vitreoretinal surgery. At presentation, the patient was in good general health and without any other significant symptoms. The patient had undergone surgical removal of a squamous cell carcinoma of the lower lip two years previously, with complete remission. His past ocular history was unremarkable. He was non-smoker. Best-corrected visual acuity at presentation was hand

<sup>\*</sup> Corresponding author. Unit of Ocular Oncology, Neuromuscular and Sense Organs Department, Careggi University Hospital, Largo Brambilla, 3, 50134, Florence, Italy.

E-mail address: [giulio.vicini@gmail.com](mailto:giulio.vicini@gmail.com) (G. Vicini).

<https://doi.org/10.1016/j.rmcr.2020.101074>

Received 12 March 2020; Received in revised form 1 May 2020; Accepted 1 May 2020

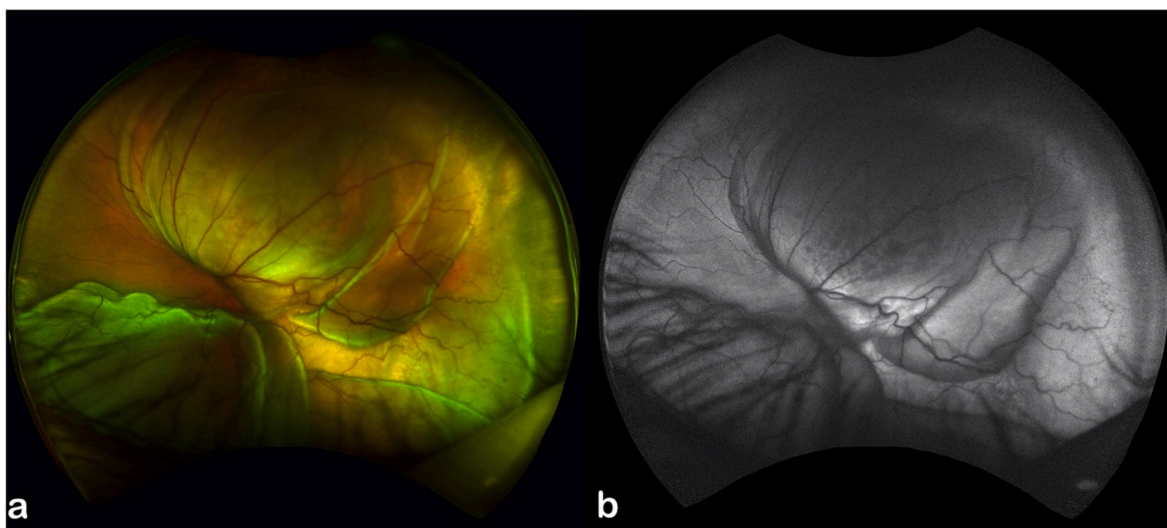
Available online 4 May 2020

2213-0071/© 2020 The Authors.

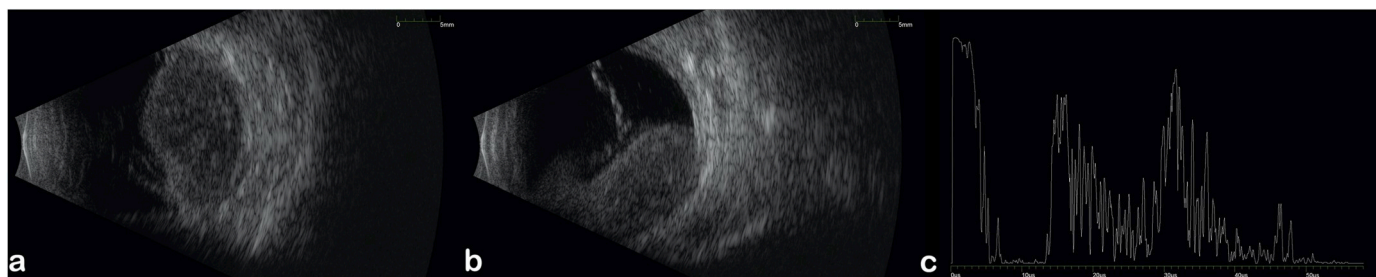
Published by Elsevier Ltd.

This is an open access article under the CC BY-NC-ND license

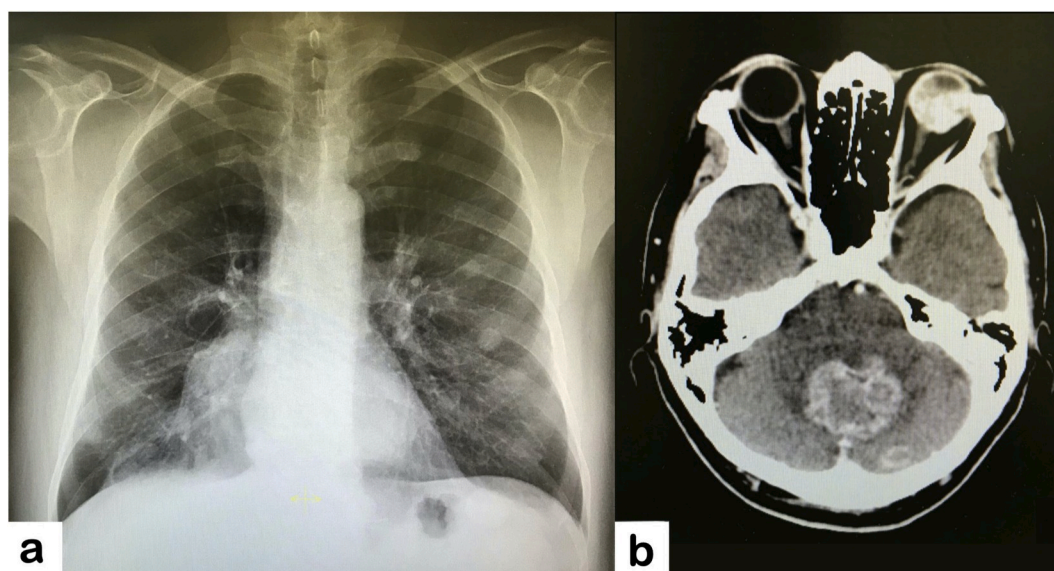
(<http://creativecommons.org/licenses/by-nc-nd/4.0/>).



**Fig. 1.** a: Ultra-wide-field fundus photography (Daytona Optos, Marlborough, MA, USA) of left eye showed a large slightly pigmented choroidal neovascularization with an extensive secondary retinal detachment; b: green-light fundus autofluorescence imaging (Daytona Optos) revealed no orange pigment. (For interpretation of the references to colour in this figure legend, the reader is referred to the Web version of this article.)



**Fig. 2.** a,b: B-scan ultrasonography revealed a hyperechogenic solid choroidal mass, measuring 18 mm in largest basal diameter and 13 mm in thickness, with exudative retinal detachment and initial choroidal excavation. c: A-scan ultrasonography showed a lesion with low-to-medium internal reflectivity.



**Fig. 3.** a: Chest radiography showed a large lung mass in the right lower lobe, with multiple foci of opacity disseminated in both lung fields. b: Contrast-enhanced brain computed tomography documented the presence of an expansive lesion in cerebellar hemisphere region with another smaller satellite lesion, which were compatible with brain metastases.

motion in left eye and 20/20 in right eye. Anterior segment and intra-ocular pressure were normal bilaterally. Dilated fundus examination of the left eye showed a voluminous slightly pigmented choroidal neoplasm with an extensive secondary retinal detachment (Fig. 1). Fundus evaluation of right eye was unremarkable. B-scan ultrasonography of left eye revealed a hyperechogenic solid choroidal mass, measuring 18 mm in largest basal diameter and 13 mm in thickness, with exudative retinal detachment and initial choroidal excavation (Fig. 2a and b); the lesion showed low-to-medium internal reflectivity on A-scan (Fig. 2c). The clinical and echographic aspect of the lesion suggested a primary malignancy, in particular a choroidal melanoma. We arranged for systemic staging with chest and abdomen imaging and laboratory investigation in anticipation of a possible enucleation surgery. Chest radiography showed a large lung mass in the right lower lobe and multiple foci of opacity disseminated in both lung fields (Fig. 3a). Computed tomography (CT) scan of chest and abdomen with iodinated contrast showed a voluminous contrast-enhancing lesion of the lung (largest diameter 8 cm), another gross contrast-enhancing lesion in left lobe of the liver (largest diameter 5 cm), and abdominal metastases near the aortic bifurcation, wrapping the right common iliac artery in a sleeve. After discussion in a multidisciplinary tumor board, CT-guided biopsies of the pulmonary and hepatic lesions were performed. Histopathological examination of both samples showed a malignant epithelial neoplasm with focal neuroendocrine differentiation and extensive necrosis. Tumor cells were positive for CAM 5.2, focally positive for synaptophysin, and negative for TTF1 and p40. The clinical and pathological features were compatible with a metastatic small cell lung cancer. The patient experienced an onset of gait disturbance within one month of presentation and contrast-enhanced brain CT demonstrated an expansive lesion (largest diameter 3.5 cm) in the cerebellar hemisphere region with a smaller satellite lesion (largest diameter 1.2 cm) (Fig. 3b). The findings were compatible with brain metastases. When admitted to the oncology department the patient was bedridden due to severe walking disability (ECOG performance status was 4). The patient was started on carboplatin/etoposide chemotherapy, with doses reduced by 20% due to poor general condition. The patient died during the course of the systemic treatment, 5 months after his initial presentation.

### 3. Discussion

Small cell lung cancer (SCLC) is an aggressive neuroendocrine tumor derived from bronchial epithelial cells and represents about 13–15% of all lung cancers [5,6]. Its rapid doubling time and early propensity to metastasize (most commonly to the brain, liver, or bone) results in a 95% mortality rate, which is a significantly worse prognosis than non-small cell lung cancer [7].

SCLC metastases to the choroid are uncommon and only few reports exist about CM as onset manifestation of the disease. Singh et al. systematically reviewed literature about patients with CM from lung cancer and identified 55 patients in whom CM were the presenting manifestation of the disease [8]. Among these patients, adenocarcinoma ( $n = 23$ ) was the most common histologic type followed by squamous cell carcinoma ( $n = 11$ ) and small cell carcinoma ( $n = 8$ ). Shah et al. studied 194 patients with a diagnosis of uveal metastases from lung cancer and 44% of these did not have a history of known malignancy [9]. In these patients the diagnosis of uveal metastases led to general investigation and subsequent diagnosis of the primary tumor. Histopathologic type of primary lung cancer was recorded in 55 patients and included non-small cell lung cancer in 84% of cases and small cell lung cancer in 16%.

The mean life expectancy after detection of uveal metastases in lung cancer patients has been calculated as 12 months [9]. The presence of CM places the patient with SCLC in TNM stage IV, which is associated with the worst prognosis [10].

Ocular ultrasonography identifies some morphological differences between CM and choroidal melanoma, regarding tumor shape, echogenicity, frequency of retinal detachment and choroidal excavation [1].

CM appear on ultrasonography as flat or a slightly dome-shaped masses, often multilobular with an irregular surface, with a medium-to-high non-homogeneous reflectivity, whereas choroidal melanoma is more frequently dome-shaped with a low-to-medium homogeneous reflectivity. The reflectivity differences between CM and choroidal melanoma are explained by the histoarchitecture of the lesions: CM show more typically solid epithelial nests or glandular structures, which act as echo-producing interfaces, resulting in high internal reflectivity and irregular internal structure. Melanoma, however, is composed of dense cellular masses with low-to-moderate vascularization and only few necrotic area (few echo-producing interfaces), resulting in low-to-medium reflectivity with a regular internal structure [1]. Some authors have reported that secondary retinal detachment is more frequently associated with choroidal melanoma than CM [11], but others report that CM are often associated with variable amounts of subretinal fluid, up to complete exudative retinal detachment [1]. Choroidal excavation, the result of the difference in reflectivity between the abnormal tissue that replaces the choroid and the underlying normal choroid, is more frequently associated with melanoma, while it is found in only up to a fifth of CM [1].

In our case, the patient reported a subacute onset of severe loss of vision in his left eye, without any other significant symptoms. He presented with a large hyperechogenic choroidal mass, with low-to-medium internal reflectivity on A-scan, exudative retinal detachment and initial choroidal excavation. The clinical-instrumental aspects of the choroidal lesion suggested to us the possibility of a primary malignancy; however, the subsequent systemic work-up revealed other areas of disease leading to the diagnosis of metastatic SCLC.

Treatment for ocular metastases is palliative, the aims of treatment are to maintain and preserve useful vision of patients and improve their quality of life [12].

In our case, the patient started chemotherapy after SCLC diagnosis. Unfortunately, the very aggressive behavior of the disease led to a rapid clinical deterioration and death, 5 months after the initial presentation.

The case we report is peculiar, both for the choroidal metastasis being the clinical presentation of undiagnosed SCLC and for the morphological appearance of the lesion resembling a primary uveal melanoma rather than metastatic disease. This case also highlights the role of the ophthalmologist in the diagnosis of some extra-ocular malignancies that may present with CM as the first clinical manifestation of disease.

### Patient consent

The patient gave his consent for the publication of this case.

### Funding sources

The authors received no funding for this work.

### Author contributions

GV, CN and GP: Conceptualization, Data curation, Writing – Original draft preparation, Visualization. CM: Supervision, Writing – Review & Editing. All the authors have read and approved the final version of the manuscript.

### Declaration of competing interest

The authors declared no potential conflicts of interest with respect to the research, authorship and publication of this article.

## References

- [1] T. Mathis, P. Jardel, O. Loria, B. Delaunay, A.M. Nguyen, F. Lanza, et al., New concepts in the diagnosis and management of choroidal metastases, *Prog. Retin. Eye Res.* 68 (2019 Jan) 144–176.
- [2] C.L. Shields, J.A. Shields, N.E. Gross, G.P. Schwartz, S.E. Lally, Survey of 520 eyes with uveal metastases, *Ophthalmology* 104 (8) (1997 Aug) 1265–1276.
- [3] L. Konstantinidis, I. Rospond-Kubiak, I. Zeolite, H. Heimann, C. Groenewald, S. E. Coupland, et al., Management of patients with uveal metastases at the liverpool ocular oncology centre, *Br. J. Ophthalmol.* 98 (1) (2014 Jan) 92–98.
- [4] R. Amer, J. Pe'er, I. Chowers, I. Anteby, Treatment options in the management of choroidal metastases, *Ophthalmologica* 218 (6) (2004 Nov-Dec) 372–377.
- [5] R. Govindan, N. Page, D. Morgensztern, W. Read, R. Tierney, A. Vlahiotis, et al., Changing epidemiology of small-cell lung cancer in the United States over the last 30 years: analysis of the surveillance, epidemiologic, and end results database, *J. Clin. Oncol.* 24 (28) (2006) 4539–4544.
- [6] J.P. Van Meerbeek, D.A. Fennell, D.K. De Ruysscher, Small-cell lung cancer, *Lancet* 378 (2011) 1741–1755.
- [7] B. Oronsky, T.R. Reid, A. Oronsky, C.A. Carter, What's new in SCLC? A review, *Neoplasia* 19 (10) (2017) 842–847.
- [8] N. Singh, P. Kulkarni, A.N. Aggarwal, B. Rai Mittal, N. Gupta, D. Behera, et al., Choroidal metastasis as a presenting manifestation of lung cancer: a report of 3 cases and systematic review of the literature, *Medicine (Baltim.)* 91 (4) (2012 Jul) 179–194.
- [9] S.U. Shah, A. Mashayekhi, C.L. Shields, H.S. Walia, G.B. Hubbard 3rd, J. Zhang, et al., Uveal metastasis from lung cancer: clinical features, treatment, and outcome in 194 patients, *Ophthalmology* 121 (1) (2014 Jan) 352–357.
- [10] W. Lim, C.A. Ridge, A.G. Nicholson, S. Mirsadraee, The 8<sup>th</sup> lung cancer TNM classification and clinical staging system: review of the changes and clinical implications, *Quant. Imag. Med. Surg.* 8 (7) (2018) 709–718.
- [11] A.J. Lemke, N. Hosten, T. Wiegel, R.D. Prinz, M. Richter, N.E. Bechrakis, et al., Intraocular metastases: differential diagnosis from uveal melanomas with high-resolution MRI using a surface coil, *Eur. Radiol.* 11 (12) (2001) 2593–2601.
- [12] W. Small Jr., Management of ocular metastasis, *Canc. Contr.* 5 (1998) 326–332.