American Journal of Ophthalmology Case Reports 26 (2022) 101424

Contents lists available at ScienceDirect

American Journal of Ophthalmology Case Reports

journal homepage: www.ajocasereports.com/

# Unusual visual loss in a patient with exudative macular degeneration

Enoch T. Peng [a,b], Sean D. Adrean [a,*]

[a] Retina Consultants of Orange County, Fullerton, CA, USA
[b] Department of BioSciences, Rice University, Houston, TX, USA

ARTICLE INFO

*Keywords:*
Carcinoma
nAMD
Occipital lesion

ABSTRACT

*Purpose:* To describe a case of marked vision loss in a patient with neovascular age-related macular degeneration after choroidal neovascular membrane (CNV) improvement and stabilization.

*Observations:* An 82-year-old male presented with 20/800 vision having dropped from 20/50 three months prior. He had been undergoing active treatment for exudative macular degeneration over the past seven years, the CNV had stabilized. An extensive ophthalmic workup was performed revealing no CNV progression and no ophthalmic cause was identified for visual loss. An MRI of the brain was obtained, which showed a metastatic brain lesion in the occipital lobe, and subsequent workup determined it originated from an adenosquamous carcinoma of the lung.

*Conclusions:* When there is unexplained visual loss in an otherwise stable patient with macular degeneration, suspicion for non-retinal related causes of visual loss could alter the morbidity and mortality for patients with systemic diseases.

## 1. Introduction

Cancer is the second most common cause of death in the United States.[1] With over 1.8 million new cases of cancer and over 600,000 deaths in the US expected in 2020 alone, it stands as a major public health problem.[1] Effective cancer care includes early detection and failure on the part of the physician to recognize signs that warrant further investigation may be detrimental.[2] Lung cancer is the leading cause of cancer death globally and adenosquamous carcinoma is a rare subtype of non-small cell carcinoma with a 55% mortality rate over 5 years.[3–5]

It is known that intracranial tumors can cause visual deficits, however, detection may be difficult when there are comorbid visual conditions such as neovascular age-related macular degeneration (nAMD), which makes the cause of visual deficits uncertain.[5] This case report details a patient that was diagnosed with lung cancer after unexpected visual loss while undergoing nAMD treatment.

## 2. Case report

In March 2011, a 74-year-old male with age-related macular degeneration, developed a choroidal neovascular membrane (CNV) OS, with 20/60 vision. The right eye had geographic atrophy with 20/400 vision. In October 2011, the CNV was regressing, and showed signs of improvement and stabilization. He was managed with a Treat-Extend-Stop protocol, using Intravitreal bevacizumab (IVB) (Avastin, Genentech, San Francisco, CA).[6]

By April 2018, after receiving 58 IVB injections, his vision was 20/50, but it then dropped to 20/800 in July 2018. An extensive ophthalmic workup was performed. The fundus photos were compared with previous exams and showed no evidence of glaucoma or optic neuropathy. FA showed a stabilizing CNV OS. SD-OCT showed no progression of the CNV (Fig. 1a, b, 1c), with an intact ellipsoid zone. A subjective brightness test revealed 100% OD versus 70% OS. HVF showed central loss in the left eye greater than right (Fig. 2). A posterior ischemic optic neuropathy was considered since the patient was on dialysis and a hypotensive episode may have caused a posterior ischemic optic neuropathy. An MRI of the brain and orbits was recommended to determine if there was a neurological cause for the unexplained visual loss, such as ischemic stroke in the occipital lobe.

The MRI showed a 6 mm lesion in the left occipital lobe with cerebral edema (Fig. 3a and b). The lesion was suspicious for metastasis, and a PET scan revealed an apical lung lesion (Fig. 3c). The patient had a needle biopsy of the lung mass, which revealed an adenosquamous

*Abbreviations:* nAMD, neovascular age-related macular degeneration; CNV, choroidal neovascular membrane; IVB, intravitreal bevacizumab.

* Corresponding author. 301 W. Bastanchury Ave #285, Fullerton, CA, 92835, USA.
*E-mail address:* seadrean@yahoo.com (S.D. Adrean).

https://doi.org/10.1016/j.ajoc.2022.101424
Received 25 May 2021; Received in revised form 9 February 2022; Accepted 10 February 2022
Available online 11 February 2022

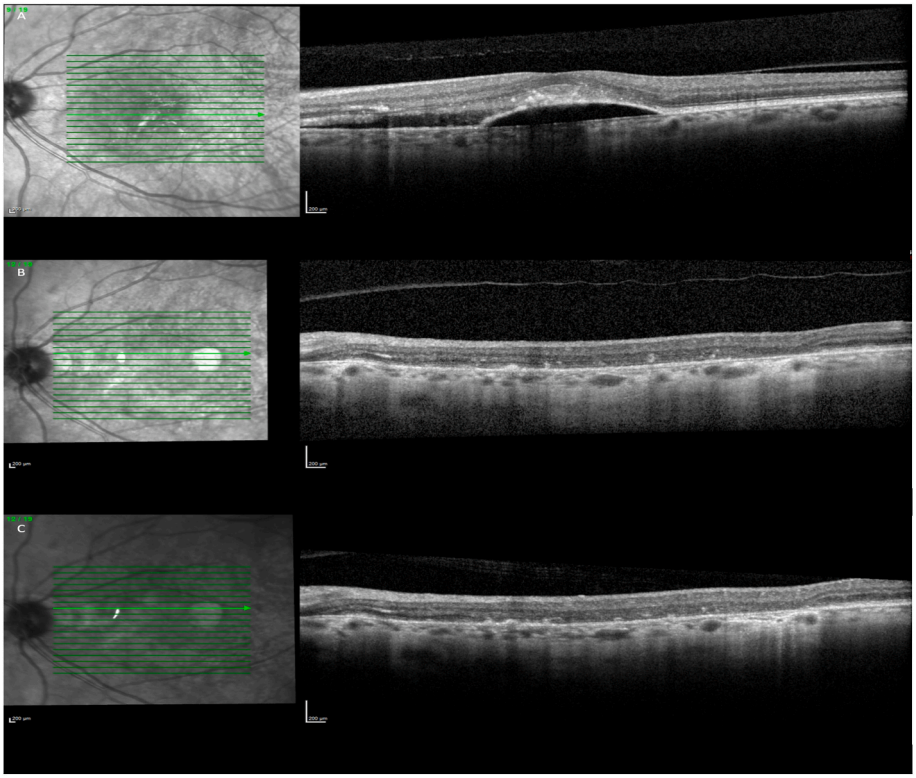


**Fig. 1.** Spectral Domain Optical Coherence Tomography of Left Eye A) At onset of CNV, VA 20/60; B) One month prior to dramatic visual loss, VA 20/50; C) At presentation of dramatic vision loss, VA 20/200, without obvious progression of exudative or degenerative macular degeneration.

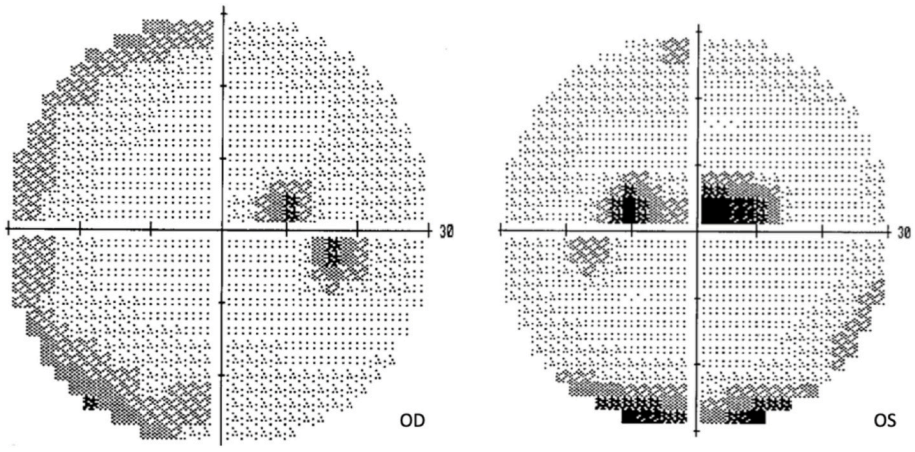


**Fig. 2.** Visual field test with greater central vision loss in left eye (100% OD, 70% OS).

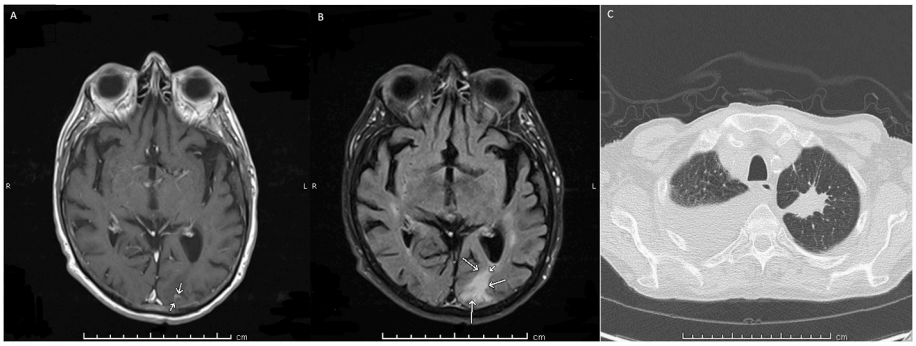


**Fig. 3.** A) 6 $mm^2$ metastasized brain tumor in left occipital lobe; B) Swelling due to brain tumor in left occipital lobe; C) Lung cancer lesion in apical left lobe of lung.

carcinoma. With this diagnosis, the patient underwent chemotherapy and radiation treatment. Even though the CNV was well controlled with continual IVB injections, his vision 2 years later was still 20/800, yet with treatment for his lung carcinoma, he still lives.

## 3. Discussion

Age-related macular degeneration (AMD) is the most common cause of blindness in developed countries and can be categorized into early and late stages.[7] Early stage AMD consists of drusen buildup under the retinal pigment epithelium and areas of hyperpigmentation and hypopigmentation.[7] Late stage AMD consists of either geographic atrophy or exudative AMD which is also known as neovascular AMD (nAMD).[7] nAMD is characterized by choroidal neovascularization, with exudation and hemorrhage, leading to vision loss.[7] In response to nAMD, intravitreal injections of anti-VEGF agents are used to treat and are the gold standard for nAMD. These monoclonal antibodies bind to VEGF, decreasing the permeability of vessels and inhibiting angiogenesis.[8]

When patients with nAMD have profound visual loss, the cause must be determined. First, increased activity of the CNV should be suspected, with careful examination of the OCT, to determine if there is increased exudation with either subretinal fluid, intraretinal fluid, or hemorrhage. Also, the degenerative component of the AMD should be evaluated to see if it is worsening, which may include increasing GA. We recommend various testing such as SD-OCT, OCT-Angiography, and FA, to assist in the diagnosis. The OCT examinations allow for inspection of the various retinal layers and a careful examination of the ellipsoid zone should be performed noting the integrity and intensity as changes may represent disease progression.[9] Examinations such as OCT-Angiography and FA allow for assessment of blood flow to the retina and the size and extent of the CNV may be ascertained. If the previous examinations reveal no unexpected changes, other ophthalmic causes should be on the differential diagnosis. The cornea should be evaluated for edema. The lens or pseudophakic capsular bag should be carefully evaluated for cataract progression or posterior capsular opacification respectively. Progressive glaucoma or ischemic optic neuropathy should be considered. Subjective brightness and pupillary examination were critical in suggesting a neuro-ophthalmic cause of visual loss in this case, such as a posterior ischemic optic neuropathy associated with hypotension from dialysis. The visual field examination result also highlighted the possibility of a neurological cause, prompting an MRI of the brain and orbits.[10]

As the patient had an existing retinal degenerative disease it would be intuitive to conclude that this sudden loss of vision would be associated with the retina. However, upon further examination the retina appeared intact and the choroidal neovascular membrane was stabilized. In such an event, if it does not appear that sudden vision loss is associated with the disease being treated, it is essential to consider that the vision loss may be due to an entirely separate mechanism. It is especially difficult to discern the causes of symptoms with comorbid conditions, however maintaining a high degree of clinical suspicion to work-up unexplained visual loss, is necessary to account for any outlying conditions that could not only be sight threatening, but also life threatening. The patient lung cancer diagnosis came about due to an unexpected loss in vision.

When faced with sudden visual loss in the context of nAMD, first retinal causes should be ruled out including increased progression of geographic atrophy, progression of degenerative AMD or worsening of nAMD. Once retinal causes have been ruled out, then other ophthalmic causes should be suspected and a high index of suspicion for neurological causes should be entertained to make the correct diagnosis.

## IRB approval

IRB approval was not obtained as this report does not contain any personal information that could lead to the identification of the patient.

## Consent

Consent to publish the case report was not obtained. This report does not contain any personal information that could lead to the identification of the patient.

## HIPAA

The study is in compliance with HIPAA regulations.

## Publication originality statement

We confirm this publication is original.

## Meeting presentation

None.

## Precis

We describe a case in an 82-year-old undergoing active treatment for exudative macular degeneration over the past seven years. The choroidal neovascular membrane had improved and stabilized, but then the patient presented with marked visual loss. An MRI was obtained, which showed a metastatic brain lesion in the occipital lobe, and subsequent workup determined it originated from an adenosquamous carcinoma of the lung.

## Funding

No funding was received for this work.

## Authorship

All listed authors meet the ICMJE criteria.
We attest that all authors contributed significantly to the creation of this manuscript, each having fulfilled criteria as established by the ICMJE.

## Declaration of competing interest

No conflict of interest exists.

## Acknowledgements

None.

## References

1. Siegel RL, Miller KD, Jemal A. Cancer statistics, 2020. *Ca - Cancer J Clin.* 2020;70(1):7–30.
2. Lancet T. Late-stage cancer detection in the USA is costing lives. *Lancet.* 2010;376(9756):1873.
3. Bray F, Ferlay J, Soerjomataram I, et al. Global cancer statistics 2018: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. *Ca - Cancer J Clin.* 2018;68(6):394–424.
4. Ruffini E, Rena O, Oliaro A, et al. Lung tumors with mixed histologic pattern. Clinico-pathologic characteristics and prognostic significance. *Eur J Cardio-Thorac Surg Off J Eur Assoc Cardio-Thorac Surg.* 2002;22(5):701–707.
5. Wu X, Yu W, Petersen RH, et al. A competing risk nomogram predicting cause-specific mortality in patients with lung adenosquamous carcinoma. *BMC Cancer.* 2020;20(1):429.
6. Adrean SD, Chaili S, Grant S, Pirouz A. Recurrence rate of choroidal neovascularization in neovascular age-related macular degeneration managed with a treat-extend-stop protocol. *Ophthalmol Retina.* 2018;2(3):225–230.
7. Taylor DJ, Hobby AE, Binns AM, Crabb DP. How does age-related macular degeneration affect real-world visual ability and quality of life? A systematic review. *BMJ Open.* 2016;6(12).

8. Yorston D. Anti-VEGF drugs in the prevention of blindness. *Community Eye Health*. 2014;27(87):44–46.
9. Tao LW, Wu Z, Guymer RH, Luu CD. Ellipsoid zone on optical coherence tomography: a review. *Clin Exp Ophthalmol*. 2016;44(5):422–430.
10. Danesh-Meyer HV, Papchenko TL, Savino PJ, Gamble GD. Brightness sensitivity and color perception as predictors of relative afferent pupillary defect. *Invest Ophthalmol Vis Sci*. 2007;48(8):3616–3621.