

Metastatic Lung Cancer Masquerading as Endophthalmitis

KEVIN C. DIETRICH, MD; ROBERT H. JANIGIAN, JR, MD; ANDREW YOUNG, MD, MPH

ABSTRACT

A 41-year-old man presented to the emergency department with a painful and red left eye associated with chronic vision loss. He had a history of homelessness and polysubstance abuse including intravenous drug use. Fundus examination revealed several cream-colored lesions encroaching on the macula of the right eye, and a total retinal detachment with secondary neovascular glaucoma in the left eye. Further work-up with imaging and endobronchial ultrasound-guided fine needle aspiration revealed stage IV epidermal growth factor receptor (EGFR) mutant (L858R) lung adenocarcinoma with brain, bone, adrenal, lymph node and bilateral choroidal metastases. Herein we present a case of metastatic lung cancer masquerading as endophthalmitis.

KEYWORDS: choroidal metastases, endophthalmitis, lung cancer

CASE PRESENTATION

A 41-year-old male presented to our emergency department with a blind, painful and red left eye. His symptoms began 1.5 months prior with painless gradual vision loss progressing to complete loss of vision. Thereafter he began experiencing left eye pain and self-treated with illicit drugs: heroin, cocaine, and marijuana. There was no history of trauma and past ocular history was unremarkable. He denied associated flashes, floaters, headaches, focal neurological deficits or contralateral visual field cut and had no pertinent past medical/surgical/family history. Social history was significant for polysubstance use disorder, including intravenous drug use (heroin: 3–4 bags daily, crack cocaine, marijuana), 0.50 pack cigarettes per day, incarceration, and homelessness.

The visual acuity in the right eye was 20/20, left eye was no light perception. The intraocular pressures were 14 mmHg OD and 26 mmHg OS. External examination of both eyes was normal. The anterior segment of the right eye was unremarkable. The left eye showed 3+ injection with



Figure 1. Right eye fundus photo depicting choroidal lesions.

trace corneal edema and peripheral neovascularization, 2+ cell, 4+ flare, circumferential neovascularization of the iris, and posterior synechiae. Fundus examination of the right eye demonstrated clear vitreous with a superonasal 5 disc diameter raised hypopigmented lesion and an infero-temporal 3 disc diameter cream-colored lesion encroaching the macula. (Figure 1) The left eye showed dense vitritis with a poor red reflex. B Scan ultrasonography revealed a total retinal detachment, vitreous opacities and a fungating mass. (Figure 2)



Figure 2. B-Scan demonstrating total retinal detachment of left eye.

Patient was admitted for presumed endogenous endophthalmitis given history of intravenous drug use (IVDU). Vancomycin, cefepime and voriconazole were administered empirically while source and etiology were further investigated. Brimonidine was prescribed to the left eye to palliate pain. Transthoracic echocardiogram did not demonstrate

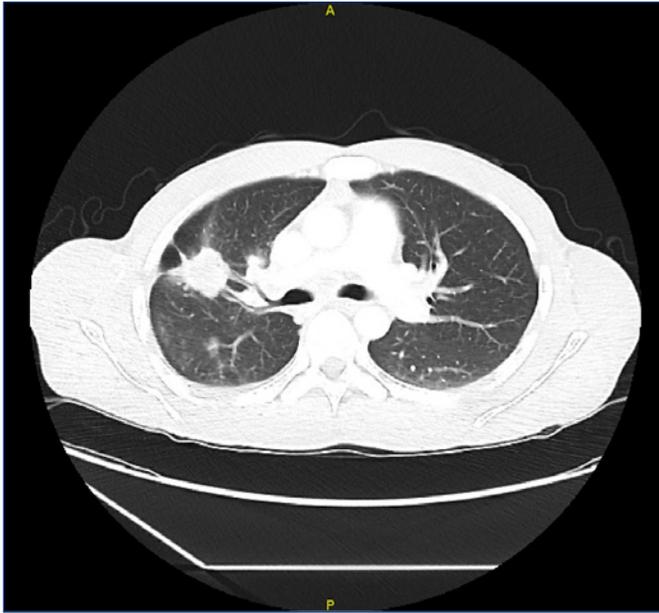


Figure 3. Primary lung tumor in right lobe.

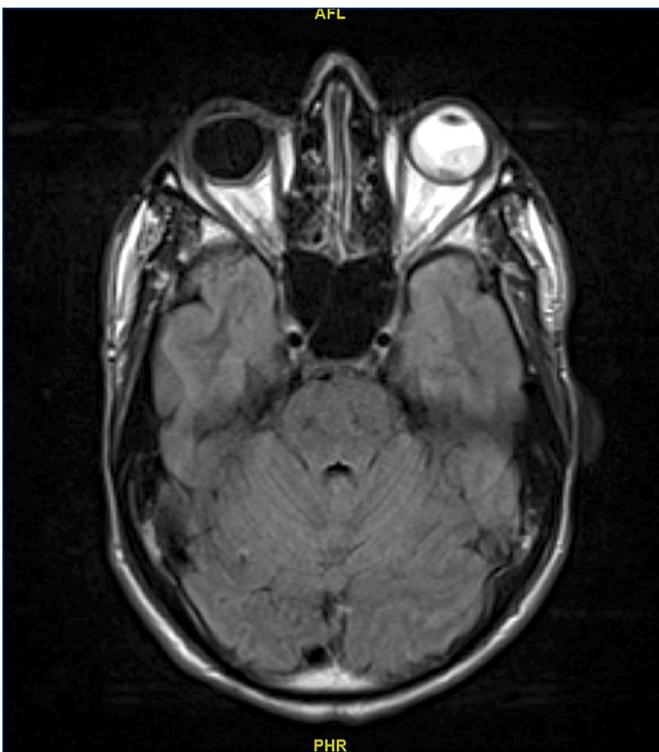


Figure 4. Axial MRI depicting enhancement of left eye and mass.

endocarditis. CT chest/abdomen/pelvis was performed for source work-up. It showed a 2.7 x 3.9 cm cavitary right upper lobe lesion with scattered nodular opacities throughout right lung with lymphadenopathy measuring up to 4.3 cm; 2.5 x 1.6 cm heterogeneously enhancing right adrenal nodule, 2.0 x 1.3 cm intraosseous lesion in right lateral aspect of the T 12 vertebral body. (Figure 3) An endobronchial ultrasound with fine-needle aspiration with cytological confirmed diagnosis of non-small cell lung cancer. Further testing confirmed stage IV EGFR mutant (L858R) lung adenocarcinoma with brain, bone, adrenal, lymph node and left choroid metastases. MRI showed greater than 15 enhancing brain lesions, 2.2 cm left calvarial osseous lesion, left intraocular lesion abutting posterior globe with hemorrhagic retinal detachment. (Figure 4) The patient was ultimately treated with whole brain external radiation and left orbit external radiation therapy, and osimertinib.

DISCUSSION

This case demonstrates how neoplastic disease can masquerade as ocular inflammation. Endogenous endophthalmitis is typically unilateral, and risk factors are malignancy, intravenous drug use, and invasive surgery.¹ Given the patient's history of IVDU, the initial presentation was concerning for bacterial or fungal infection. It was the presumed embolic source work-up that discovered the primary lung lesion. This drastically changed the patient's course of care from considering which antibiotics or antifungals to use, to staging cancer.

Confounding factors were his social situation and lack of systemic symptoms. He presented solely with eye complaints. Choroidal tumor was on the differential although his eye was more infectious appearing. However, lung cancer was not considered. Given the multiple sites of metastases it is surprising his review of systems was completely unremarkable. Neovascularization is not characteristic of eye infection and alluded to some cause of ischemia which could not be explained by infectious process alone. CT scan demonstrating hemorrhagic retinal detachment may account for these findings.

Upon reviewing fundus images following the diagnosis, the lesions in the right eye are very characteristic of the yellow/cream-colored choroidal metastases. This, along with the CT findings and confirmation of lung cancer, and the propensity for ocular metastases made intravitreal biopsy or further invasive investigation unnecessary. Intraocular metastases are under-recognized clinical problem: 16% of individuals dying from cancer have metastases to the eye; it is 40% when evaluating lung cancer.² The uvea is the most common ophthalmic site for dissemination of metastatic tumors from remote sites.³ Metastases to the eye is atypical and is an independent poor prognostic factor.⁴ Two-thirds of choroidal metastases stem from lung and breast

cancers.⁵ Multiple studies have exhibited a poor life expectancy: Systemic treatment in conjunction with local treatment demonstrated 11-month survival, and 5-year survival rate is 23%.^{5,6} Treatment at this point is solely palliative.

Upon literature review, ocular metastases from lung cancer did not present as endophthalmitis. Patients with choroidal involvement are typically asymptomatic; however, other ocular components may present with pain and vision loss.^{7,8}

CONCLUSION

Metastases to intraocular structures from a distant site are rare and often missed. This case demonstrates metastatic cancer masquerading as endophthalmitis, which is a unique presentation of metastatic disease. Employing a wide differential during initial evaluation is crucial to detecting an underlying malignancy.

References

1. Sheu SJ. Endophthalmitis. *Korean J Ophthalmol.* 2017;31(4):283–289. doi:10.3341/kjo.2017.0036
2. Lampaki S, Kioumis I, Pitsiou G, et al. Lung cancer and eye metastases. *Med Hypothesis Discov Innov Ophthalmol.* 2014;3(2):40–44.
3. Shields CL, Welch RJ, Malik K, et al. Uveal Metastasis: Clinical Features and Survival Outcome of 2214 Tumors in 1111 Patients Based on Primary Tumor Origin. *Middle East Afr J Ophthalmol.* 2018;25(2):81–90. doi:10.4103/meajo.MEAJO_6_18
4. Niu FY, Zhou Q, Yang JJ, et al. Distribution and prognosis of uncommon metastases from non-small cell lung cancer. *BMC Cancer.* 2016;16:149. Published 2016 Feb 24. doi:10.1186/s12885-016-2169-5
5. Shields CL, Shields JA, Gross NE, Schwartz GP, Lally SE. Survey of 520 eyes with uveal metastases. *Ophthalmology.* 1997 Aug;104(8):1265–76. PMID: 92613136
6. Fan Y, Huang Z, Fang L, et al. Chemotherapy and EGFR tyrosine kinase inhibitors for treatment of brain metastases from non-small-cell lung cancer: survival analysis in 210 patients. *Onco Targets Ther.* 2013;6:1789–1803. Published 2013 Dec 4. doi:10.2147/OTT.S52172
7. Hsuan-Tsung SU, Tuh-Min Chen, Reury-Perng Perng. Symptomatic ocular metastases in lung cancer. *Respirology.* Published 2007 Dec 7.
8. Liu SL, Nie YH, He T, Yan XX, Xing YQ. Iris metastasis as the first sign of small cell lung cancer: A case report. *Oncol Lett.* 2017;13(3):1547–1552. doi:10.3892/ol.2017.5648

Author

Kevin C. Dietrich, MD, Resident Physician, Brown Division of Ophthalmology, Alpert Medical School of Brown University, Providence, RI.

Robert H. Janigian, Jr., MD, Clinical Assistant Professor of Surgery (Ophthalmology), Alpert Medical School of Brown University, Providence, RI.

Andrew Young, MD, MPH, Clinical Assistant Professor of Surgery (Ophthalmology), Alpert Medical School of Brown University, Providence, RI.

Correspondence

kevin.c.dietrich@gmail.com