Metastatic breast carcinoma involving the optic disc

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1. Introduction

Intraocular metastasis is the most common type of malignant tumor in the eye. However, metastatic disease to the optic disc accounts for only 4.5% of intraocular metastases.\textsuperscript{1} These tumors are usually associated with a contiguous choroidal lesion. Metastases to the optic disc without regional choroidal involvement are far less common, and therefore clinicians must remain vigilant for systemic disease when patients present with abnormal optic nerve lesions.\textsuperscript{2} Herein, we present a rare case of unilateral optic disc metastasis without choroidal involvement in a patient with known metastatic carcinoma of the breast.

2. Case report

A 65-year-old African-American female presented to our clinic for evaluation of a one-month history of blurred vision and increased floaters in her left eye. Her past medical history was significant for estrogen and progesterone receptor mutation positive, Her2 mutation negative, invasive mammary carcinoma diagnosed four years prior to presentation. She had undergone mastectomy followed by anti-estrogen chemotherapy. One year prior to presentation, she was found to have lung and bone metastases that were treated with palliative radiation. Her ocular history was significant for remote retinal detachment in the right eye that was repaired by a scleral buckling procedure. On presentation, visual acuity of counting fingers at 3 feet in her right eye and 20/50 in the left. The anterior segment was unremarkable except for mild nuclear cataracts in both eyes. Fundus biomicroscopy revealed an attached retina with full scleral buckle and peripheral chorioretinal scarring in the right eye, consistent with her known history of retinal detachment. In the left eye, a flesh colored nodule with white lobules demonstrating an endophytic growth pattern was seen on the optic nerve. Magnetic resonance imaging of the brain and orbits revealed multiple intraparenchymal enhancing lesions, leptomeningeal enhancement, and enhancement of the left optic disc and proximal optic nerve all consistent with metastatic disease. The diffuse cranial disease was treated with whole brain radiation leading to regression of the optic nerve lesion and stabilization of visual acuity.

Conclusions and Importance: Intraocular metastases are the most common malignant tumor of the eye. Prompt identification and treatment of intraocular metastases is vital to prevent severe visual loss. Here, we document an unusual case of optic disc metastasis with unique fundoscopic features.
Optic disc metastases are generally the result of direct spread from juxtapapillary choroidal metastasis or hematogenous spread via the posterior ciliary arteries supplying the optic nerve head. An estimated 74% of metastases to the optic disc are contiguous with a choroidal metastasis due to the rich vascular supply in the choroid of the posterior pole. In our case, no thickening of the choroid was observed that would suggest choroidal infiltration contiguous with the optic nerve lesion. Mild increased reflectivity of the choroid was noted on OCT imaging, however this most likely represented resolved subretinal fluid exudation.

Given the presence of subarachnoid spread of tumor in the bifrontal regions, extension into the left optic nerve sheath on MRI and enhancement of the optic disc and proximal left optic nerve, the optic disc metastasis in this case is more likely due to direct infiltration of the optic nerve by leptomeningeal carcinomatosis (LC). Leptomeningeal metastases may occur via hematogenous seeding of the meninges from a distant source or by direct subarachnoid invasion by a primary or metastatic intraparenchymal brain tumor. An estimated 5% of all patients with breast cancer develop LC. The diagnosis of LC is most often made by the combination of enhancing subarachnoid mass lesions on radiologic imaging and positive CSF cytology. However, in patients with known systemic disease and radiologic findings highly suggestive...
of LC, such as our patient with known metastatic breast cancer, intraparenchymal brain metastases and multiple enhancing masses within the subarachnoid space on post-contrast MRI, imaging alone can be virtually diagnostic for LC. 6 Vision loss is the most common ocular symptom of LC, occurring in up to 44% of cases, and may present as the initial complaint. 3,9 The mechanism by which visual loss occurs in LC is not clear, but current theories include optic nerve sheath compression, vascular compromise, and neoplastic infiltration of the optic nerve. 9–13 Distant hematogenous dissemination of malignant cells from the primary source to the optic disc is also a possibility, but less likely given the radiologic evidence of LC involving the optic nerve sheath.

An optic nerve metastasis can easily be mistaken for another lesion on funduscopic examination. Retinal astrocytic hamartomas have a very similar appearance to the lesion in our case. They may appear as a raised multilobulated “mulberry” lesion but typically exhibit a characteristic hyperautofluorescence. Optic disc drusen can mimic this presentation if the calcific bodies are robust in number or demonstrate extrusion. However, disc drusen tend to have an eccentric location without disc swelling.

Treatment for leptomeningeal carcinomatosis is usually palliative and may include intrathecal chemotherapy or local radiation therapy for symptomatic management. 6 In regard to ocular metastases, fractionated external beam radiation of 35–40 gray is the first line choice for local treatment. 14–16 Tumor response to radiotherapy is variable, with 50% of patients reporting stabilization of vision and 36% reporting improvement in visual acuity. 12 Unfortunately, the prognosis for patients with leptomeningeal carcinomatosis is very poor, with a median survival of duration of 2–3 months.

4. Conclusions

Optic disc metastasis is a rare presentation of metastatic carcinoma and may present a diagnostic challenge due to its heterogeneity on funduscopic exam and nonspecific appearance on radiographic imaging. Clinicians should have a high index of suspicion for ocular metastases in patients with visual complaints and a past history of cancer, particularly breast or lung carcinoma. Prompt recognition can facilitate the initiation of local and systemic therapy, prevent severe vision loss and improve overall prognosis.

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.

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Authorship

All authors attest that they meet the ICMJE criteria for Authorship.

Declaration of competing interest

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