Case Report

Tumor seeding after diagnostic vitrectomy for choroidal metastasis in breast cancer

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Abstract

Choroidal metastasis is the most common type of intraocular tumor in adults, and in females the most common primary site is the breast. We report a case of unilateral choroidal metastasis with exudative retinal detachment as the initial presentation of recurrent breast cancer, and subsequent ophthalmic metastasis following diagnostic vitrectomy. A 49-year-old woman with a 7-year-history of well-treated bilateral breast cancer had been suffering from blurred vision in the left eye for 1 week. Ocular examination was normal except for superotemporal retinal detachment in the left eye. Neither retinal break nor choroidal mass was seen. The patient received scleral buckling and pneumatic retinopexy without significant improvement. Fluorescein angiography revealed a suspected choroidal metastasis in the left eye, but ocular ultrasonography did not show a visible choroidal mass. Two consecutive diagnostic vitrectomies with cytology could not confirm malignancy. A systemic workup was also negative. Six months later, two tumor masses were noted over two of the sclerotomy wounds of the left eye. Pathology showed adenocarcinoma compatible with invasive ductal carcinoma of the breast. Ocular metastasis may present as infiltrative choroidal lesions with exudative retinal detachment without a visible mass. Invasive procedures, such as fine-needle aspiration biopsy and diagnostic vitrectomy, may risk tumor seeding.

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1. Introduction

Choroidal metastasis is the most common type of intraocular tumor in adults. The most common primary tumors that metastasize to the choroid are breast cancer in females and lung cancer in males. Most intraocular tumors can be diagnosed by noninvasive techniques, but those with atypical features may need additional cytological or histological confirmation. Diagnostic vitrectomy and fine-needle aspiration are common methods to evaluate patients with indeterminate posterior intraocular tumors. However, these invasive techniques may increase the risk of extraocular tumor spread and orbital seeding. We present a case of choroidal metastasis from recurrent breast cancer with subsequent tumor seeding over sclerotomy wounds following pars plana vitrectomy.

2. Case report

A 49-year-old female had undergone mastectomy and chemotherapy for bilateral breast cancer approximately 7 years previously. No evidence of recurrence was noted during regular follow-up. The patient was referred because of blurred vision in the left eye of 1 week’s duration. Vision was 6/6 in the right eye and 6/12 in the left. Intraocular pressure was 14 mmHg in the right eye and 10 mmHg in the left. Ocular examination was normal except for bullous retinal detachment noted at the periphery of the superotemporal quadrant in the
left eye (Fig. 1A). Neither retinal break nor choroidal tumor mass was detected under indirect ophthalmoscopy. There was no obvious shifting of subretinal fluid upon changing posture.

To address this case of diagnostic uncertainty, scleral buckling and pneumatic retinopexy were performed initially. However, subretinal fluid persisted after the operation (Fig. 1B). We arranged for fluorescein angiography for evaluation, and choroidal metastasis was suspected in the left eye (Fig. 1C and 1D). Ocular ultrasonography showed no visible choroidal mass or abnormal acoustic reflectivity. A systemic survey provided no more clinical findings or distant dissemination, and a gallium-67 scintigraphy scan did not reveal any malignancy.

In the following 2 months, two consecutive pars plana vitrectomies were performed on the patient to establish a diagnosis and to reattach the retina. Retinotomy was created after thorough vitrectomy, and subretinal fluid was aspirated through the retinotomy with a 25-gauge needle. An endo-diode laser was applied at the margin of the retinotomy. Both the vitreous specimen and subretinal fluid were sent for cytological examination, but no malignant cells were found. Rapidly, numerous whitish choroidal patches with flat, ill-defined margins scattered diffusely over the posterior pole and mid-periphery in the left eye (Fig. 1E). The patient was advised to receive evaluation and treatment at the oncology department.

Fig. 1. Fundus photography and fluorescein angiography. (A) A bullous retinal detachment was seen at the periphery of the superotemporal quadrant in the left eye without a shifting pattern of the subretinal fluid. (B) Persistent subretinal fluid was noted after scleral buckling and pneumatic retinopexy. (C) Fluorescein angiography showed hypofluorescence over the lesion during the early phase. (D) During the venous phase, multiple hyperfluorescent spots appeared at the subretinal and choroidal levels, with late leakage into the subretinal space, suggestive of choroidal metastasis. (E) About 2 months later, numerous whitish choroidal patches with flat, ill-defined margins were scattered diffusely over the posterior pole and mid-periphery.
Fig. 2. Clinical appearance and microscopic examination of the tumor. (A) A tumor mass measuring 0.4 cm × 0.3 cm × 0.3 cm was noted over the sclerotomy wound in the left eye. (B) A cross-section of the tumor mass (H&E stain, 40×) showed nests and cords of neoplastic cells with stromal invasion. (C) The morphology was compatible with metastasis from invasive ductal carcinoma of the breast (H&E stain, 400×).

Six months after initial presentation, two tumor masses were noted over two of the three sclerotomy wounds in the left eye (Fig. 2A). Excisional biopsy was performed with cryotherapy, and pathology showed adenocarcinoma consistent with an origin of invasive ductal carcinoma of the breast (Fig. 2B and 2C).

3. Discussion

Uveal metastasis accounts for a considerable number of intraocular tumors in adults, with breast and lung cancer being the leading primary sites in women and men, respectively. In a study by Shields et al, the uveal metastasis came from a primary cancer of the breast in 47% of cases, the lung in 21%, and the gastrointestinal tract in 4%. Tumor cells may metastasize to the eye via hematogenous dissemination, with the posterior choroid being the most common site of intraocular metastases due to its rich vascular supply.

Patients with choroidal metastasis may be asymptomatic or may experience photopsia and, rarely, pain. The most common sites of involvement are the superior and temporal quadrants of the postequatorial region. Fully 91% of patients with choroidal metastasis have posterior pole involvement, and they may experience blurred vision and metamorphopsia. Only 6% of patients have peripheral retinal involvement. Metastatic tumors from breast cancer may be solitary or multifocal, unilateral or bilateral, and may have diverse findings on dilated fundus examination. In retrospective reviews by Kreusel et al and Demirci et al, most eyes with choroidal metastasis from breast cancer showed flat, yellow-white lesions with diffuse borders and a mean tumor thickness of 2 mm (range 0.3–15 mm). The lesions had variable degrees of pigmentation: 55% were mottled, 40% showed no pigmentation, and 5% were densely pigmented. Exudative retinal detachment may be present with shifting subretinal fluid, but retinal hemorrhage and exudates are rare.

When attempting to make a diagnosis, fine-needle aspiration biopsy and diagnostic vitrectomy may help detect malignancy, speeding the application of specific and appropriate treatment. However, these procedures still have limitations. Fine-needle aspiration biopsy is unreliable in lesions thinner than 2 mm, and inadequate samples or sampling errors may lead to false-negative results. Severe complications may occur, such as spreading of the tumor, hemorrhage, retinal detachment, cataract, and endophthalmitis related to the procedure.

The faint risk of needle track seeding is more likely with trans-scleral fine-needle biopsies compared with the transvitreal approach. Although the risk of tumor cell dissemination is generally low in fine-needle biopsy, local epibulbar seeding at the scleral pars plana puncture site was once reported in a case of posterior temporal melanoma after a transvitreal biopsy.

Our patient had a unilateral, flat amelanotic lesion that presented initially at the periphery of the superotemporal quadrant with a bullous retinal detachment; however, neither obvious shifting patterns of subretinal fluid nor a tumor mass were noted at that time. Despite systemic evaluation, two consecutive diagnostic vitrectomies and cytological examination of the subretinal fluid and vitreous samples, we could not confirm the presumed diagnosis of metastasis. The lesion rapidly progressed to multifocal infiltrative subretinal foci with a yellow-white color and an ill-defined margin diffused over the posterior pole. Although we did not obtain sufficient material for cytological confirmation of malignancy, a subclinical number of scant tumor cells were implanted at the sclerotomy puncture site. Probes introduced through the sclerotomy during vitrectomy may have increased the risk of seeding in this case.

Choroidal metastasis from breast cancer may occur many years after operation, with most cases diagnosed 20–40 months postoperatively. Usually, ocular metastasis is preceded by involvement of the lungs or other organs. Nonetheless, after a relatively prolonged 7 years of remission, our patient developed ocular metastasis as the initial presentation of a systemic recurrence of her breast cancer. This case indicates that a careful systemic survey and history-taking are mandatory for the diagnosis of unusual presentations. Invasive procedures, such as fine-needle aspiration biopsy and diagnostic vitrectomy, may aid rapid diagnosis, but clinicians should be cautious of the potential risk of extraocular spread of tumor cells.

References