Cavitary Choroidal Metastasis From Lung Neuroendocrine Tumor: Report of 3 Cases

Neuroendocrine tumors (NET) arise from the diffuse neuroendocrine system in the gastrointestinal tract, bronchopulmonary system, and the urogenital tract. Generically these tumors have been referred to as carcinoid tumors, but more recent scientific evaluation introduced by the World Health Organization has reclassified them as NET based on size, proliferative rate, localization, differentiation, and hormone production. Neuroendocrine tumors can be a low-grade malignancy (carcinoid tumor) or a more aggressive variant. This tumor rarely metastasizes to the ocular region. However, when this does occur, gastrointestinal NET typically spreads to the orbit, whereas bronchial NET classically metastasizes to the choroid.2

Ocular ultrasonography is important in differentiating carcinoid metastasis from amelanotic melanoma in that metastasis is usually echogenic while melanoma is typically echolucent.3,4 Occasionally, melanoma can also show intraleisional cavitation, a feature not previously described with metastases. In this article, we describe a new observation of cavitation within biopsy-proven NET (carcoid) metastasis in 3 cases.

Report of Cases. Case 1. A 59-year-old, asymptomatic, healthy woman was found to have an amelanotic choroidal mass in her left eye on routine examination. Visual acuity measured 20/20 OU. The mass measured 4 × 4 × 2 mm. Ocular ultrasound showed medium acoustic hollowness and medium internal reflectivity. The lesion remained stable for 4 years but then showed growth to 16 × 15 × 8 mm. (Figure, A) Two new, smaller tumors were also noted. On ocular ultrasonography, the main lesion was acoustically solid, with a well-defined, acoustically hollow cavity occupying approximately 40% of the mass (Figure, B). The diagnosis was multiple choroidal metastases, the largest with cavitation. Systemic evaluation revealed biopsy-proven primary bronchial NET with clinical features of carcinoid syndrome. Plaque radiotherapy was performed. Thirteen months after therapy, the patient died of systemic complications of metastatic NET.

Case 2. A 77-year-old woman with breast cancer developed blurred vision in the right eye and was found to have an amelanotic choroidal mass, presumed to represent breast cancer metastasis. Her visual acuity was 20/50 OD and 20/20 OS. The mass measured 12 × 12 × 7 mm and showed associated subretinal fluid (Figure, C). B-scan ultrasonography revealed an echogenic mass with an acoustically hollow cavity occupying 30% of the mass (Figure, D). Fine-needle aspiration biopsy revealed an NET with morphology and immunocytochemical staining (positive AE1/AE3, EMA, chromogranin, synaptophysin and negative HMB45, Melan A, CD45) suggestive of carcinoid tumor. Systemic evaluation found a primary tumor in the lung and possible liver metastases. Plaque radiotherapy was performed, and the tumor regressed to 2.6 mm on the last follow-up visit 4 months later. The liver neuroendocrine metastases were later confirmed by biopsy and the patient started receiving chemotherapy.

Case 3. A 77-year-old woman with a 4-year history of nonproductive cough had a 4-month history of progressive blurred vision in the left eye. Her visual acuity was 20/20 OD, and hand motions OS. Fundus examination showed 2 subtle, amelanotic, acoustically solid choroidal masses on the right eye located along the inferotemporal arcade measuring 3 × 1.5 × 1.5 mm and 1 × 1 × 0.5 mm with no associated subretinal fluid. In the left eye, there was a solitary amelanotic mass measuring 13 × 12 × 0.4 mm with serous retinal detachment. (Figure, E) On ultrasonography, the acoustically solid mass displayed a hollow central cavity occupying 20% of the mass. (Figure, F) Fine-needle biopsy disclosed pleomorphic cells more consistent with melanoma than metastasis. Therapeutic options included radiotherapy or enucleation, and the patient preferred enucleation of the left eye. Gross examination of the enucleated eye showed a tan choroidal mass with overlying shallow retinal detachment. Microscopic analysis of the lesion (previously described5) showed a malignant neoplasm with pigmented dendritic cells with slender processes and a fluid-filled, intraleisional cavity without an endothelial lining. There was no area of necrosis, hemorrhage, or inflammation surrounding the cystic cavity. There was no sign of trauma from the needle biopsy inducing the cavity. Immunohistochemical staining of the mass showed immunoreactivity for cytokeratin markers (CAM 5.2, AE1), calcitonin, chromogranin, and synaptophysin, features that were indicative of a metastatic NET. Results of immunoreactivity testing for melanoma marker HMB45, as well as S100, vimentin, and breast carcinoma markers were negative. Systemic evaluation revealed a lung nodule on the right middle lobe with positive immunoreactivity to AE1, calcitonin, chromogranin, and synaptophysin, consistent with NET.3 On the last follow-up visit at 22 months, her visual acuity remained unchanged in the right eye and the choroidal metastases were stable.

Comment. Cavitation of an intraocular tumor has been documented with uveal melanoma, ciliary body melanocytoma, and retinoblastoma.5-12 Cavitary melanoma can show unifocal or multifocal cavities, some of which occupy up to 90% of the tumor.8 The origin of intratumoral cavities is speculated to be the result of tumor necrosis, intraleisional hemorrhage or accumulation of mucoproteaceous substance.7,8
With retinoblastoma, intratumoral cavities are suggestive of well-differentiated retinoblastoma that show minimal response to chemotherapy and radiotherapy.6

The differentiation of a choroidal metastasis from amelanotic melanoma depends on several clinical features as well as diagnostic testing with fluorescein angiography and ultrasonography.2-4 It is well established that most metastatic tumors appear echodense on B-scan and show medium to high internal reflectivity on A-scan ultrasonography.2-4 Melanoma tends to be echolucent on B-scan and show low internal reflectivity on A-scan ultrasonography.2-4 Until now, cavitation within a choroidal lesion was most suggestive of a melanoma. In this study, we found cavitation within 3 choroidal metastases, all of which proved to be large NET from primary site in the lung. Based on this finding, patients who present with a cavitory amelanotic choroidal mass should have systemic evaluation for a primary cancer and possible confirmation with fine-needle aspiration biopsy of the intraocular tumor, as large choroidal metastases as well as melanoma can show cavitation.

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External examination (B.N.W.) revealed an approximately 1-cm mass just inferior and lateral to the left medial canthus (Figure 1A). The overlying skin was erythematous and the lesion firm. The right medial canthus was minimally erythematous, but without mass. The remaining anterior segment and retinal examinations were normal bilaterally.

The patient underwent a left nasolacrimal probing and irrigation in the office with topical anesthetic. Copious yellow-white material was expressed via the lower punctum when the No. 0 Bowman probe was passed into the lacrimal sac and then into the nasolacrimal duct. No attempt was made to accomplish intranasal “metal-on-metal” contact. The lacrimal system was irrigated with normal saline. The patient was prescribed moxifloxacin and tobramycin/dexamethasone drops, administered each alternating hour while awake. The parents were instructed to perform nasolacrimal sac massage.

One day later, the parents reported discharge from both eyes. Massage and eye drop administration were continued. Five days later, examination revealed a new right dacryocele without infection but with persistent discharge bilaterally (Figure 1B). The child was afebrile and feeding well. Office right nasolacrimal probing and irrigation was performed, again producing copious discharge. One day later, the right dacryocele had recurred. Gentle massage failed to decompress the dacryocele. Repeated office probing and irrigation was performed. The next day, the dacryocele returned. There was persistent discharge from the left eye, despite apparent resolution of the left dacryocele.

The patient was hospitalized, where probing and irrigation were performed under general anesthesia. Intranasal endoscopy revealed bilateral intranasal cysts (Figure 2), which were excised. All symptoms were resolved on follow-up examination 1 month later.

Case 2. An otherwise healthy, full-term, 2-day-old baby was observed to have swelling of the left lower eyelid medially. The parents reported “yellow pus” draining from the left eye since 4 days of age, which then stopped at 10 days of age. Subsequently, the left lower eyelid swelling became firm and developed surrounding erythema. Oral amoxicillin was prescribed by the pediatrician. On initial examination by Ophthalmology (B.M.S.) at 12 days old, a firm, erythematous, cystlike lesion inferior and lateral to the medial canthus, causing an upward distortion of the eyelid margin, (Figure 3A) consistent with an infected dacryocele was seen.

Attempted decompression by moderate pressure failed. The lacrimal system was probed into the lacrimal sac without passing the probe down the nasolacrimal duct. Copious greenish-yellowish material drained. The parents were instructed to continue lacrimal sac compression and oral antibiotics. Two days later, the dacryocele was decreased in size and the erythema resolved. Compression by the ophthalmologist yielded approximately 2 to 3 mL of discharge and the dacryocele decompressed. Subsequently, the dacryocele recurred.

At 29 days old, the patient underwent left nasolacrimal probing and intranasal cyst excision with intranasal endoscopy under general anesthesia for a persistent dacryocele. Immediately after probing and cyst excision, the dacryocele resolved and did not recur.

At 40 days old, discharge was first noted from the right eye. At 61 days old, a firm swelling was found just inferolateral to the medial canthus.

Sequential Bilateral Dacryocele

Dacryoceles, also known as lacrimal sac mucocele, amniocoele, amniocyst, or dacryocystocele, are a rare form of congenital nasolacrimal duct obstruction with both proximal and distal obstruction resulting in lacrimal sac enlargement. Usually presenting at birth, there is significant risk for infection. Probing and excision of an associated intranasal cyst under general anesthesia may be needed. We present 2 infants who underwent probing for a unilateral dacryocele who subsequently developed a dacryocele on the unaffected side. We suggest that if a unilateral dacryocele is probed under general anesthesia it may be prudent to evaluate the contralateral side, even if asymptomatic. Probing and excision of an intranasal cyst, if present on the asymptomatic side, may prevent development of a dacryocele and a second anesthesia.

Report of Cases. Case 1. An otherwise well, full-term, 6-day-old girl was referred for evaluation of a purple mass present since birth near the left medial canthus. The parents noted yellowish discharge from both eyes. She was feeding well without dyspnea.

Figure 1. Case 1, A, Newborn female with initial presentation of a left dacryocele with minimal redness on the right. B, Sequential right dacryocele days later, after successful probing and irrigation of the left lacrimal system.