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Adenoid cystic carcinoma presenting as an orbital apex mass with intracranial extension

Adenoid cystic carcinoma (ACC) is an uncommon epithelial neoplasm that usually originates from the salivary glands of the head and neck, but it has been reported in other areas of the body as well.[1,2] ACC is an aggressive malignancy with high rate of recurrence, distant metastasis, and intracranial extension.[3] Within the orbit, ACC typically presents as a superotemporal orbital mass of lacrimal gland origin, as the lacrimal gland is the only source of epithelial cells in the orbits.[4] Rare cases of tumours developing in the lacrimal sac or other areas of the orbit from ectopic lacrimal gland tissue have been reported.[4–8] To our knowledge, there have been only 3 reported cases of ACC arising as a primary orbital tumour without lacrimal gland involvement.[3,9,10] The authors would like to report another case of primary orbital apex tumour with a subsequent histopathologic diagnosis of ACC without pathological evidence of lacrimal gland involvement.

A 70-year-old female presented with a 5-month history of left-sided facial numbness in the infraorbital nerve region and progressive visual loss of the left eye with intermittent sharp facial and periorbital pain. The patient's medical history was significant for asthma, hypothyroidism, and hypertension. There was no history of sinonasal, eyelid, or conjunctival lesions. Her surgical history included a remote history of tonsillectomy and cholecystectomy.

On examination, visual acuity was 20/20 OD and no light perception OS. There was a dense left afferent pupillary defect. Extraocular movement was severely restricted in all directions of gaze. There was evidence of globe displacement with approximately 3 mm of left proptosis.

A computed tomography (CT) scan of the head and orbits demonstrated a left optic apex mass encasing the optic nerve and extraocular muscles without evidence of sinus involvement. The CT scan also demonstrated extension into the left pterygopalatine fossa and left superior and inferior orbital fissures, as well as erosion of the anteroinferior squamous temporal bone. A subsequent magnetic resonance imaging (MRI) scan of the head and orbits was obtained, demonstrating the perineural spread of the soft tissue mass into the pterygopalatine fossa along the maxillary division of the left trigeminal nerve into the cavernous sinus. There was also signal abnormality within

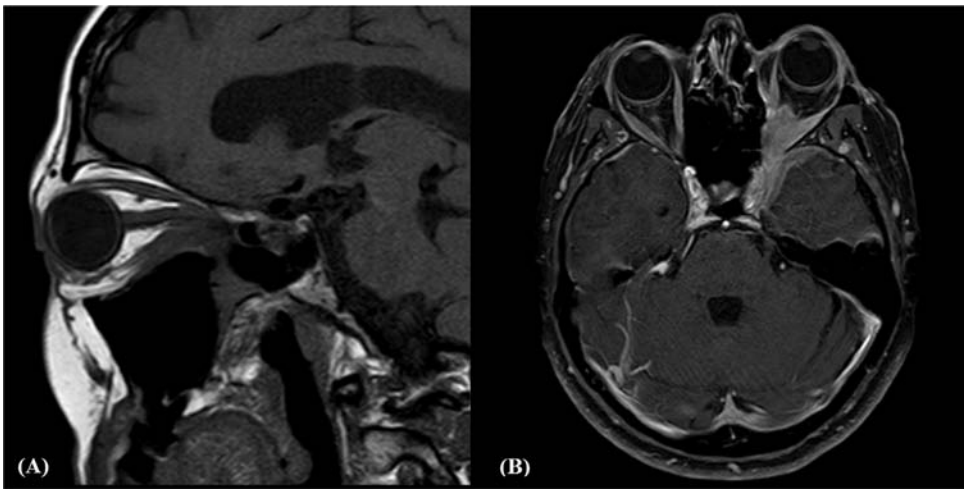

Fig. 1—Magnetic resonance imaging of brain and orbits. Irregular infiltrative lesion in the left orbital apex with extension into the left cavernous sinus and left anterior temporal lobe extra-axial space seen on (A) saggital cut on T1 and (B) axial cut on T1 with gadolinium.

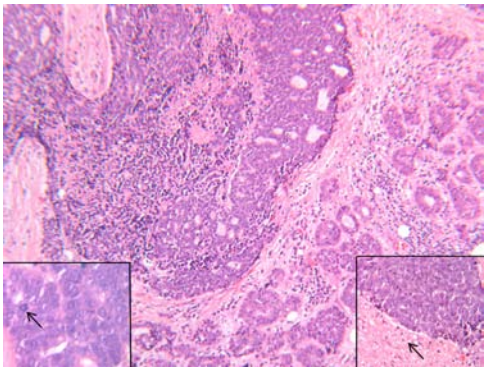

Fig. 2—Photomicrographs showing lobules of tumour cells separated by fibrovascular septa. Evidence of mucin production was present (hematoxylin and eosin stain, original magnification ×50). Left inset: higher magnification showing mitotic figure (arrow). Right inset: the tumour showed presence of neuronal invasion (arrow).

the left anteroinferior temporal lobe, which raised the possibility of brain invasion (Fig. 1).

Given the location of the mass, the patient was referred to otolaryngology for diagnostic biopsy and therapeutic decompression of the orbit. Endoscopic biopsy was successfully performed with the LandmarX image guidance system Medtronic (Dublin, Ireland). At the time of biopsy, no evidence of sinus invasion or primary nasal malignancy was noted. The tissue was submitted for frozen section, cytogenetic testing, and flow cytometry analysis. Histopathology found the tumour to be consistent with intermediate-grade ACC (Fig. 2). A metastatic workup was negative without any evidence of distant metastases on positron emission tomography (PET) scan.

To achieve adequate pain control, a lid-sparing left orbital exenteration was performed. The exenteration specimen demonstrated lymphovascular and perineural infiltration of intermediate-grade ACC along the optic nerve. The tumour infiltration did not involve other globe structures or the lacrimal gland. Subsequently, palliative radiation to the left orbital cavity was applied. The patient received 6000 cGY in 30 fractions over the course of 6 weeks. At 6-, 12-, and 18-month follow-ups, the patient remained pain-free and without clinical or radiographic evidence of near or distant metastasis.

ACCs are rare malignant epithelial tumours of the exocrine glands, accounting for less than 2% of head and neck malignancies[1,11] and approximately 1% of orbital tumors.[12] ACCs often have prolonged history, insidious growth, and late diagnosis, with indolent recurrence and distant hematogenous metastasis. The prognosis is often poor because the tumour can recur and metastasize by spreading submucosally and throughout major and minor nerves.[11]

The patient presented in this report had a very unusual presentation of ACC over the orbital apex without alternative primary source identified. Because of the presence of epithelial tissues, the vast majority of ACCs of the orbit arise from the lacrimal glands, and the most common orbital presentation of ACC is a palpable mass in the superior temporal quadrant.[4,10]

Primary orbital ACC without lacrimal gland involvement is rare. Shields et al.[4] reported a case of ACC in the anteronasal region of the orbit without bone erosion in a 26-year-old male, and the authors postulated that the ACC arose from ectopic lacrimal gland tissue within the medial orbit. To date, there have been only 3 cases of primary ACC orbital tumour without evidence of lacrimal tissue involvement. Venkitaraman et al.[10] described a case of ACC in the orbital apex with intracranial extension without evidence of lacrimal tissue involvement in a 51-year-old male. Lin et al.[9] presented a case of ACC in a 60-year-old female in the inferior orbit involving the inferior rectus muscle and without evidence of lacrimal tissue involvement. Walsh et al.[3] reported a case of ACC invading the orbital apex and cavernous sinus without evidence of lacrimal tissue involvement in a 53-year-old female.

It is also possible for ACC to arise outside of the orbit with secondarily orbital apex or orbit involvement through perineural spread of the tumour. For example, Arsene et al.[13] presented a case of a 55-year-old female who presented with ACC over the anterior skull base with invasion into bilateral cavernous sinuses and right orbit but without ACC involvement of the lacrimal gland. In the case presented here, multiple imaging modalities, including CT, MRI, and PET, failed to identify other possible primary tumour sites. Also, longer-term follow-up has not revealed any alternative local or distant sources, thus suggesting that orbital apex is likely the primary site of the ACC.

In the literature, there is a lack of consensus on the optimal treatment of orbital ACC,[3] partly because of the rarity of the condition. The conventional therapies typically include surgical resection and postoperative radiation.[7] However, because of lacrimal gland ACC's propensity toward infiltration of surrounding structures, retrograde perineural extension, and hematogenous and lymphatic spread, combinations of conventional treatment modalities have not produced stepwise incremental improvements in treatment outcome.[7] Other treatments have been reported, including plaque radiotherapy[14] and intra-arterial cytoreductive chemotherapy (IACC).[15] In a retrospective case series, Tse et al.[7] demonstrated the potential for neoadjuvant IACC in improving survival and decreasing disease recurrence for those patients with favourable anatomy. However, it is important to note that neoadjuvant IACC is designed for the treatment of ACC involving the lacrimal gland and relies on an intact lacrimal artery for favourable outcomes. For primary orbital ACC without evidence of lacrimal tissue involvement, the effectiveness of IACC remains unknown. For ACC with skull base involvement, proton beam radiation therapy has emerged as a promising treatment option. Proton beam radiation allows larger radiation doses

to be delivered to tumour tissue while significantly lowering the dose to surrounding healthy tissues.[16] Although it has demonstrated encouraging rates of local tumour control, the lack of wide-spread availability and long-term data limit its clinical use at the present time.[16,17]

Although exceedingly rare, here we present another case of ACC as a primary orbital apex tumour in the absence of lacrimal gland involvement. Given the aggressive nature of ACC, it is paramount for clinicians to include ACC in their differential diagnoses when evaluating orbital apex tumours, even without signs of lacrimal gland involvement.

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Intraocular adenocarcinoma: histopathological report of two cases with different origin

Acquired malignant tumours that involve nonpigmented ciliary body epithelium (NPCE) and retinal pigment epithelium (RPE) such as adenocarcinoma are extremely rare. Most of the histopathological changes that involve these structures are benign lesions such as adenoma, congenital hypertrophy of retinal pigment epithelium (CHRPE), and reactive hyperplasia. Although some of the benign lesions—especially CHRPE—are believed to enlarge slowly over long time, malignant changes within NPCE and RPE are extremely rare. Herein we report 2 cases of intraocular adenocarcinoma, one arising from RPE and the other from NPCE, with a description of their clinical presentation and histopathological features.

A 31-year-old male presented with a few months' history of a painful left eye, which was blind after trauma by a stick resulting in loss of vision at the age of 5 years. Visual acuity on the left was no light perception, and the intraocular pressure was 15 mm Hg. The conjunctiva was mildly injected, and the cornea showed band keratopathy with keratic precipitates that did not permit proper evaluation of the fundus (Fig. 1A). Ultrasonography revealed shrinkage of the globe, ocular wall calcification, and dense vitreous opacities. Evisceration specimen showed pleomorphic tumour cells arranged in nests as well as focal tubular and acinar patterns, separated by fine septae and invading the heterotopic bone (Fig. 1B, C). Some cells showed intracytoplasmic vacuoles. Immunohistochemical (IHC) staining showed positivity with cytokeratin AE1/AE3 (Fig. 2D), neuron-specific enolase, vimentin, CK8-18, CK19, and CK20. However, the tumour cells were negative with S-100 stain as well as melanocytic markers (HMB45 and Melan-A). A diagnosis of intraocular adenocarcinoma presumably arising from the RPE was made. Systemic workup of the brain, chest, abdomen, and pelvis did not