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## **MR in squamous cell carcinoma of the lacrimal sac.**

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*AJNR Am J Neuroradiol* 1995, 16 (6) 1262-1264

<http://www.ajnr.org/content/16/6/1262>

This information is current as  
of April 17, 2024.

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## MR in Squamous Cell Carcinoma of the Lacrimal Sac

Sandeep R. N. Rahangdale, Mauricio Castillo, and William Shockley

**Summary:** A case of squamous cell carcinoma arising from the right lacrimal sac is presented. MR T2-weighted images showed a mass of low signal intensity in the right medial canthus extending into the nasolacrimal duct. This led us to postulate a high-grade malignant neoplasm arising in the lacrimal sac.

**Index terms:** Carcinoma; Eyes, neoplasms

The lacrimal sac is a membranous structure that derives embryologically from ectoderm. It serves as a temporary reservoir for the collection of tears before transmitting them into the nasolacrimal duct and ultimately into the nose. The normal lacrimal sac is a small structure (11 × 2 × 4 mm [length × depth × width]) (1) and, therefore, not commonly seen by either computed tomography or magnetic resonance (MR). It lies in the lacrimal fossa, and posteriorly it is separated from the orbit by the orbital septum (periosteum and check ligament of the medial rectus). The lacrimal sac may be involved by inflammatory (or infectious) processes that give origin to acute or chronic dacryocystitis. Malignant neoplasms, which occasionally arise in the lacrimal sac, include squamous cell carcinoma, adenoid cystic carcinoma, adenocarcinoma, and mucoepidermoid carcinoma (2–7). The lacrimal sac may also be involved secondarily by tumors arising in skin, eyelids, paranasal sinuses, and metastases. A high index of clinical suspicion is needed to make the correct diagnosis. In the majority of cases the initial diagnosis is dacryocystitis, only to find later underlying malignancy. We present the MR imaging features in a case of squamous cell carcinoma of the lacrimal sac.

### Case Report

A 48-year-old man presented with a painless mass in the right medial orbital canthus that had increased gradu-

ally in size over a 5-month period. Initially, the patient consulted an outside physician, who made the diagnosis of dacryocystitis and prescribed short-term antibiotics with minimal relief. Physical examination revealed a 1.5-cm mass in the right medial canthus. The overlying skin was erythematous, and the patient had pain referable to the ipsilateral inferior orbital rim and maxilla. MR imaging was performed and showed a well-defined preseptal mass in the right medial orbit that extended to the anterior ethmoid air cells on the same side. The mass extended into the proximal nasolacrimal duct. On T1-weighted images, the lesion was isointense to normal brain and enhanced moderately and inhomogeneously after contrast administration (Fig 1A–C). On proton density-weighted images, the tumor was isointense to normal muscle, but on T2-weighted sequences, it was of low signal intensity (Fig 1D and E). Open biopsy revealed moderately differentiated squamous cell carcinoma, and the patient received 50 Gy to the right orbit followed by orbital exenteration, lateral rhinostomy, and a radical right maxillectomy. A 2-year follow-up showed the patient to be free of disease.

### Discussion

Squamous cell carcinoma of the lacrimal sac is rare, with a few cases reported in the literature (2–8). In two large series, 14% of all lacrimal sac tumors were squamous cell carcinomas (3, 4). Squamous cell carcinoma of the lacrimal sac occurs with equal frequency in both sexes and peaks during the fifth decade of life. The majority of patients present with nonspecific signs and symptoms that include a palpable mass in the medial orbital canthus and epiphora (abnormal overflow of tears). However, patients may also have chronic dacryocystitis that irrigates freely, regurgitation of blood-stained tears, or epistaxis. These symptoms should raise the possibility of underlying malignancy. The paranasal sinuses should be examined, because carcinomas from the maxilloethmoid

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Received December 7, 1993; accepted after revision April 7, 1994.

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AJNR 16:1262–1264, Jun 1995 0195-6108/95/1606–1262 © American Society of Neuroradiology

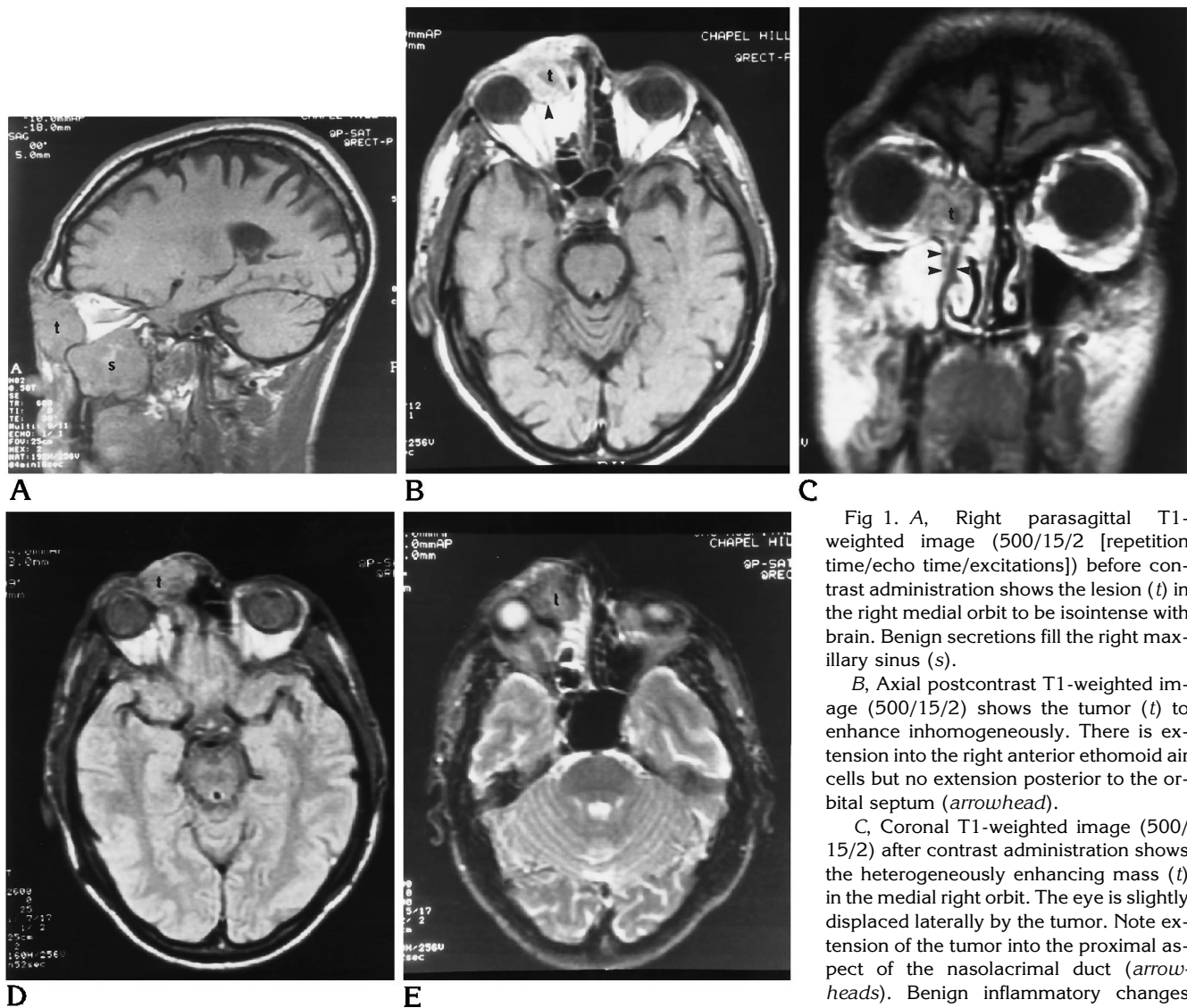


Fig 1. A, Right parasagittal T1-weighted image (500/15/2 [repetition time/echo time/excitations]) before contrast administration shows the lesion (*t*) in the right medial orbit to be isointense with brain. Benign secretions fill the right maxillary sinus (*s*).

B, Axial postcontrast T1-weighted image (500/15/2) shows the tumor (*t*) to enhance inhomogeneously. There is extension into the right anterior ethmoid air cells but no extension posterior to the orbital septum (*arrowhead*).

C, Coronal T1-weighted image (500/15/2) after contrast administration shows the heterogeneously enhancing mass (*t*) in the medial right orbit. The eye is slightly displaced laterally by the tumor. Note extension of the tumor into the proximal aspect of the nasolacrimal duct (*arrowheads*). Benign inflammatory changes (surgically proved) are present in the right maxillary sinus.

D, Axial proton density-weighted image (2600/25/1) shows the tumor (*t*) to be of intermediate signal intensity similar to white matter.

E, Axial T2-weighted image (2500/90/1) at the same level as D shows that the mass (*t*) is of low signal intensity and clearly separable from the benign secretions in the ipsilateral middle and posterior ethmoid air cells.

complex may also present as medial canthus masses.

Squamous cell carcinoma of the lacrimal sac spreads mainly by direct invasion of the orbit, paranasal sinuses, and cranium. Metastases to lymph nodes are late occurrences and generally involve the preauricular, submandibular, jugulodigastric, and cervical nodes. If the tumor is localized to the orbit at diagnosis, complete surgical excision before and/or after radiation therapy offers the best chance for survival.

In adults, the differential diagnoses of masses occurring in the medial orbital canthus include

mainly inflammatory lesions and tumors (9). Dacryocystitis (dilatation and inflammation of the lacrimal apparatus) is usually accompanied by signs of periorbital inflammation (9). Pseudotumor may occasionally present as a painful and isolated mass in the medial canthus. Characteristically, pseudotumor is of low signal intensity on T2-weighted MR images (true inflammation is of high signal intensity on long-repetition-time/long-echo-time sequences) (9). Anterior ethmoidal mucocèles may also present as medial canthus lesions. MR or computed tomography readily discloses the site of origin,

benign bone expansion, and a rim of enhancing mucosa, all of which suggest a benign process. Sarcoidosis involving the lacrimal sac is rare and is clinically and radiographically indistinguishable from other lesions (9). The most common primary tumors of the lacrimal sac include squamous cell, transitional, and mucoepidermoid carcinomas. Melanoma, lymphoma, and various metastases have also been reported (9). Primary tumors of the sinonasal cavities may also occasionally present initially as masses in the medial canthi.

In cases of lacrimal sac tumors, plain films may show bone erosion of the lacrimal fossa and/or calcifications. However, in most cases plain films are normal. On dacryocystography, complete occlusion and/or presence of an irregular intraluminal mass suggests a neoplasm. On computed tomography, most neoplasms are solid, whereas abscesses may show central low density and adjacent inflammatory changes. Computed tomography also demonstrates bone erosion (9). MR imaging may be used to detect subtle bone marrow invasion caused by lesions extending well beyond the confines of the medial canthus, to distinguish the lesion from adjacent retained secretions, and to assess intracranial or perineural tumor extension.

In our case, the initial clinical diagnosis was dacryocystitis. As is typical in patients with malignancies of the lacrimal sac, antibiotic treatment resulted in only minimal improvement. MR imaging showed a lesion in the medial canthus of the right orbit. The exact site of origin of the tumor was suggested based on the extension of the lesion into the proximal nasolacrimal duct (Fig 1C). Despite enhancement after contrast administration, T2-weighted images showed that the lesion was of relatively low signal intensity (Fig 1B-E). The absence of pain made the possibility of orbital pseudotumor less likely. Low signal intensity on T2-weighted se-

quences, as seen in our case, may also be seen with orbital lymphomas or pseudotumors (9). Some high-grade malignancies arising from other glands, particularly the parotid gland, may also show low signal intensity on long-repetition-time/long-echo-time sequences (10). In the parotid gland, this low signal intensity on T2-weighted images is thought to reflect the high mitotic ratio and the high nuclear-to-cytoplasm ratios found in high-grade malignant neoplasms (10).

In summary, MR not only delineated the exact origin of the lacrimal sac tumor, but also suggested malignancy based on its low signal intensity on T2-weighted images.

## References

1. Malik SRK, Gupta AK, Chatterjee S, Bhardwaj OP, Saha M. Dacryocystography of normal and pathological lacrimal passages. *Br J Ophthalmol* 1969;53:174-179
2. Duke-Elder WS. Tumours of the lacrimal passages. In: Duke-Elder WS, ed. *System of Ophthalmology*. St Louis: CV Mosby, 1974;XIII:738-759
3. Ryan SJ, Font RL. Primary epithelial neoplasms of the lacrimal sac. *Am J Ophthalmol* 1973;76:73-88
4. Ni C, D'Amico DJ, Fan CQ, Kuo PK. Tumors of the lacrimal sac: a clinicopathological analysis of 82 cases. *Int Ophthalmol Clin* 1982;22:121-140
5. Flanagan JC, Stokes DP. Lacrimal sac tumors. *Ophthalmology* 1978;85:1282-1287
6. Schenck NL, Ogura JH, Pratt LL. Cancer of the lacrimal sac: presentation of five cases and review of the literature. *Ann Otol Rhinol Laryngol* 1973;82:153-161
7. Stephenson NL, Ogura JH, Pratt LL. Cancer of the lacrimal sac: presentation of five cases and review of the literature. *Ann Otol Rhinol Laryngol* 1973;82:153-161
8. Russell EJ, Czervionke L, Huckman M, Daniels D, McLachlan D. CT of the inferomedial orbit and lacrimal drainage apparatus: normal and pathologic anatomy. *AJNR Am J Neuroradiol* 1985; 6:759-766
9. Friedman DP, Rao VM, Flanders AE. Lesions causing a mass in the medial canthus of the orbit: CT and MR features. *AJR Am J Roentgenol* 1993;160:1095-1099
10. Som PM, Biller HF. High-grade malignancies of the parotid gland: identification with MR imaging. *Radiology* 1989;173:823-826