Lacrimal Sac Lymphoma in a Child

The 3 most common cancers in children in the United States include leukemia (33%), brain tumors (20%), and non-Hodgkin lymphoma (10%).1 Non-Hodgkin lymphoma in children most commonly manifests in the abdomen (35%), anterior mediastinum (26%), and peripheral lymph nodes (19%). Less than 5% of such cases occur initially in the orbit.2 In a review of 250 pediatric orbital tumors, Shields and coworkers3 found 6 cases (2.4%) of orbital lymphoma, none of which were in the lacrimal sac. Using a MEDLINE search of the English language literature from 1970 to 2002, we identified 21 reported cases of primary non-Hodgkin lymphoma of the lacrimal sac,4-13 and only 1 patient was younger than 18 years.4 We report a case of a primary non-Hodgkin lymphoma of the lacrimal sac in a 10-year-old child.

Report of a Case. A 10-year-old otherwise healthy Hispanic male had a 3-week history of painful swelling and epiphora in the left medial canthus (Figure 1). He recalled blunt trauma to the right side of his forehead 3 months earlier. On examination, his visual acuity was 20/25 OD and 20/30 OS. The only ocular abnormality was a firm, tender mass in the left lacrimal sac region straddling the medial canthal ligament and fixed to the orbital rim. There were no secretions from the lacrimal punctum, and epiphora without blood was noted. Lacrimal sac ultrasonography disclosed an acoustically hollow subcutaneous mass measuring 11 mm in base and 18 mm in height, consistent with a cystic mass (Figure 2). Orbital computed tomography revealed a solid mass involving the left lacrimal sac region, with associated effacement of the lacrimal sac fossa and bone remodeling (Figure 3). Based on these findings, the lesion was suspected to be a lacrimal sac cyst obstructing the nasolacrimal duct. Surgical repair revealed a firm, distended lacrimal sac. The opened sac disclosed a pink, solid mass conforming to the sac wall, and complete dacrocystectomy was performed.

Histopathologic examination showed an intense diffuse infiltrate of atypical lymphocytes, consistent with extranodal marginal B-cell lymphoma of the mucosa-associated lymphoid tissue type in the stroma of the lacrimal sac (Figure 4). The infiltrate lacked germinal centers and contained prominent foci of monocytoid lymphocytes (Figure 5). The malignant cells expressed B-cell–specific antigens (CD20, CD79A) and coexpressed T-cell marker CD43 but lacked other T-cell–specific antigens (CD3, CD5). Polymerase chain reaction performed on paraffin-embedded tissue disclosed a clonal rearrangement of immunoglobulin heavy-chain genes.

Systemic evaluation revealed no findings of lymphoma. The patient was then treated with 2 cycles of chemotherapy, consisting of vincristine, cyclophosphamide, doxorubicin, and prednisone. Thirty months after diagnosis, he remains alive with no evidence of disease clinically or radiographically. He has no treatment-related complications and no persistent epiphora.

Comment. Nasolacrimal disorders are common in young children. Primary congenital nasolacrimal duct obstruction is the most frequent disorder of the lacrimal system, occurring in approximately 5% of all newborns. In infants, the obstruction is usually secondary to incomplete canalization of the valve of Hasner in the lower nasolacrimal duct.14 Secondary acquired nasolacrimal duct obstruction can also occur in children owing to infectious, inflammatory, traumatic, or mechanical causes.6 However, secondary infections or inflammatory causes most
frequently accompany congenital nonpatent nasolacrimal systems. Nontraumatic spontaneous nasolacrimal duct obstruction in older children, as in our 10-year-old patient, is distinctly unusual.

Neoplasms of the lacrimal sac are uncommon, especially in children. They include epithelial (75%) and nonepithelial (25%) tumors, such as mesenchymal tumors (12%), melanoma (5%), and malignant lymphomas (<6%). The lacrimal sac may also be involved secondarily in patients with leukemia, particularly older patients with chronic lymphocytic leukemia. In a review by the Armed Forces Institute of Pathology, of 35 nonepithelial tumors of the lacrimal sac, 8 patients (23%) had malignant lymphoma of the lacrimal sac. The median age of these patients was 64 years, and the youngest patient was 39 years old.

Lymphoma in the periorbital region generally originates in the conjunctiva or orbit. Lymphoma of the lacrimal sac, however, is unusual. Twenty-one cases of primary lymphoma of the lacrimal sac have been reported during the past 30 years (Table). The median age at onset was 51 years, and only 1 case occurred in a child, similar to our case. The most common initial manifestations in these cases were epiphora and painless swelling of the lacrimal sac area (Table 1). The mean duration of epiphora prior to diagnosis was 9 months, and the mean duration of swelling was 2 months. Our case differed in that our patient had acute signs and symptoms, including pain, of 3 weeks’ duration.

Imaging studies, such as computed tomography or magnetic resonance imaging, can be helpful in the diagnosis of lacrimal sac lymphoma. In 9 reported cases, imaging was performed, and an isodense homogeneous mass was found. Six patients (66%) demonstrated effacement of the lacrimal sac fossa and/or erosion of the medial orbital wall (Table 1). In our case, computed tomography showed a solid mass, and ultrasonography misinterpreted it as a hollow mass, owing to the homogeneous density of the compact lymphoma. Erickson et al. found magnetic resonance imaging to be superior to computed tomography for imaging tumors of the lacrimal sac, as magnetic resonance imaging provided better tumor definition and determination of the cystic or solid nature of the mass.

The management of lacrimal sac lymphoma remains controversial. In the 22 reported cases, all patients underwent incisional biop-

Figure 3. Computed tomography of the left orbit demonstrates the solid, noncalcified lacrimal sac mass (arrow) with associated effacement of the lacrimal sac fossa and bone remodeling.

Figure 4. Diffuse infiltrate of lymphoid cell compresses the lumen of the lacrimal sac (hematoxylin-eosin, original magnification ×25).

Figure 5. Monomorphic population of lymphocytes comprising infiltrate has a monocytoid appearance consistent with mucosa-associated lymphoid tissue lymphoma (hematoxylin-eosin, original magnification ×250).
sies, and the most common treatment was external beam radiation, either alone (5 patients) or in combination with systemic chemotherapy (4 patients) or excisional biopsy (1 patient). Two patients (cases 5 and 20), and our patient (case 22), received excisional biopsy and systemic chemotherapy, with no external beam radiation treatment. Overall, the patients' prognoses were favorable, with 11 (85%) of 13 patients free of local recurrence and systemic disease at a mean of 24 months' follow-up. Because the clinical course of lymphoma is lengthy and indolent, our patient will require long-term follow-up. Four of the 9 patients who received external beam radiation developed postirradiation stenosis of the nasolacrimal duct, and 2 required dacrocystorhinostomy.4,8,9 One advantage of systemic chemotherapy alone may be avoidance of this complication, as demonstrated in our case.

In summary, we report an unusual case of a child with a lacrimal sac tumor that proved histopathologically to represent a non-Hodgkin B-cell lymphoma. We advise that older children with nontraumatic nasolacrimal duct obstruction undergo imaging studies of the lacrimal sac to rule out a solid tumor. Pa-

### Published Cases of Biopsy-Proven Primary Lymphoma of the Lacrimal Sac

<table>
<thead>
<tr>
<th>Case</th>
<th>Source</th>
<th>Age, y</th>
<th>Sex</th>
<th>Symptoms (mo)</th>
<th>CT Findings</th>
<th>Histologic Findings</th>
<th>Phenotype</th>
<th>Treatment, Gy</th>
<th>Follow-up, (mo)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Carlin and Henderson</td>
<td>10</td>
<td>M</td>
<td>Epiphora (12); painless swelling (1)</td>
<td>CT not performed</td>
<td>Poorly differentiated</td>
<td>B-cell</td>
<td>EBRT, 3600</td>
<td>NED (11)</td>
</tr>
<tr>
<td>2</td>
<td>Jordan et al</td>
<td>63</td>
<td>F</td>
<td>Epiphora (1); painless swelling (1)</td>
<td>Sac enlarged, no bony erosion</td>
<td>Diffuse large</td>
<td>B-cell</td>
<td>EBRT</td>
<td>NED (30)</td>
</tr>
<tr>
<td>3</td>
<td>Bartley et al</td>
<td>76</td>
<td>F</td>
<td>Epiphora (12); painless swelling (3)</td>
<td>NA</td>
<td>Not performed</td>
<td>NA</td>
<td>EBRT</td>
<td>NED (6)</td>
</tr>
<tr>
<td>4</td>
<td>Khetarpal et al</td>
<td>82</td>
<td>F</td>
<td>Epiphora (7); painless swelling (1); nasal obstruction (1)</td>
<td>Soft tissue mass, orbital wall bowing</td>
<td>Diffuse large</td>
<td>B-cell</td>
<td>Systemic chemotherapy (8 cycles)*</td>
<td>NED (24)</td>
</tr>
<tr>
<td>5</td>
<td>Saccogna et al</td>
<td>21</td>
<td>M</td>
<td>Epiphora (7); painless swelling (1); nasal obstruction (1)</td>
<td>Soft tissue mass, orbital wall bowing</td>
<td>Diffuse large</td>
<td>B-cell</td>
<td>Systemic chemotherapy (8 cycles)*</td>
<td>NED (24)</td>
</tr>
<tr>
<td>6</td>
<td>Erickson et al</td>
<td>48</td>
<td>M</td>
<td>Epiphora (several mos); diplopia; recent</td>
<td>Homogeneous mass</td>
<td>Diffuse large</td>
<td>B-cell</td>
<td>EBRT, 46.8</td>
<td>NED (54)</td>
</tr>
<tr>
<td>7</td>
<td>Erickson et al</td>
<td>39</td>
<td>M</td>
<td>Epiphora (several mos); painless swelling (1.5)</td>
<td>Soft tissue mass with orbital wall erosion</td>
<td>Large cell</td>
<td>B-cell</td>
<td>EBRT, 3750; systemic chemotherapy (3 cycles)*</td>
<td>NED (30)</td>
</tr>
<tr>
<td>8</td>
<td>Erickson et al</td>
<td>68</td>
<td>M</td>
<td>Epiphora (2); painless swelling (2)</td>
<td>CT not performed; MRI: mass with bony erosion</td>
<td>Well-differentiated; small cleaved</td>
<td>B-cell</td>
<td>EBRT, 41.4</td>
<td>NED (36)</td>
</tr>
<tr>
<td>9</td>
<td>Erickson et al</td>
<td>66</td>
<td>M</td>
<td>Epiphora (48); painful swelling (several months)</td>
<td>Homogeneous mass, bony erosion</td>
<td>Diffuse large</td>
<td>B-cell</td>
<td>EBRT, 36</td>
<td>AWR (36)</td>
</tr>
<tr>
<td>10</td>
<td>Erickson et al</td>
<td>53</td>
<td>M</td>
<td>Epiphora (12); painless swelling (12)</td>
<td>Mass, no bony erosion</td>
<td>Large cell</td>
<td>B-cell</td>
<td>EBRT, 34.2; systemic chemotherapy (6 cycles)</td>
<td>NED (12)</td>
</tr>
<tr>
<td>11-18</td>
<td>Pe’er et al</td>
<td>39-73</td>
<td>5 M, 3 F</td>
<td>Not mentioned</td>
<td>Not mentioned</td>
<td>4 Diffuse large</td>
<td>B-cell</td>
<td>Not mentioned</td>
<td>Not mentioned</td>
</tr>
<tr>
<td>19</td>
<td>Nakamura et al</td>
<td>70</td>
<td>F</td>
<td>Epiphora (12); painless swelling (3)</td>
<td>Enhancing mass, bony erosion, dilated duct</td>
<td>Diffuse large</td>
<td>B-cell</td>
<td>EBRT, 50; systemic chemotherapy (1 cycle)*</td>
<td>NED (26)</td>
</tr>
<tr>
<td>20</td>
<td>El-Hakim and Nunez</td>
<td>35</td>
<td>F</td>
<td>Epiphora (6); pansinusitis</td>
<td>CT sinus: periosteal thickening, air-fluid level</td>
<td>High-grade</td>
<td>B-cell</td>
<td>Excision; systemic chemotherapy (6 cycles),* intrathecal methotrexate</td>
<td>NED (9)</td>
</tr>
<tr>
<td>21</td>
<td>Mori et al</td>
<td>55</td>
<td>F</td>
<td>Painless swelling</td>
<td>Homogeneous mass, no bone erosion</td>
<td>Natural-killer cell</td>
<td>B-cell</td>
<td>Systemic chemotherapy (6 cycles),* intrathecal cytarabine, methotrexate, prednisolone; EBRT</td>
<td>DOD</td>
</tr>
<tr>
<td>22</td>
<td>Schefler et al</td>
<td>10</td>
<td>M</td>
<td>Epiphora (1 week); painful swelling (3 weeks)</td>
<td>Effacement of the lacrimal sac fossa, bone remodeling</td>
<td>Marginal zone MALT type</td>
<td>B-cell</td>
<td>Excision; systemic chemotherapy (2 cycles); prednisone, vincristine, cyclophosphamide, doxorubicin</td>
<td>NED (30)</td>
</tr>
</tbody>
</table>

**Abbreviations:** AWR, alive with recurrence; CT, computed tomography; DOD, dead of disease; EBRT, external beam radiation therapy; MALT, mucosa-associated lymphoid tissue; MRI, magnetic resonance imaging; NA, not applicable; NED, no evidence of disease.

*Chemotherapy regimen: cyclophosphamide, Adriamycin, vincristine, and prednisone.
patients with this diagnosis appear to have a favorable prognosis with a variety of treatment approaches. Systemic chemotherapy rather than radiotherapy may avoid potential persistent epiphora due to radiation-induced lacrimal duct stenosis.

Amy C. Scheffer, MD
Carol L. Shields, MD
Jerry A. Shields, MD
Hakan Demirci, MD
Marlon Maus, MD
Ralph C. Eagle, Jr, MD
Philadelphia, Pa

This research was supported by the Paul Kaiser International Award of Merit in Retina Research (Dr J. Shields), the Rosenthal Award of the Macula Society (Dr C. Shields), the Noel T. and Sara L. Simonds Endowment for Ophthalmic Pathology, Wills Eye Hospital, Philadelphia, Pa (Dr Eagle), and the Eye Tumor Research Foundation, Philadelphia (Dr C. Shields).

The authors have no relevant financial interest in this article.

Corresponding author and reprints: Carol L. Shields, MD, Ocular Oncology Service, Wills Eye Hospital, 840 Walnut St, Philadelphia, PA 19107.


Topical Cyclosporin in the Treatment of Chronic Sarcoidosis of the Conjunctiva

Sarcoidosis is a multisystem, T-lymphocyte-mediated granulomatous inflammatory process of unknown cause. The clinical spectrum varies in severity from single-organ involvement and self-limiting disease to multisystem inflammation with potential mortality. The characteristic noncaseating granulomatous infiltrations can affect almost any tissue, including conjunctiva. The granulomatous inflammation of the conjunctivae in the form of conjunctival nodules resembling follicular conjunctivitis is a common initial finding. We describe a patient with chronic conjunctivitis who was subsequently diagnosed as having sarcoidosis and successfully treated with topical cyclosporin.

Report of a Case. A 58-year-old white woman was referred for further management of ocular rosacea and keratoconjunctivitis sicca, which had been refractory to treatment with multiple medications, including oral and topical doxycycline, 1% topical prednisolone acetate, 0.5% ketorolac tromethamine, 0.1% olopatadine hydrochloride, and preservative-free artificial tears for 7 months. Her ocular history was remarkable for primary open-angle glaucoma, for which she underwent a bilateral laser trabeculoplasty 1 year prior to our initial examination. She was also a steroid-responder, with intraocular pressures rising up to the high 30s (mm Hg) while taking topical 1% prednisolone acetate. Her medical history was negative for any known diseases, and review of systems was remarkable only for mild exertional dyspnea.

On initial examination, the intraocular pressures were within normal limits while she was receiving treatment with topical 1% brinzolamide and 0.2% brimonidine. Visual acuity was 20/20 OU. External examination disclosed eyelid margin telangiectases and irregularity, along with mild meibomian gland dysfunction in both eyes. Slitlamp examination demonstrated moderate bilateral bulbar conjunctival hyperemia with subtle lower fornical follicles and conjunctival subepithelial fibrosis (Figure 1). The corneas were clear with no punctate epitheliopathy. The rest of the anterior segment findings were unremarkable. Ophthalmoscopic examination showed a cup-disc ratio of 9/10 OU. A Schirmer test performed on the right eye with topical anesthesia revealed a weting of 7 mm at 5 minutes.

A conjunctival biopsy specimen was harvested from the inferior fornix of the left eye for diagnosis. Histopathologic examination of the specimen showed foci of noncaseating granulomas intermingled and surrounded by moderately intense infiltration of normal-appearing lymphocytes (Figure 2). No evidence of acid-fast bacilli, fungi, and foreign bodies was found. The patient underwent a systemic evaluation for presumed sarcoidosis, including complete physical examination, computed tomography of the chest, pulmonary function tests, and serum angiotensin-converting enzyme analysis. The angiotensin-converting enzyme level was within normal limits. Computed tomography showed bilateral hilar lymphadenopathy with no parenchymal involvement. Results of pulmonary function tests were normal.

A pulmonologist elected to defer the oral corticosteroid treatment (REPRINTED) ARCH OPHTHALMOL/VOL 121, SEP 2003 WWW.ARCHOPHTHALMOL.COM

©2003 American Medical Association. All rights reserved.