

Sir,  
**Low-grade systemic lymphoma with aggressive transformation in the lacrimal sac**

We report an unusual case of low-grade systemic lymphoma presenting with nasolacrimal duct obstruction secondary to a localised aggressive transformation in the lacrimal sac. There was a good response to treatment with surgical excision and chemotherapy combined with rituximab.

**Case report**

A 64-year-old female presented with a 1-year history of right epiphora. Lacrimal syringing confirmed obstruction at the distal canaliculus implying common canaliculus block with no associated palpable mucocele/masses. She underwent an external right dacryocystorhinostomy; however, intra-operatively, the lacrimal sac wall was abnormally thickened, and a biopsy was performed.

Histology revealed an aggressive high-grade diffuse large B-cell lymphoma (DLBCL, Figure 1). Physical examination, biochemical tests, MRI, and staging CT scans were all normal, with no evidence of lymphomatous involvement elsewhere. A subsequent bone marrow biopsy revealed low-grade non-Hodgkin's lymphoma (Figure 2).

Treatment was commenced with chemotherapy comprising of six cycles of vincristine, cyclophosphamide, doxorubicin, prednisone, and rituximab (R-CHOP) over 4 months. She responded well towards treatment, and is currently awaiting adjunct maintenance rituximab. She remains systemically well with no symptoms of epiphora.

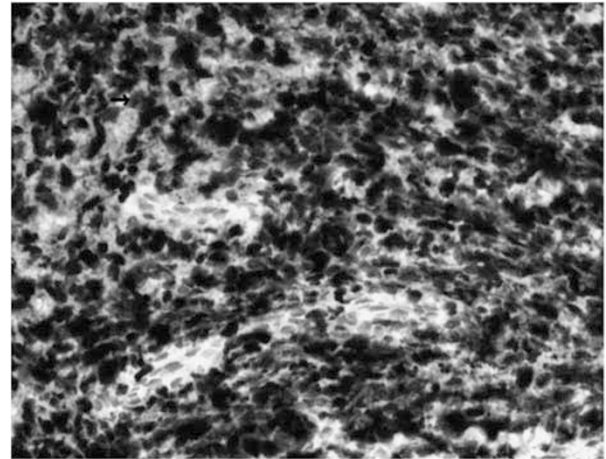
**Comment**

Lymphomas involving the lacrimal sac are rare and usually occur secondary to systemic lymphoreticular malignancy.<sup>1</sup> They typically present with medial canthal swelling, classically extending above the medial canthal ligament, and epiphora. Our patient was unusual as her only symptom was persistent epiphora, with no associated masses.

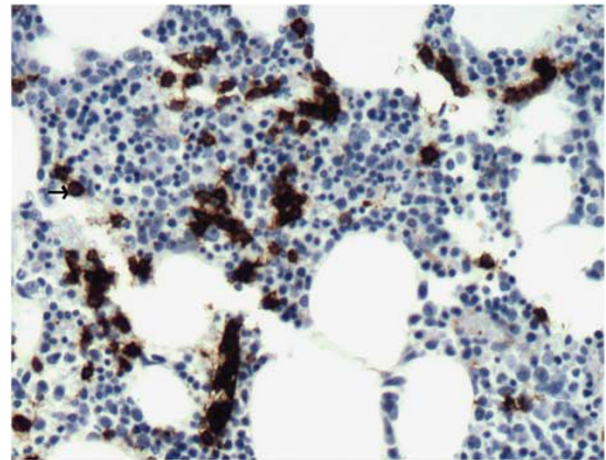
Although orbital and adnexal lymphomas are commonly of the low-grade MALT subtype, there is a marked over-representation of high-grade DLBCL occurring within the lacrimal sac.<sup>2</sup> This could potentially be explained by localised transformation from the MALT lymphoma subtype possibly due to persistent antigenic stimulation arising from the frequently chronic nature of infections of the lacrimal sac.<sup>3</sup>

Radiotherapy is considered the standard treatment for indolent/localised lymphoma.<sup>4</sup> In our patient, due to the systemic disease and aggressive subtype, chemotherapy was considered to be a better first-line treatment. Over the last decade, survival rates have improved with the addition of rituximab to CHOP chemotherapy.<sup>4</sup> This is a CD20-specific monoclonal antibody that focuses on pre-differentiated B cells. Its exact mode of action is unclear, but it is thought to downregulate the B-cell receptor and induce apoptosis of CD20+ cells.

Our case highlights the need for consideration of unusual presentations of aggressive lymphomas in seemingly trivial complaints such as epiphora, and documents the lacrimal sac as a site for aggressive



**Figure 1** Lacrimal sac histology of B cells stained with MIB-1 (arrow), an immunohistochemical marker of cell proliferation, demonstrating very high (almost 100%) proliferation characteristic of high-grade NHL.



**Figure 2** Bone marrow biopsy showing low-grade sinusoidal small B-cell infiltrate (arrow) very typical of marginal zone lymphoma. The B cells have been stained with CD20 (B lymphocyte surface antigen B1), which is strongly positive on almost all B-cell lymphomas and has a role in the regulation of B-cell proliferation.

malignant transformation of an otherwise low-grade systemic lymphoma.

**Conflict of interest**

The authors declare no conflict of interest.

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Sir,  
**Analysis of inorganic elements in a dacryolith using polarised X-ray fluorescence spectrometry: a case report**

A dacryolith extracted from the lacrimal sac of a patient undergoing endonasal dacryocystorhinostomy (DCR) was analysed using light microscopy and polarised X-ray fluorescence spectrometry (XRF). The main nature of the dacryolith was found to be inorganic, and XRF analysis demonstrated it was composed of calcium (Ca), potassium (K), iron (Fe), titanium (Ti), and manganese (Mn), and their oxidised forms (CaO, K<sub>2</sub>O, Fe<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub>, MnO).

**Case report**

The study was designed to investigate the chemical composition of a dacryolith using polarised X-ray fluorescence spectrometry (P-XRF). It has not been used in any analysis of lacrimal sac calculi up to now, but is nowadays supposed to be a more convenient, practical, alternative multi-element analytical tool to analyse inorganic nature of substances. It preserves the material after the investigation, resulting in a non-destructive analysis.<sup>1</sup> A dacryolith extracted from the lacrimal sac of a patient undergoing endonasal dacryocystorhinostomy was analysed using P-XRF.<sup>1</sup> The main nature of the dacryolith was found to be inorganic, and XRF analysis demonstrated it was composed of calcium (Ca), potassium (K), iron (Fe), titanium (Ti), and manganese (Mn), and their oxidised forms (CaO, K<sub>2</sub>O, Fe<sub>2</sub>O<sub>3</sub>, TiO<sub>2</sub>, MnO). Chemical analysis of the dacryoliths in literature had revealed calcium, magnesium, potassium, sulphur, and some phosphorus.<sup>2</sup> High K<sup>+</sup> ratio may be attributed to the accumulation of tear K<sup>+</sup> in dacryolith by increased evaporation, resulting in unstable concentrations of electrolytes leading to crystal formation on the matrix. Additionally, Ti, TiO<sub>2</sub>, Fe<sub>2</sub>O<sub>3</sub>, Mn, and Fe were detected in the dacryolith of our study.

**Comment**

We speculate that these elements and compounds may be originated from rich mineral composition of soil in Aksaray, which is a small town covered with volcanic tuff, resulting in chronic soil exposure of the patient in rural life as a farmer.<sup>3–5</sup> Our study is the first in literature that has investigated a dacryolith with XRF, and analysed multi-element concentration in a dacryolith in detail. XRF analysis presented in this report is an alternative

multi-element analytical tool to analyse inorganic nature of dacryoliths and has similar costs to other analysis methods, such as atomic absorption spectrophotometry. Its great advantage is material preservation after the investigation, and researchers can easily access this method by contact with geological or mining engineering departments of faculties.

**Conflict of interest**

The authors declare no conflict of interest.

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**Disclosure**

There is no government or non-government support for the study. There is no financial support for this study, either. The authors adhered to the Declaration of Helsinki and all state laws in the country, and the patient in the study was asked to give consent form before being enrolled in the study. This study was approved by the local ethics committee of Aksaray State Hospital, Ministry of Health.

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