

# Ocular Trauma as the First Presentation of Langerhans Cell Histiocytosis

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## Abstract

**Purpose:** Ocular trauma occurs disproportionately in children on an annual basis. However, because of this frequency, other diagnoses, such as orbital neoplasms, can easily be ignored.

**Methods:** We report on a two-year-old boy who presented with a dark purple, irregularly shaped lesion on his lower left eyelid. The patient had suffered injuries twice to that area.

**Results:** Axial computed tomography images demonstrated an ill-defined and inhomogeneous soft tissue mass in the lateral and posterior region of the left orbit, with bony destruction and absorption of the adjacent orbital wall. Magnetic resonance imaging of the orbit showed a lesion involving the greater sphenoidal wing, the supraorbital wall, and the frontal area. Enlarged nuchal and inguinal lymph nodes were detected by sonographic examination. Histopathological examination of a surgical biopsy showed an accumulation of characteristic Langerhans cells. The diagnosis of Langerhans cell histiocytosis was confirmed by immunohistochemical examinations positive for CD1a and SP-100.

**Conclusion:** Orbital Langerhans cell histiocytosis is rarely encountered in ophthalmic practice, so the ophthalmologist needs to be familiar with its presentation and work-up, and has to be aware of possible OLCH diagnosis when a child (or even an adult) presents with prolonged and persistent eyelid edema, even with a history of ocular trauma. (*Eye Science 2013; 28:204–207*)

**Keywords:** Langerhans cell histiocytosis (LCH); orbit; ocular trauma; Immunohistochemistry

## Introduction

Injuries occur disproportionately in childhood, and every year, a quarter of a million children present with serious ocular trauma<sup>1</sup>. However, because of this frequency, other diagnoses, such as orbital neoplasms, are easily ignored. Langerhans cell histiocytosis (LCH) is a rare disorder of unknown etiology, characterized by pathological proliferation of dysfunctional Langerhans cells in various tissues ranging from benign solitary bone lesions to an aggressive and life-threatening multisystem soft-tissue disease involvement<sup>2</sup>. It has a childhood predominance, with highly heterogeneous clinical presentations and unpredictable prognosis. It is rarely encountered in ophthalmic practice and it has an affinity for the orbit. We report on a two-year-old boy who presented with a dark purple, irregularly shaped lesion on his left lower eyelid; the patient had suffered injuries twice to the area.

## Case report

A two-year-old boy presented with a lower left eyelid obstinate lesion, involving the temporal eyelid skin. The lesion showed a firm ulcerated scar on its surface, and had persisted for about six months (Figure 1). Partial eyelid retraction and collateral swelling were noted. Palpation revealed a thickening of the temporal orbital rim. His parents reported an injury due to hitting the desk corner six months previously, which had resulted in a prolonged and persistent swelling of the left eyelid. This had first been con-

sidered a general inflammation, but topical tobramycin eye drops had provided little relief of the symptoms. Another injury from a badminton racket four weeks previously led to greater attention to the lesion. A routine blood examination revealed mild anemia (hemoglobin concentration: 114 g/L (normal range: 120–160 g/L), a slightly increased lymphocyte count ( $4.23 \times 10^9/L$  (normal value:  $0.8-4.0 \times 10^9/L$ ), and an increased percentage of lymphocytes of 60.5% (normal range: 20–40%) in the differential blood count. Bone marrow biopsy was normal. Routine tests of urine and stool and of the hepatic and renal functions were unremarkable. Axial computed tomography images demonstrated an ill-defined and inhomogeneous soft tissue mass in the lateral and posterior region of the left orbit, with bony destruction and absorption of adjacent orbital wall. Magnetic resonance imaging of the orbit showed a lesion involving the greater sphenoidal wing, the supraorbital wall, and the frontal area (Figure 2). Sonographic examinations revealed enlarged nuchal and inguinal lymph nodes. A radioisotope bone scan (technetium scintigraphy) exhibited an increased uptake of technetium by the involved orbital bone. Other examinations, including computed tomography of the chest and mediastinum and abdominal sonographic examination, were unremarkable. Based on the clinical examinations, an infiltrative and neoplastic lesion was suspected, and a surgical curettage of the lateral orbital wall was carried out. Histopathological examination of the biopsy showed an accumulation of characteristic Langerhans cells (Figure 2). The diagnosis of LCH was confirmed by immunohistochemical examinations positive for CD1a and SP-100 (Figure 2). The patient was then referred to the pediatric department for chemotherapy with vinblastine and etoposide.

## Discussion

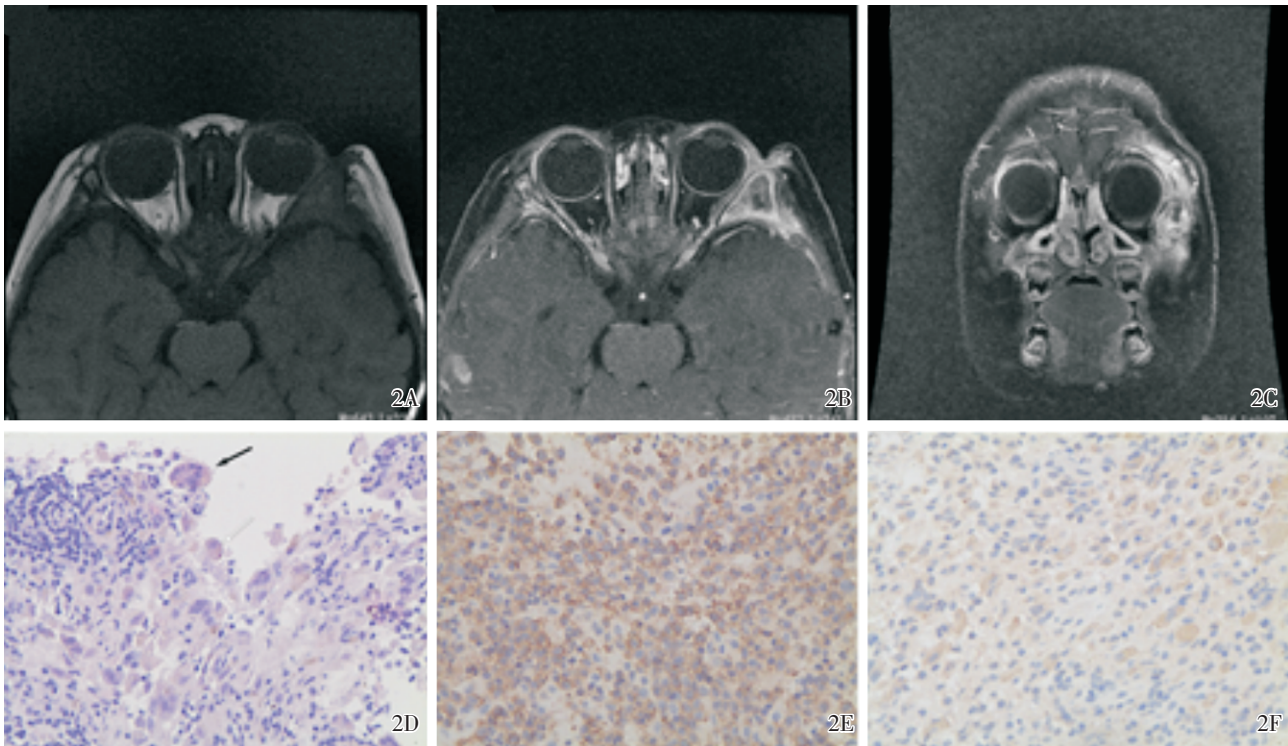
Langerhans cell histiocytosis, previously known as histiocytosis X, includes diseases such as the eosinophilic granuloma, Hand-Schüller-Christian disease, and Abt-Letterer-Siwe disease<sup>3</sup>. All these disorders have recently been acknowledged to represent different manifestations and courses of Langerhans cell histiocytosis, which is differentiated into a unifocal,



**Figure 1** Dark purple lesion with an irregular shaped, ulcerated scar on the surface of the left eyelid in a 2-year-old boy

multifocal, and disseminated forms. The first two forms are considered non-neoplastic borderline diseases, while the disseminated disorder is considered a malignant disease<sup>4</sup>. Orbital involvement in Langerhans cell histiocytosis most often represents the unifocal form of the disease and it is almost invariably associated with osteolytic lesions of the orbital wall<sup>5</sup>. The incidence of Langerhans cell histiocytosis in children has recently been estimated at 2.6–8.9/106 children per year<sup>6,7</sup>. Orbital lesions secondary to Langerhans cell histiocytosis account for less than 1% of orbital tumors in children<sup>8,9</sup>, while 23% of patients with Langerhans cell histiocytosis have clinical signs of orbital involvement<sup>9</sup>.

The characteristic clinical features of OLCH include acute or chronic periorbital swelling, rapidly progressive eyelid edema, and erythema, ptosis, or proptosis<sup>9,10</sup>. It can occasionally mimic acute infection (preseptal cellulitis), dermoid cyst, rhabdomyosarcoma, neuroblastoma, and pseudoinflammatory tumor<sup>11</sup>. Kiratli et al<sup>12</sup>. investigated seventeen patients with OLCH and found that the most frequent presenting sign was proptosis and upper eyelid edema; no patient reported a history of trauma. However, our boy suffered eye injuries twice. OLCH usually involves the frontal bone; however, the greater sphenoid wing was also compromised in our patient, which could be explained by the fact that the Langerhans cells had a predilection for hematopoietically active bone marrow (the residence of Langerhans cell precursors), and both these bones retained



**Figure 2** Magnetic resonance images of the orbit (Fig.2A–C) with a soft tissue signal (size:34×28 mm)(T1–2A,T2–2B) involving the greater sphenoidal wing, supraorbital wall,and orbital frontal convex area of the left orbit with heterogeneous enhancement;and histopathographs of the orbital lesion,showing coffee bean-like multinucleated giant histiocytes with peripheral nuclei (black arrow), mononuclear cells (white arrow) and scattered eosinophilic cells and lymphocytes (hematoxylin-eosin staining) (Fig.2D); immunohistochemical staining shows expression of CD1a antigen (Fig.2E) and SP-100 antigen (Fig.2F) by the Langerhans cells

an active bone marrow function<sup>10</sup>.

The diagnosis of OLCH may be missed simply because of failure to consider it as a possibility. The imaging examination is what can provide the diagnostic recommendation. Computed tomography can show orbit bone destruction and reject other conditions in the clinical differential diagnosis. Magnetic resonance imaging can suggest, with more accuracy than computed tomography, the extent of the lesion and the relationship with the adjacent structures. The lesions usually display as hypointense on T1-weighted images, with marked enhancement after injection (red hematopoietic marrow has low signal intensity in T1-weighted images)<sup>13</sup>. The histological and immunophenotype examinations are essential. A definitive diagnosis requires identification of CD1a and SP-100 positive lesion cells and/or Birbeck granules upon electron microscopy<sup>14</sup>. In the case of OLCH, a diagnostic biopsy (an open, incisional biopsy) is usually obtained easier from the involved orbital

bone, as was done for our patient. When LCH is suspected, a thorough clinical examination should not be ignored even if no clinical evidence of systemic involvement is apparent<sup>15</sup>.

The choice of therapeutic treatment is based ultimately on disease severity and the number of systems involved. Surgical excision or local curettage may provide complete resolution in patients with solitary small bony lesions. Systemic chemotherapy is required for treatment resistant sites and multisystem disease<sup>16</sup>. OLCH requires adjuvant chemotherapy to minimize the potential risk of long-term central nervous system complications such as diabetes insipidus and neurodegenerative abnormalities<sup>17,18</sup>. Our patient responded well to the combination therapy of vinblastine and etoposide. He is currently undergoing the course of chemotherapy.

## Conclusion

Orbital Langerhans cell histiocytosis is rarely en-

countered in ophthalmic practice, but it should be included in the differential diagnosis of orbital tumors, particularly in children. An ophthalmologist needs to be familiar with its presentation and work-up, and has to be aware of a possible OLCH diagnosis when a child (or even an adult) presents with prolonged and persistent eyelid edema, even with a history of ocular trauma. Making the correct diagnosis should always be based on concordant clinical, radiological, and pathological evidence.

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