Multifocal Langerhans' Cell Histiocytosis Involving the Orbit

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INTRODUCTION

The histiocytoses are a group of disorders characterized by proliferation of the Langerhans' cell. Since 1985, the Histiocyte Society has recommended that the term "Langerhans' cell histiocytosis" be used rather than histiocytosis X, Hand-Schüller-Christian syndrome, Letterer-Siwe disease, or eosinophilic granuloma.1,2 This identifies the pathognomonic cell, the Langerhans' cell, which acts as an antigen-presenting cell involved in delayed hypersensitivity. The disease is then further described clinically as unifocal or multifocal, localized or disseminated, and with or without systemic involvement. Multifocal Langerhans' cell histiocytosis occurs predominately in males and often presents with lytic bone lesions.3 Although affecting all age groups, the median age of diagnosis is 2 to 3 years. The lesions tend to involve the calvarium, sphenoid bone, sella turcica, mandible, and upper extremity long bones.4-5 Despite a predilection for the skull bone, the disease has had rare involvement of the orbits. The frontal bone is the usual site of orbital involvement,5-6 but there have been a few scattered case reports of unifocal lytic lesions involving the lateral wall of the orbit.6 To our knowledge, multifocal Langerhans' cell histiocytosis with orbital involvement and an additional contralateral lytic lesion has not been reported.

METHODS

A case of multifocal lytic bone lesions involving the lateral orbital wall and contralateral temporal bone in a patient is discussed. Pertinent radiologic and pathologic pictures, including electron microscopy, are presented.

CASE REPORT

This patient is one of triplets born prematurely at 34 weeks' gestation. At 7 months of age, she developed mild periorbital erythema and swelling below her right eye. A diagnosis of lacrimal duct obstruction was made. One week later after no improvement and the onset of a low-grade fever, the diagnosis was changed to preseptal cellulitis. While on oral antibiotics, the eyelid swelling and erythema appeared to regress. However, 3 days after discontinuance of antibiotics, her symptoms worsened. In the sixth week, the patient was sent to an ophthalmologist for evaluation.

On examination, epiphora and moderate diffuse swelling and erythema of the right and left lower lid were noted. The inferior aspect of the right anterior orbit had a diffuse mass with firmness over the temporal aspect. The globe did not appear displaced and ductions of each eye were normal. The balance of the examination was
Fig 1(a): Axial computed tomography showing a cystic mass involving the lateral wall of the right orbit with considerable bone destruction and an additional lytic lesion involving the lateral aspect of the right temporal bone. B: Coronal computed tomography demonstrating the lytic bone lesion of the right lateral orbit.

Fig 2: A: Langerhans' Cells: Large mononuclear histiocytes with round nuclei and indented nuclear membranes (hematoxylin–eosin ×100). B: EM demonstrating Birbeck granules: A pentilaminar structure with a bilaminar cell membrane on each side and glycocalyx in the middle (×18000).

within normal limits.

Computed tomographic examination of the orbits revealed a cystic mass involving the lateral wall of the right orbit with considerable bone destruction and a small area of intrinsic calcification. An additional lytic lesion involving the lateral aspect of the left temporal bone was noted (Fig 1). Systemic examination, which included an abdominal ultrasound, whole body bone scan, and computed tomography of the chest, abdomen, and pelvis failed to demonstrate additional lesions.

A lateral orbitotomy was performed with removal of abnormal necrotic tissue, friable bone, and yellow-colored cheesy material. The dura was exposed but remained intact. The second lesion was excised several weeks later after the diagnosis of Langerhans' cell histiocytosis was confirmed.

On gross examination, the specimen consisted of multiple soft tissue fragments, light brown to dark red, with areas of bone. Microscopic sections revealed histiocytes as the predominant cell type as well as occasional multinucleated giant cells (Fig 2A). An immunohistochemical stain was used to identify the S-100 protein of the Langerhans' cell, which is specific for this type of histiocyte. The lesion also contained a moderate number of eosinophils. Ultrastructurally, the electron micrograph demonstrated typical Birbeck granules, again specific for this type of histiocyte (Fig 2B).

The excision and curettage of the two lesions was curative. There is no evidence of recurrence or systemic involvement 14 months following surgery.

DISCUSSION

Although Langerhans' cell histiocytosis has a predilection for the skull, a few reports have described involvement of the lateral orbital wall. All of these reported cases have been solitary lytic lesions.
The skull is involved in 20% of all Langerhans' cell histiocytosis. When the orbital bones are involved, the frontal bone is most commonly affected. It is rare for other bones of the orbit to be involved. It is unusual for the Langerhans' cell to infiltrate the globe. Feldman reported two cases of Langerhans' cell histiocytosis in children aged 18 and 23 months, which involved the lateral orbital wall. Both of these cases were unifocal lesions. To our knowledge, multifocal involvement of the head and orbit is exceedingly rare with the exception of the present case; there have been no reports of a patient with involvement of both the lateral orbit wall and the contralateral temporal bone.

Typically, the diagnosis is delayed because the presenting symptoms in patients with orbital involvement tend to mimic other diseases. In this case, the child was treated for a lacrimal duct obstruction for 1 week and then treated for preseptal cellulitis for an additional 2 weeks. Once the child was examined by an ophthalmologist, 6 weeks after the onset of symptoms, a mass was palpated and the diagnosis of an orbital tumor was considered. It is important to have Langerhans' cell histiocytosis as part of the differential diagnosis of orbital tumors or preseptal cellulitis.

It is essential to establish the presence of the Langerhans' cell to make the diagnosis. This is aided by using immunocytochemical techniques to stain the S-100 protein. Additionally, electron microscopy can be used to demonstrate the Birbeck granules.

With unifocal lytic lesions, complete resolution is expected by curettage or low-dose radiation. With multifocal involvement, the disease is considered more chronic and recurrence rates are as high as 72% by 5 months. Treatment options include curettage, low-dose radiation, and systemic steroids. Aggressive tumors may respond to cytotoxic agents, such as vinblastine or methotrexate. The most important adverse prognostic factor relative to survival is functional compromise of the organs, mainly the liver and spleen as described by Letterer in 1924. However, disease limited to the skeleton is associated with a uniformly favorable prognosis. In the present case, there is no systemic involvement and the disease process is limited to multifocal lesions of the skeletal system. Treatment involved only excision and curettage of both lytic lesions and 14 months later, no clinical or radiologic evidence of recurrence was present.

Langerhans' cell histiocytosis is usually thought of as a unifocal disease when orbital involvement is present. However, this case demonstrates that it may be multifocal. Therefore, if a child has bilateral eyelid erythema and edema, Langerhans' cell histiocytosis should be included in the differential diagnosis to avoid delay of treatment.

REFERENCES