

## Preseptal cellulitis and orbital subperiosteal abscess in a patient with osteopetrosis

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**Section:** Head & neck imaging

**Imaging Technique:** MR

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Case Type: Clinical Cases

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**Patient:** 5 years, female

### Clinical History:

A girl who had hepatosplenomegaly, anemia, thrombocytopenia, leukocytopenia and recurrent infections, was admitted to the hospital with bilateral proptosis apparent on the left and a new onset painful, redness swelling of the left eyelid. She was subfebrile. Vision was impaired. The movements of the eye have reduced and the eyeball had a swollen, hazy appearance.

### Imaging Findings:

The girl who had hepatosplenomegaly, anemia, thrombocytopenia, leukocytopenia and recurrent infections, was admitted to the hospital with bilateral proptosis apparent on the left and a new onset painful, redness swelling of the left eyelid. She was subfebrile. Vision was impaired. The movements of the eye have reduced and the eyeball had a swollen, hazy appearance. An MRI study of the patient with 1.5 T MR scanner, in three planes with pre-post contrast SE T1, FSE PD and T2 sequences were performed. The MR pictures showed diffuse decrease in diploe spaces and thickening of the calvarial bones' tabula interna and externas with hypointensity in all sequences. Craniofacial ratio was increased for cranium. Posterior fossa was too small and foramen magnum diameter was diminished. Bilateral proptosis was evident. In the left orbita, an extraconal lesion hypointense on T1 WI, hyperintense on T2 WI and enhances peripherally after IV Gd DTPA injection. Also the left eyelid is thickened and has got the same signal characteristics with the orbital lesion and enhances after IV Gd DTPA injection.

### Discussion:

Inflammatory changes of the orbit are divided into two categories (preseptal versus post septal) based on their relation to the orbital septum. Pre septal cellulitis does not affect the orbital contents. On the other hand, post septal cellulitis commonly demonstrates swelling of the extra-ocular muscles, as well as displacement of extraconal fat and rectus muscle away from the orbital wall. Soft tissue planes can also be obliterated. Subperiosteal cellulitis or abscess formation is often associated with multifocal sinusitis with either direct spread through the sinus wall or thrombophlebitis. Specifically, this most commonly results from inflammatory changes involving the ethmoid air cells or frontal sinuses. A medial subperiosteal abscess (SPA) of the orbit is the most common serious complication of sinusitis in children. Direct extension of infection through congenital osseous dehiscences or involvement of the thin bony walls of the orbit by osteomyelitis can lead to the formation of subperiosteal abscess. The orbital periosteum is loosely attached except at the suture line, so that subperiosteal collections are easily formed. The distinction between SPA and the more benign pre-septal disease is difficult to make especially in a young child in whom an ophthalmological evaluation is often difficult. Computerised tomography (CT) and magnetic resonance imaging (MRI) is the investigation of choice in making this distinction. Both CT and MRI show the extent of involvement of soft

tissues by infection; however, CT is more precise in demonstrating the bony changes. However, if intracranial complications such as cavernous sinus infiltration is suspected, MRI is the first choice. Subperiosteal inflammatory disease of the orbit is initially treated with intravenous antibiotic therapy with surgery reserved for those patients who do not respond to medical treatment and in whom a medial SPA is confirmed by CT. Conventionally, the abscess is drained via an external incision and an ethmoidectomy is performed at the same time. More recently, successful drainage of SPA's has been accomplished endoscopically via a intranasal approach with less morbidity. Symptoms of orbital infections include extreme pain, bulging eyes, reduced eye movement, swollen eyelids and fever. Osteopetrosis is a disorder characterized by osteoclastic dysfunction. The bones of afflicted patients become sclerotic and show modeling defects resulting in either a decrease or obliteration of the marrow cavity and resultant pancytopenia. Other clinical manifestations include bony deformities, cranial nerve palsies from bony overgrowth, pathological fractures, osteomyelitis, and hepatosplenomegaly secondary to extramedullary hematopoiesis. In the skull, the diploic space is usually decreased or obliterated. Absent or decreased marrow space is observed on plain films. On plain radiography diffuse osteosclerosis with obliteration of normal trabecular pattern causes bone-within-bone appearance certainly in long bones and vertebral bodies. Also CT is valuable in the diagnosis. On MRI, the marrow cavity very likely will be obliterated with low signal intensity on T1- and T2-weighted images.

**Differential Diagnosis List:** Preseptal cellulitis and orbital subperiosteal abscess in a patient with osteopetrosis

**Final Diagnosis:** Preseptal cellulitis and orbital subperiosteal abscess in a patient with osteopetrosis

#### References:

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**Figure 1**

**a**



**Description:** Axial T1 WI demonstrates, hypointensity and diffuse decrease of diploe spaces and thickening of the calvarial bones' tabula interna and externas. In the left orbit, an extraconal lesion hypointense on T1 WI which displaces extraconal fat and rectus muscle away from the orbital wall is seen. Also the left eyelid is thickened and has got the same signal characteristics with the orbital lesion.

**Origin:**

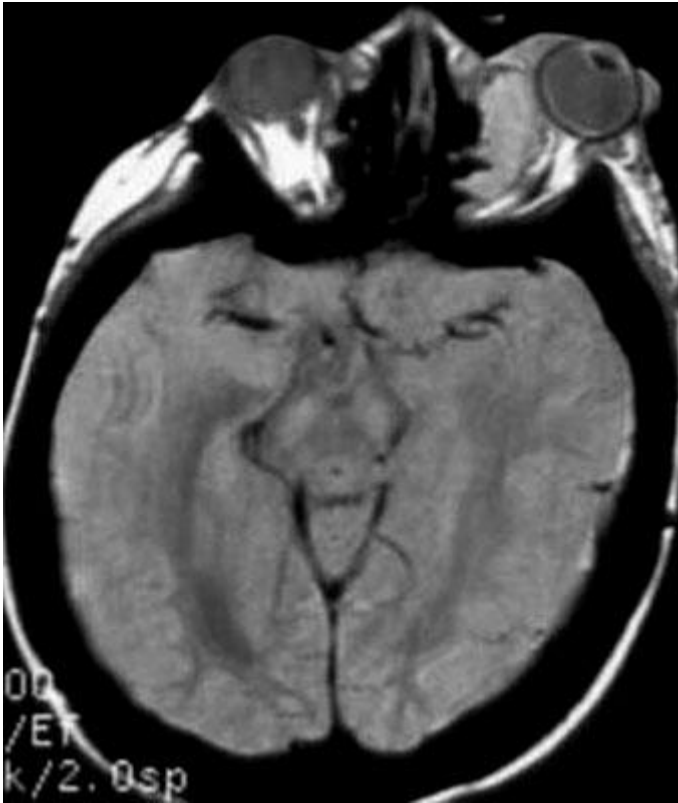
**b**



**Description:** Axial T2 WI demonstrates, hypointensity and diffuse decrease of diploe spaces and thickening of the calvarial bones' tabula interna and externas. In the left orbit, an extraconal lesion hyperintense on T2 WI which displaces extraconal fat and rectus muscle away from the orbital wall is seen. Also the left eyelid is thickened and has got the same signal characteristics with the orbital lesion.

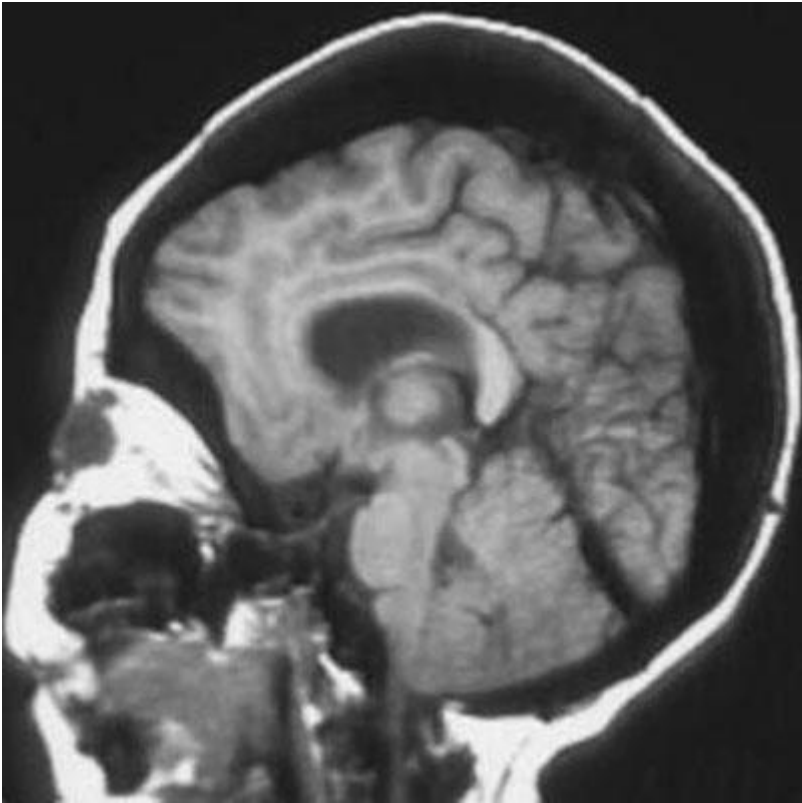
**Origin:**

c



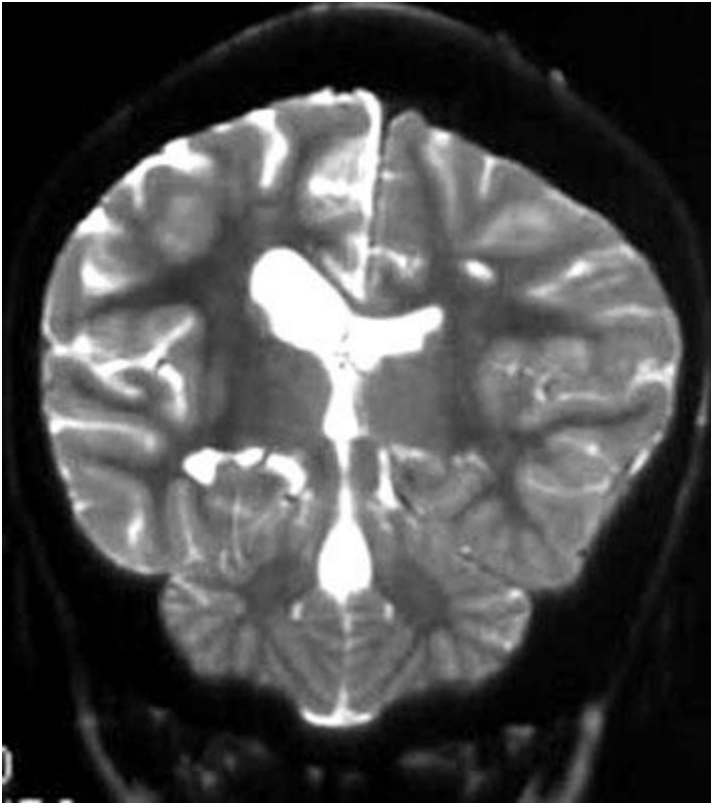
**Description:** Axial PD WI demonstrates, hypointensity and diffuse decrease of diploe spaces and thickening of the calvarial bones' tabula interna and externas. In the left orbita,an extraconal lesion slightly hyperintense on T2 WI which displaces extraconal fat and rectus muscle away from the orbital wall is seen. Also the left eyelid is thickened and has got the same signal characteristics with the orbital lesion **Origin:**

d



**Description:** Sagittal T1 WI demonstrates, hypointensity and diffuse decrease of diploe spaces and thickening of the calvarial bones' tabula interna and externas. Posterior fossa is too small and foramen magnum diameter is diminished. **Origin:**

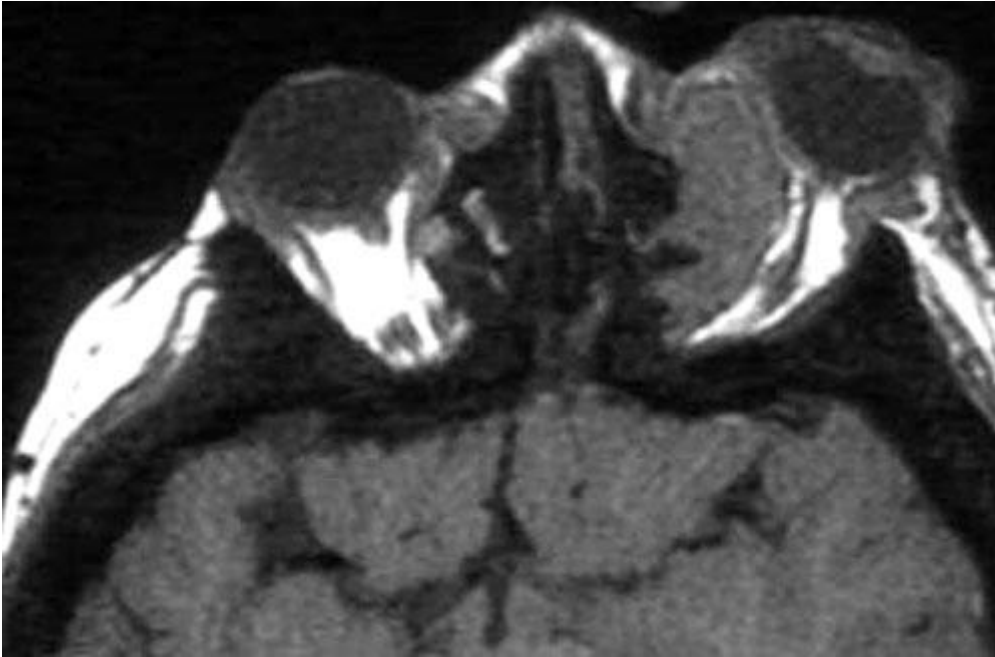
e



**Description:** Coronal Fat Sat.T2 WI demonstrates, hypointensity and diffuse decrease of diploe spaces and thickening of the calvarial bones' tabula interna and externas. There is a mild hydrocephalus probably due to small posterior fossa. **Origin:**

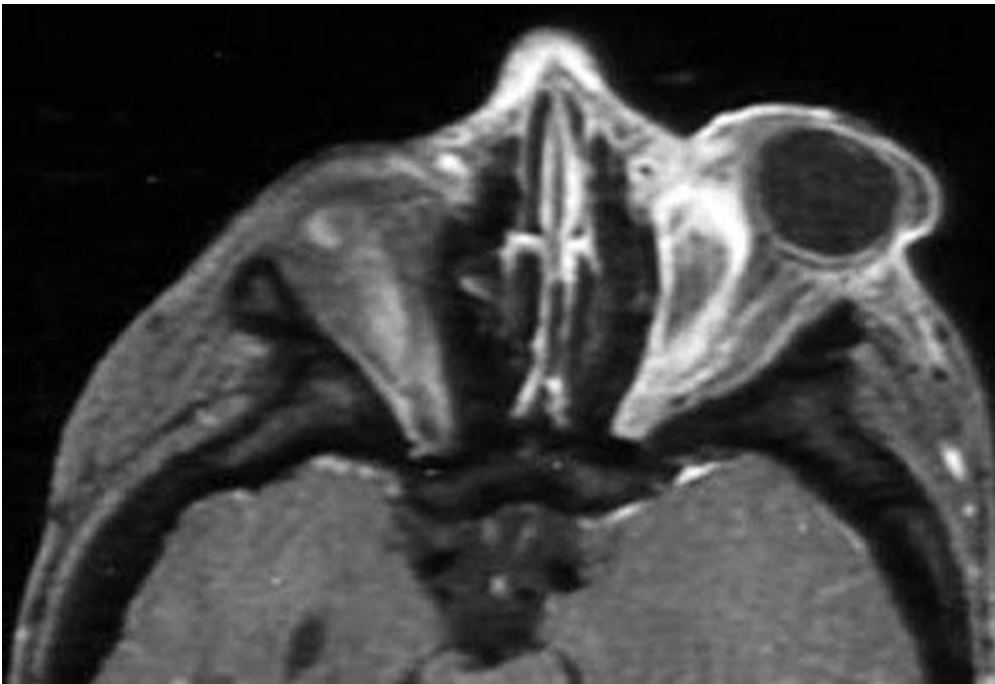
**Figure 2**

**a**



**Description:** Axial T1 WI demonstrates,an extraconal lesion in the left orbita hypointense on T1 WI which displaces extraconal fat and rectus muscle away from the orbital wall is seen. Also the left eyelid is thickened and has got the same signal characteristics with the orbital lesion. **Origin:**

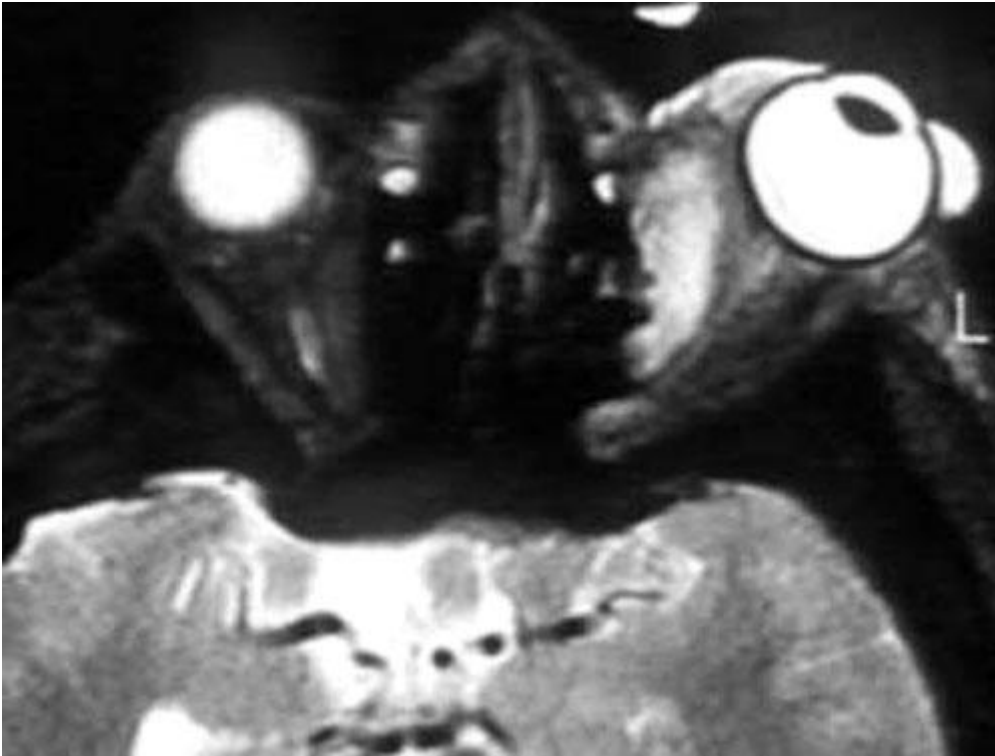
**b**



**Description:** Axial Fat Sat. post IV Gd DTPA T1 WI demonstrates,an extraconal lesion in the left orbita hypointense on T1 WI which displaces extraconal fat and rectus muscle away from the orbital wall is seen. Also the left eyelid is thickened and has got the same signal characteristics with the orbital lesion.The orbital lesion shows marked peripheral enhancement as well as the eyelid. **Origin:**



**c**



**Description:** Axial Fat Sat.T2 WI shows an extraconal lesion which demonstrates central hyperintense signal intensity and a hypointense signal intensity peripherally on T2 WI in the left orbita. The lesion displaces extraconal fat and rectus muscle away from the orbital wall. Also the left eyelid is thickened and seems hyperintense. **Origin:**