Multiple myeloma of the orbit
Published on 25.10.2017

DOI: 10.1594/EURORAD/CASE.15165
ISSN: 1563-4086
Section: Neuroradiology
Area of Interest: Eyes Musculoskeletal bone
Procedure: Education
Procedure: Diagnostic procedure
Imaging Technique: CT
Imaging Technique: MR
Special Focus: Haematologic diseases Metastases
Case Type: Clinical Cases
Authors: Dr. Akshay Pendkar 1, Dr. Nandish Kumar1 , Dr. Gaurav Parmar2 , Dr. Tosha Desai 3 M.D., Dr. Nandini U. Bahri 2 M.D.
Patient: 36 years, male

Clinical History:

A 36-year-old male patient presented to the emergency room with a history of gradually progressive bilateral eye swelling (left > right) with restricted ocular movements for 10 days. It was known that this patient suffered from multiple myeloma and was on thalidomide treatment. On examination, both eyes showed evidence of chemosis associated with proptosis.

Imaging Findings:

A contrast-enhanced CT examination of the orbit revealed a mildly enhancing soft tissue density lesion in the left orbit in the extraconal compartment (Fig. 1a, b). Similar characteristic lesion was also noted along the lateral wall of the left orbit posterior to the above mentioned lesion (Fig. 1a, b).

A similar characteristic lesion was noted in the right orbit in the extraconal compartment (Fig. 2a, b).

The optic nerve and lacrimal glands were visualised separately from the lesion. All ocular muscles were distinctly visualised separately from the lesion.

Multiple punched out lytic lesions were noted involving skull bones suggestive of myeloma metastases (Fig. 3).

The above mentioned lesions appeared hypointense on both T2 weighted images (Fig. 4a, 5a, 5b) and T1 weighted images (Fig. 4b).

On diffusion-weighted images, the lesions did not show diffusion restriction (Fig. 6a) and appeared dark on ADC sequence (Fig. 6b).

The above mentioned lesions were confirmed to be multiple myeloma on biopsy (Fig. 7).
Multiple myeloma is the most common malignant bone tumour in adults, its incidence being 5.5 cases per 100,000 [1]. It is caused by monoclonal proliferation of malignant plasma cells that produce immunoglobulins, which infiltrate into haemopoietic tissues. It is commonly seen in patients above 40 years of age (maximum incidence occurs between 50-70 years of age). The disease is more common in males with a male:female ratio being 2:1. The most common location for multiple myeloma are the vertebrae. Extra-skeletal involvement of multiple myeloma is rare (seen in 15-16% of patients) and is more commonly seen in younger patients [2]. Extraosseous myeloma is also associated with poor prognosis [2]. Orbital involvement in extraskeletal multiple myeloma is very rare and less than 50 cases have been reported in medical papers [3]. The most common presentation for orbital involvement includes slowly progressive painful exophtalmos, diplopia and decrease in visual acuity. In addition, it can also lead to cranial nerve palsies and papilloedema if intra-cranial extension occurs [1]. Orbital myeloma most commonly presents radiologically as a soft tissue mass, which is actually an extension of the bony deposit, however, it may also present independently without any osseous component [4]. Bony changes in the orbit include bony destruction, bone thinning, or no change [3]. Soft tissue seen in orbit in a case of orbital myeloma shows mild homogeneous enhancement. If it is large enough, it may cause compression over the optic nerve or extra-ocular muscles, and may or may not be distinctly visualised from the soft tissue mass. On MRI, the lesion generally presents as soft tissue mass that is hypointense on T1WI and iso to hypointense on T2WI. It shows mild homogeneous post-contrast enhancement with no diffusion restriction. Optic nerve compression and involvement of extra-ocular muscles are better evaluated on MRI than on CT. These lesions are highly responsive to radiotherapy [3]. The overall prognosis, however, is dependent on the extent of the disease with a mean survival of 2-3 years if associated with multiple myeloma.

Presence of orbital involvement in a known case of multiple myeloma is a poor prognostic factor. With orbital myeloma being highly responsive to radiotherapy, its early diagnosis and prompt treatment are of utmost importance, as they may prolong the duration of survival of the patient.

**Differential Diagnosis List:** Multiple myeloma of the orbit, Orbital lymphoma, Orbital pseudotumour, Thyroid orbitopathy, Orbital sarcoidosis, Orbital metatases

**Final Diagnosis:** Multiple myeloma of the orbit

**References:**


Archana Malik, Subina Narang, Uma Handa,1 and Sunandan Sood; (2009) Multiple myeloma presenting as bilateral orbital proptosis. Indain J of Ophthalmology 797;: 10.4103/0301-4738.55069; (PMID:2804132)
Figure 1

Description: Bone window axial section CT Brain demonstrating multiple punched out lytic lesions involving skull bones (red arrows). Origin: Department of Radio diagnosis, M.P. Shah Government Medical College, Guru Gobind Singh Government Hospital, Jamnagar, Gujarat, India.
Figure 2

Description: Haematoxylin – Eosin stain revealed monomorphic lymphoid cells. It showed plasmacytoid features with eccentric nuclei consistent with myeloma cells. Origin: Department of Radiodiagnosis, M.P. Shah Government Medical College, Guru Gobind Singh Government Hospital, Jamnagar, Gujarat, India.
Description: Figure A showing plain axial section CT orbit demonstrating soft tissue lesions in left orbit (yellow arrows).

Origin: Department of Radio diagnosis, M.P. Shah Government Medical College, Guru Gobind Singh Government Hospital, Jamnagar, Gujarat, India.

Description: Figure B showing contrast enhanced axial section CT orbit demonstrating mild enhancement in soft tissue lesions in left orbit (red arrows).

Origin: Department of Radio diagnosis, M.P. Shah Government Medical College, Guru Gobind Singh Government Hospital, Jamnagar, Gujarat, India.
Figure 4

**a**

*Description:* Figure A showing contrast enhanced axial section CT orbit demonstrating mild enhancing soft tissue lesion in right orbit (red arrow). *Origin:* Department of Radio diagnosis, M.P. Shah Government Medical College, Guru Gobind Singh Government Hospital, Jamnagar, Gujarat, India.

**b**

*Description:* Figure B showing coronal section contrast enhanced CT orbit demonstrating mild enhancing soft tissue lesions in bilateral orbits (yellow arrows). *Origin:* Department of Radio diagnosis, M.P. Shah Government Medical College, Guru Gobind Singh Government Hospital, Jamnagar, Gujarat, India.
**Figure 5**

**Description:** Figure A showing plain axial section T2 weighted MRI orbit image demonstrating hypointense soft tissue lesions in bilateral orbits (yellow arrows). **Origin:** Department of Radio diagnosis, M.P. Shah Government Medical College, Guru Gobind Singh Government Hospital, Jamnagar, Gujarat, India.

**Description:** Figure B showing plain axial section T1 weighted MRI orbit image demonstrating hypointense soft tissue lesion in bilateral orbits (yellow arrows). **Origin:** Department of Radio diagnosis, M.P. Shah Government Medical College, Guru Gobind Singh Government Hospital, Jamnagar, Gujarat, India.
Description: Figure A showing plain sagittal section T2 weighted MRI orbit image demonstrating hypointense soft tissue lesion in left orbit (white arrow) in extraconal compartment that seems to be extending into left frontal bone superiorly. Origin: Department of Radio diagnosis, M.P. Shah Government Medical College, Guru Gobind Singh Government Hospital, Jamnagar, Gujarat, India.
**Description:** Figure B showing plain sagittal section T2 weighted MRI orbit image demonstrating hypointense soft tissue lesion in right orbit (white arrow) in extraconal compartment. **Origin:** Department of Radio diagnosis, M.P. Shah Government Medical College, Guru Gobind Singh Government Hospital, Jamnagar, Gujarat, India.
Figure 7

a

Description: Figure A demonstrates no significant diffusion restriction in above mentioned orbital soft tissue lesions (yellow arrows). Origin: Department of Radio diagnosis, M.P. Shah Government Medical College, Guru Gobind Singh Government Hospital, Jamnagar, Gujarat, India.

b

Description: Figure B demonstrates that above mentioned orbital soft tissue lesions appear dark on ADC (Red arrows). Origin: Department of Radio diagnosis, M.P. Shah Government Medical College, Guru Gobind Singh Government Hospital, Jamnagar, Gujarat, India.