

Points

- Traditionally, after clinical examination, the eye and orbit have been studied radiologically by ultrasound and CT scan, respectively.
- Though MRI has been available for a long time, its use has been limited by lack of spatial resolution.
- The use of new high-resolution, surface coils and special sequences now allows us to evaluate orbital and ocular pathologies in greater detail

MRI of the Eye and Orbit

The eye is traditionally evaluated clinically and with ophthalmologic tools. In the recent years, ultrasound (USG) has become an important tool for anterior and posterior chamber pathologies. The orbit is usually evaluated using plain radiographs and CT, with USG playing a small, adjunctive role.

MRI of the eye and orbit has recently become an important diagnostic tool in ophthalmology. The developmental and refinement of the small surface coils, increased speed of scanning and newer pulse sequences such as post-contrast, high-resolution sequences, have improved visualization of fine orbital and ocular details, as compared to scanning with the standard large head coil (Fig. 1).

High resolution MRI of the orbit and eye, when clinically indicated, is routinely performed, using special phased array coils. The patient is instructed to avoid eye movements and the study usually takes approximately 25-30 minutes to perform. Intravenous contrast (gadolinium) is given wherever necessary.

Using special pulse sequences, which make the vitreous dark, it is now possible to delineate the ocular layers better (Fig. 1B). It is also possible to distinguish the palpebral layers, septum orbitale and levator aponeurosis (Fig. 2), allowing differentiation of preseptal from postseptal disease (Fig. 3). Intrinsic lesions of the muscles, such as Graves' ophthalmopathy (Fig. 4), inflammatory myositis (Fig. 5) and cysticercus granuloma (Fig. 6) can be easily diagnosed. Lacrimal gland (Fig. 7) and sac (Fig. 8) abnormalities are also well seen.

More importantly, pathologies of the eyeball are seen well, unlike with CT scanning. Retinal detachments (Fig. 9), melanomas (Fig. 10) and angiomas (Fig. 11) can be assessed exquisitely, along with optic nerve lesions, such as gliomas (Fig. 12).

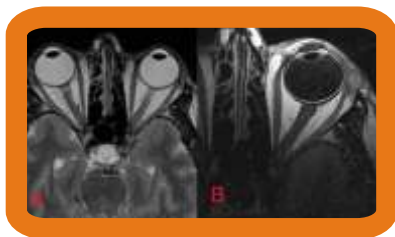


Fig. 1

Fig. 1 (A, B): T2W axial MRI of both orbits using a head coil (A). Note the far superior resolution obtained with a high-resolution surface coil (B), with suppression of the vitreous, which is seen to be dark.



Fig. 2A



Fig. 2B

Fig. 2 (A, B): High-resolution MRI of both orbits and eyes in the axial (A) and coronal (B) planes, shows the normal anatomy (labelled).



Fig. 3A

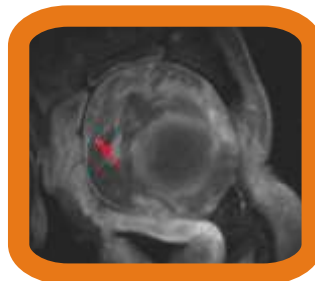


Fig. 3B

Fig. 3 (A, B): Complicated sinusitis. The T1W axial MRI (A) and the post-contrast T1W coronal image (B) show abnormal soft tissue (red arrows) invading the left orbit through the lamina papyracea, into the sub-periosteal space, displacing the medial rectus (blue arrow). Note the intact septum (A).

The online version is up at <http://www.jankharia.com/innerspaces/current.htm>

Indications:

1. For ocular abnormalities, where even after clinical examination and USG, the diagnosis is indeterminate or more information is required.
2. Orbital abnormalities, either as a primary technique or after CT scan, when the results from CT scan are indeterminate.



Fig. 4

Fig. 4: Graves' ophthalmopathy. T1W coronal MRI shows diffuse increase in thickness of the inferior and medial rectus muscles (measured), along with orbital fat proliferation.



Fig. 5

Fig. 5: Inflammatory myositis. FLAIR axial MRI shows marked fusiform thickening of the medial rectus muscle (red arrow) with focal kinking of the optic nerve (blue arrow).



Fig. 6

Fig. 6: Cysticercus granuloma. Post-contrast T1W axial MRI shows a cyst (red arrow) within the medial rectus muscle with diffuse intense enhancement and increased size of the muscle (blue arrow).



Fig. 7

Fig. 7: Lacrimal gland cyst. Post-contrast FLAIR axial MRI shows a lacrimal gland cyst (red arrow), which is non-enhancing.



Fig. 8

Fig. 8: Lacrimal duct and sac squamous cell carcinoma. T2W axial MRI shows a mass involving the lacrimal apparatus (red arrow) with involvement of the sac (blue arrow). Extension anterior to the sac is noted.



Fig. 9

Fig. 9: Retinal detachment. FLAIR axial image shows a typical retinal detachment with sub-retinal fluid accumulation (red arrow). Note the low signal vitreous. The optic nerve is labelled with a blue arrow.



Fig. 10

Fig. 10: Melanoma. Post-contrast FLAIR axial image shows a mushroom-shaped lesion (red arrowhead), sub-retinal in location, with sub-retinal fluid (blue arrow).

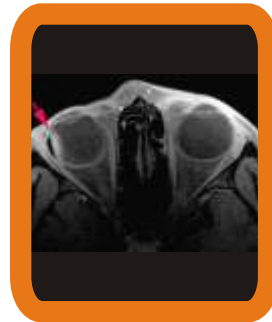


Fig. 11

Fig. 11: Retinal angioma. In this patient with von-Hippel-Lindau disease and a cerebellar hemangioblastoma, an enhancing angioma (red arrow) is seen in the uveal coat of the right globe laterally, on this post-contrast T1W axial image.

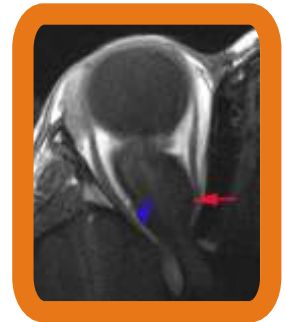


Fig. 12

Fig. 12: Optic nerve glioma. T1W axial MRI shows a concentric mass (red arrow), encircling and involving the optic nerve (blue arrow).

Designed by



Forthcoming Newsletters



- Nov 2006 - Radiofrequency Ablation of Lung Cancers
- Dec 2006 - Cardiac CT vs Cardiac MRI

Main Clinic

Bhaveshwar Vihar, 383, Sardar V. P. Road, Mumbai - 400 004
Tel : 022-6617 3333.
Email : info@jankharia.com

Cardiac & Ultra fast CT scan

Nishat Business Center, Arya Bhavan, 461, Sardar V. P. Road, Mumbai - 400 004
Tel : 022-2389-3551
Fax : 022-2382-9595

Subscribe

Provide your name and address at subscribe@jankharia.com
Tel : 022-6617 3382 (Benny or Shamina)

Owner, Printer & Publisher: Dr. Bhavin Jankharia, Published at: Dr. Jankharia's Imaging Center, Bhaveshwar Vihar, 383, S.V.P.Road, Prarthana Samaj, Mumbai 400 004. Printed at: India Printing House, First Floor, 42, G D Ambekar Marg, Opp. Wadala Post Office, Wadala, Mumbai 400 031

Accurate Results, All the Time



Subscription Coupon

This subscription is valid for the year of 2006 and 2007.

Name : Dr. _____
 Address : _____
 Tel : _____ e-mail id : _____
 Cheque details :- Bank: _____ Cheque no.: _____ Dated: _____ Amount: _____

Subscription: Rs. 150

Ex-Mumbai residents: Please send a D/D or add Rs. 50 for cheque clearance charges.

Please send this form duly filled alongwith the cheque in the name of "Dr. Jankharia's Imaging Centre" at Jankharia Imaging, Bhaveshwar Vihar, 383, Sardar V. P. Road, Mumbai - 400 004