

Role of MDCT in Evaluation of Orbital Lesions

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Abstract: The orbit is the site of large number of pathologies of diverse etiologies and imaging has to be tailored to the symptoms and clinical findings. MDCT is the first-line imaging modality for orbital evaluation in acute setting. CT offers rapid image acquisition and high spatial resolution and is suitable in the assessment of fractures, calcifications, bone destruction and radio-opaque foreign bodies. **Objectives:** 1. To evaluate efficacy of MDCT in assessing orbital diseases. 2. To determine the site and extent of tumour, for appropriate treatment including surgery whenever necessary. **Material and Methods:** This study of MDCT evaluation of orbital diseases with clinical and pathological correlation was conducted on 32 patients at Department of Radiodiagnosis, ASRAM medical college, ELURU for a period of 2 years from December 2017 to December 2019 with suspicion of orbital lesion by ophthalmologist performed using CT scanner GE Revolution ACT. **Interpretation and Conclusion:** CT is very effective in arriving at a diagnosis. CT is very effective in finding out the site and extent of tumor and thus helps in arriving at a diagnosis and very useful in further planning for the treatment.

Keywords: CT-computed tomography, MDCT-multidetector computed tomography

1. Introduction

'Eyes are windows of the brain' through which one recognizes the world. Throughout the medical history afflictions of an eye have been noted for more than any other tissue space appendage or organ of comparable size.

Diagnosis of orbital disease is often not precise even after a thorough clinical examination. In earlier era, this dilemma would necessitate on exploratory orbitotomy to determine the diagnosis. With advent of CT, it has become the modality of choice in arriving at diagnosis for orbital lesions.

The clarity of presentation of orbital lesions by multidetector computed tomography has prompted investigations into detailed multiplanar anatomy of orbit. Tumour margins and inflammatory processes are clearly defined that one can place the lesion in specific compartments and precisely determine the extent of disease processes. Extra orbital disease involving the orbit are well delineated.

Information regarding the anatomical location of orbital lesions, involvement of intraorbital structure and extension into periorbital regions such as sinuses and intracranial extension can be obtained routinely.⁴

Selection of Patients

Inclusion criteria: Patients who presented with proptosis, white reflex or mass around the orbits or clinically, fundoscopically or sonologically suspected to have intra ocular or retroorbital lesions were selected and studied. Patients included had complaints of pain in the eye, redness of eye, proptosis, white reflex and restriction of ocular movement

Exclusion criteria: Patients who had come with recent history of trauma, to evaluate the extent of trauma or to detect the presence of foreign body were totally excluded

from the study.

2. Results

- There was slight male preponderance in my study
- Maximum no of patients were less than 9 years
- Majority of patients complained of proptosis
- Majority of case had unilateral involvement
- There was involvement of paranasal sinuses in 9 cases
- Majority of cases were involving extraconal compartment. Only six cases involved optic nerve. In which three case were lesions arising from optic nerve other 3 cases were retinoblastoma cases extending into optic nerve
- Only six cases showed calcification

Table 1: Showing CT Diagnosis

	CT Diagnosis
Pseudo tumor	3
Cavernous Hemangioma	2
Capillary Hemangioma	1
Orbital Cysticercosis	1
B/L Chronic Dacryoadenitis	1
Benign Lacrimal gland tumour	1
Dermoid	2
Retinoblastoma with optic nerve extension	3
Thyroid Orbitopathy	3
Optic nerve glioma	1
Optic nerve meningioma	2
Rhabdomyosarcoma	2
Venolymphatic malformation	1
Maxillary carcinoma	2
tolosa hunt syndrome	1
Orbital cellulitis	3
Ethmoidal Mucocele	1

Pseudotumor, thyroid orbitopathy were maximum number of cases in adults. Retinoblastoma cases were maximum number of cases in children. Followed by cases of Rhabdomyosarcoma.



Figure 1: Axial CT section showing lacrimal gland mass



Figure 2: A case of rhabdomyosarcoma. Axial CT section showing ill defined mass in superomedial aspect of left orbit involving both pre and post septal compartments.

3. Discussion and Analysis

- Thirty patients with orbital lesions are evaluated
- Age of patients ranged from 11/2 yr to 75 yrs
- A slight male predominance is seen
- Proptosis is most common complaint of patients in my study
- My study shows similarity to some extent to previous studies
- In pediatric age group retinoblastoma is the most often
- In adults, Graves disease and pseudotumor are more often
- Orbital cellulitis is also more common lesion in my study
- There are 24 unilateral cases and 6 bilateral cases
- Extension external to orbit was seen in 6 cases
- Orbital involvement from periorbital structures were seen in 4 cases
- Bony changes were seen in 4 cases.

Vascular tumours:

- There are 2 cases of cavernous haemangioma
- Shows hyperdense intraconal lesions enhancing with

contrast no e/o calcification/any bony involvement

- 1 case of venolymphatic malformation which is ill-defined intraconal lesion which showed more prominent enhancement .
- 1 case of capillary haemangioma in one year baby involving superomedial aspect of right eye which was hyperdense lesion enhancing with contrast.

Pseudotumor:

- There were 3 cases of pseudotumor 2 cases with bilateral involvement (According to recent studies bilateral involvement is now reported more commonly than previously) In all cases, multiple muscles are involved
- In all cases, tendon involvement present.

Thyroid Orbitopathy:

- 3 cases were seen
- All 3 cases had B/L involvement
- All 3 cases had multiple muscle involvement
- All cases were enhancing with contrast
- In all cases tendinous insertion spared.

Retinoblastoma:

- 3 cases were seen
- All were unilateral involvement
- Age group was 4 to 6 years
- All patients mainly presented with proptosis
- All cases showed presence of calcification
- In all cases, there was extension to ipsilateral optic nerve but no intracranial extension.

Optic Nerve Tumors:

- 1 case of Optic glioma
- 2 cases of Optic Nerve Meningioma
- Diminution of vision is the most important complaint
- There may be associated proptosis
- e/o calcification in both cases of meningioma

Dermoid:

- 2 cases are seen
- One 21 years old and other 40 years old patients
- Both had hypodense lesion
- In one case there was fat fluid level
- Patient mainly complained of proptosis

Mucocele:

- 1 case of ethmoidal mucocele seen
- There was bony erosion seen

Rhabdomyosarcoma:

- 2 cases are seen one 8 year and other 7 year old child
- Complaining of rapidly developing proptosis
- In both cases, mass involves superomedial quadrant
- There was no pain
- Both were extraconal masses.

Maxillary sinus Malignancy:

- 2 cases are seen
- Lesion extends from maxillary sinus into orbit
- It extends into ethmoid sinus, sphenoid sinus and cheek

- CT diagnosis is of locally infiltrative malignancy
- Histopathology report is of maxillary sinus malignancy.

One Case of orbital cysticercosis is seen patients showed typically dilated and enhanced superior rectus muscle with cystic lesion with scolex within it.

Two Cases of lacrimal gland involvement seen.

- One patient came with unilateral swelling in lacrimal region. On CT there is well defined round lesion which did not show involvement of other orbital structures. No e/o any calcification Histopathology report suggestive of malignancy.
- Another patient complains of swelling noted in superolateral aspect (lacrimal gland region) bilaterally.
- CT revealed bilateral enlarged enhancing lacrimal gland
- Chest X-ray showed bilateral hilar lymphadenopathy.
- CT diagnosis chronic bilateral dacryoadenitis (? sarcoidosis)
- Patient followed up and confirmed. Three cases of orbital cellulitis present
- There is ethmoidal sinusitis in all cases
- Preseptal involvement with extension of inflammation into postseptal space
- A case of Tolosa hunt syndrome in a patient complained of diplopia, diseased vision and pain, on right side
- There is ill-defined enhancing soft tissue lesion in orbital apex on right side which is also involving proximal right cavernous sinus.
- In my study, the efficiency of CT in evaluation of orbital disease is 96.8%
- In another study conducted CT was 83% effective in evaluation of 50 cases of proptosis.
- In another study CT was approximately 86% to 91% efficient in detecting orbital lesions. In this study about 100 cases of clinically suspected orbital mass lesions were studied.

4. Conclusion

- CT is modality of choice in evaluating orbital lesions
- Maximum information can be obtained by appropriate scanning techniques and systematic analysis of CT characters of various lesions involving orbit.
- Appropriate window setting has to be done
- Valsalva manoeuvre technique has to be used whenever required
- Both axial and coronal sections has to be taken in order to improve diagnostic accuracy.
- Distribution of lesion varies in children and in adults.
- Retinoblastoma is the most frequent tumour in children followed by rhabdomyosarcoma
- Any extra orbital extension or intracranial extension helps in evaluating prognosis.
- Compartmentalization helps in diagnosis.
- CT also helps in monitoring response to therapy
- CT is fairly accurate in narrowing differential diagnosis.

5. Summary

- CT is very helpful in narrowing the differential

diagnosis and also helpful guide for FNAC /biopsy. In general, retinoblastoma was most common tumour in children. Thyroid orbitopathy and pseudotumor were most common in adults followed by paraorbital tumours.

- With the help of CT ,the presence of calcification, bony erosion or intracranial involvement could be studied.
- Present study could not be adequately compared with other previous study as the number of cases available in given time frame is small.
- However there was gross similarity as retinoblastoma was commonest pseudotumor was more common in adult age group.

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