



Accuracy of CT in Diagnosis of Orbital Pathology and To Determine the Site and Extent of Tumor

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ABSTRACT

The present study was conducted with the following aims-To evaluate efficacy of CT in evaluating orbital diseases, To determine the site and extent of tumor and aid in decision making for treatment modality including surgery whenever necessary, To evaluate the orbit in patient clinically suspected to have orbital pathology, To detect, localize and characterize the lesion, To establish extent of lesion prior to planning the treatment. This study included 30 patients who were suspected of having orbital lesions. And all these patients underwent computed tomographic evaluation of orbit. CT is 96.6% effective in our study. And majority of patients improved after treatment after CT diagnosis.

INTRODUCTION

A wide spectrum of tumors and pseudotumors may involve the orbit. ⁽¹⁾ Their clinical presentation is often nonspecific, consisting of exophthalmos, diplopia, visual loss, orbital pain or signs of orbital inflammation. Imaging plays a major role in the etiological diagnosis, providing a precise analysis of the location of the lesion, its components, and its effects on adjacent and nearby structures.⁽²⁾ It studies tumor extension and often provides a good evaluation of its composition. Various modalities of imaging orbital masses are -Plain/Conventional radiography, Ultrasonography (USG), Computed Tomography (CT) and Magnetic Resonance Imaging (MRI). Although real time ultrasonography with high frequency probes provides non-ionizing, cost-effective, nonradiation, non-invasive screening technique which can be performed in outdoor patient

without any use of anaesthetics or sedation, CT scan is a superior diagnostic modality.⁽³⁾

The clarity of presentation of orbital structures by computed tomography has prompted investigations into detailed multiplanar anatomy of orbit. Tumor margins and inflammatory processes are so clearly defined that one can place the lesion in specific compartments and accurately determine the extent of disease processes. Extra orbital disease involving the orbit are also well delineated.⁽²⁾

METHODOLOGY

This study of computed tomographic evaluation of orbital diseases with clinical and pathological correlation was conducted on 30 patients. The study was conducted in the Department of Radiodiagnosis and Imaging, M.B. Govt. Hospital, RNT Medical College, Udaipur.

Inclusion Criteria

Patients presented with complaints related with proptosis, white reflex or mass around the orbits or clinically, fundoscopically or sonologically suspected to have intra ocular or retro orbital lesions were included in the study.

PATIENT PREPARATION

All patients except infants were advised at least three hours fasting prior to examination. A thorough clinical examination was done with particular attention to the lesion in the orbit. Infants and children who were not co-operative were sedated by giving oral phenergen or IV diazepam.

Contrast studies were performed by injecting 60% or 76% iohexol calculated at a dose of 300 mg 1.5cc/kg body weight as a single bolus injection.

Details of imaging technique:

Computed Tomography (CT) was done on PHILIPS 16 spiral CT scan to take contiguous 2 mm thickness sections at 2 mm interval for both axial and coronal planes prior to and after administration of intra venous (ionic/nonionic) contrast media (1.5cc/kg). Axial sections were obtained with a gantry angulation of -10° to the orbitomeatal base line.. Soft tissue window was used to assess orbital soft tissue injuries. Wherever required CT Brain and CT Para Nasal Sinuses (PNS) was also done .Delayed scans were done in relevant cases.

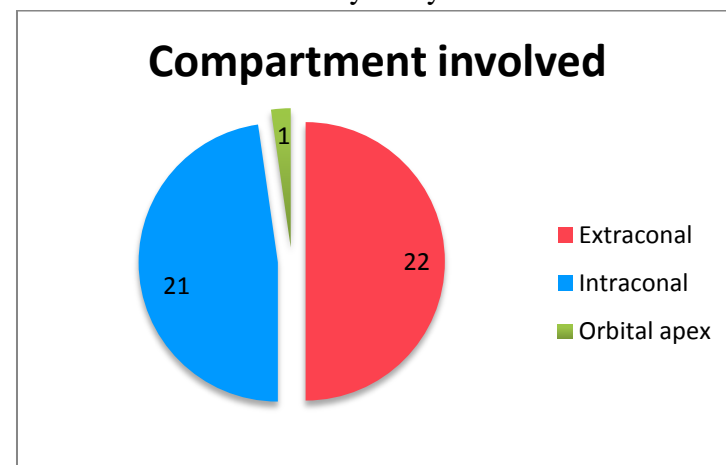
The size of the globe, orbit, optic foramen, intra ocular muscles and optic nerves were measured and overall attenuation of their structures noted.

The location of the lesion in relation to the canal space was noted as to whether it was intraconal, extraconal or conal. Involvement of optic nerve and possible intracranial extension of any tumor was looked into. The imaged part of the brain paracnhyoma in both axial and coronal planes were studies for any abnormality.

DISCUSSION AND ANALYSIS

Thirty patients with orbital lesions were evaluated. Age of patients ranged from 1.5 yr to 70 yrs. A

slight male predominance was noted. Proptosis was most common complaint of patients in our study. our study is comparable up to some extent to previous studies. In pediatric age group retinoblastoma is the most frequently occurring case.⁽⁴⁾ In adults Graves disease and pseudotumor was more common. Orbital cellulites was also more common lesion in my study.



There were 24 unilateral cases and 6 bilateral cases. Extension outside orbit was seen in 5 cases. Orbital involvement from paraorbital structures were seen in 3 cases. Bony changes were seen in 3 cases. There were 2 cases of cavernous haemangioma. Both cases were hyperdense intraconal lesions enhancing with contrast.⁽⁵⁾ There was no e/o calcification. No e/o any bony involvement. There was 1 case of venolymphatic malformation which was ill defined intraconal lesion which showed more prominent and enhanced lesion with contrast.. There was 1 case of capillary haemangioma seen in one and half year old baby involving superomedial aspect of left eye which was hyperdense lesion enhancing with contrast.⁽⁶⁾

Pseudotumour represents a nongranulomatous inflammatory process in orbit or eye with no known local or systemic causes

Pain and signs of inflammation are usually evident in acute phase. In chronic phase, differentiation from lymphoma is difficult.⁽⁷⁾

There were 3 cases of pseudotumor are seen, 2 cases with bilateral involvement (According to recent studies bilateral involvement in now

reported more commonly than previously). In all cases multiple muscle involvement was seen. In all cases tendon was involved.

There were 3 case of thyroid orbitopathy 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 is a primary malignant tumour of childhood. 90% of patients diagnosed before 5 years of age. ⁽⁸⁾ there were 3 cases of retinoblastoma are 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.

One case of Optic glioma and 2 cases of Optic Nerve Meningioma were seen. Diminution of vision was the most important complaint. There was associated proptosis. There was e/o calcification in both cases of meningioma. ⁽⁹⁾

Orbital choristoma result from the rest of embryonic cells that were anomalously intrapped in or around orbit. Orbital choristoma are most commonly represented by dermoid and epidermoid cyst and dermolipoma. ⁽¹⁰⁾ 2,cases of dermoid were seen in our study . 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. 1 case of fronto- ethmoidal mucocele seen. There was bony erosion seen. Rhabdomyosarcoma is Commonest primary malignant orbital tumour of childhood commonly occurring in the superonasal quadrant with extension into adjacent paranasal sinuses and nasal cavity, it may be primary or secondary extending from the paranasal sinuses.

⁽¹¹⁾ Rhabdomyosarcoma were seen in 2 cases, one 8 year and other 9 year old child. Complaining of rapidly developing proptosis. In one cases mass was involving superomedial quadrant,in other inferolateral quadrant was involving. There was no pain. Both were extraconal masses.

Para orbital mass frequently affect eye and its function, and are often silent prior to the involvement of the visual system. The location of the mass affecting the eye may aid the differential diagnosis. ⁽¹²⁾ 2 cases were seen of maxillary sinus malignancy. Lesion was extending from maxillary sinus into orbit. It was extending into ethmoid sinus, sphenoid sinus and cheek. CT diagnosis of locally infiltrative malignancy was made. Histopathology report of maxillary sinus malignancy was made. 1 case of orbital cysticercosis was seen patients showed typically dilated and enhanced superior rectus muscle with cystic lesion with scolex within it. CT imaging may show diffuse myositis in presence of a positive enzyme linked immunosorbent assay for anticysticercal antibodies which is also diagnostic. ⁽¹³⁾ 2 cases of lacrimal gland involvement seen. Cyst of lacrimal glands can occur due to blockage of the excretory ducts and may be located in palpebral or orbital lobes of main gland; in the accessory lacrimal glands of krause and wolfring or in ectopic lacrimal glands. These cysts appear as low density, nonenhancing lesions on CT. ⁽¹⁴⁾

1 patient came with unilateral swelling in lacrimal gland region. On CT there was well defined rounded lesion which did not show any involvement of other orbital strutures. No e/o any calcification seen CT diagnosis of benign adenoma of lacrimal gland was done. Histopathology report came as features s/o malignancy. Another patient complained of swelling noted in superolateral aspect (lacrimal gland region) bilaterally. CT revealed bilaterally enlarged enhancing lacrimal gland noted. Chest X-ray showed bilateral hilar lymphadenopathy. CT diagnosis chronic bilateral dacryoadenitis (? sarcoidosis) was made. Patient followed up and confirmed. Three cases of orbital cellulitis was seen. There was ethmoidal sinusitis in all cases. There was preseptal involvement with extension of inflammation into post septal space. Extraocular muscles, optic nerve and superior ophthalmic vein was normal. **Tolosa-Hunt**

syndrome (Painful external ophthalmoplegia)⁽¹⁵⁾ A syndrome involving the cavernous sinus and the superior orbital apex, affecting, the 3rd, 4th 6th and first divisions of the 5th nerve.

One case of Tolosa hunt syndrome was seen patient complained of diplopia, diseased vision and pain, on left side. There was ill defined enhancing soft tissue lesion in orbital apex of left side which is also involving proximal left cavernous sinus.

According to my study the efficiency of CT in evaluation of orbital disease is 96.6%. In another study conducted CT was 82% 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.²

Table: Diagnostic efficacy of CT

Test	Positive	Negative	Total
Positive	29	1	30
Negative	0	0	0
Total	29	1	30

Sensitivity = 100% Specificity = 0%

- Positive predictive value (Efficacy) = 96.6%
- Negative Predictive value = 0%

Out of 30 cases 29 diagnosed cases correlated very well with other investigations. Only one case of where CT diagnosis of benign lacrimal gland tumor came as malignant.

CONCLUSION

CT is modality of choice in assessing orbital lesions. Maximum information can be obtained by appropriated scanning technique and systematic analysis of CT characters of various lesions involving orbit. Appropriate window setting has to be done. Valsalva maneuver 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 adults retinoblastoma was most common tumor in children followed by rhabdomyosarcoma. Any extraorbital extension or intracranial extension helps in determining prognosis.

Compartmentalization helps in arriving at a diagnosis. CT also helps monitoring response to therapy. CT was fairly accurate in narrowing differential diagnosis.

SUMMARY

CT was very helpful in narrowing down the differential diagnosis and was also helpful guide for FNAC /biopsy. In general retinoblastoma was most common tumor in children. Thyroid orbitopathy and pseudotumor were most common in adults followed by paraorbital tumors. With the help of CT 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 (30) available in given time frame was small. However there was gross similarity as retinoblastoma was commonest pseudotumor was more common in adult age group.

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