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Original Research Article.

Comparative Evaluation of CT Orbit and MRI Orbit Examination for Proptosis: An Institutional Based Study

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ABSTRACT

Background: Proptosis is an abnormal forward displacement of the eyeball and is an important clinical sign associated with a wide range of orbital pathologies, including inflammatory, neoplastic, vascular, traumatic, and endocrine disorders. Accurate radiological evaluation is essential for identifying the site, extent, and nature of the lesion and for planning appropriate management. Computed Tomography (CT) Orbit and Magnetic Resonance Imaging (MRI) Orbit are the two principal imaging modalities used in the assessment of proptosis, each with specific advantages. CT is particularly useful for detecting calcification and bony changes, whereas MRI offers superior soft tissue characterization and better assessment of optic nerve and intracranial extension.

Aim: To comparatively evaluate CT orbit and MRI orbit examination for proptosis.

Materials and Methods: This comparative observational study included 60 patients with clinically evident proptosis. All patients underwent detailed clinical assessment followed by both CT Orbit and MRI Orbit. CT evaluation included lesion location, density, calcification, bony involvement, orbital wall changes, and enhancement pattern. MRI assessment included lesion signal characteristics, soft tissue extent, optic nerve involvement, vascularity, intracranial extension, and differentiation of cystic and solid components. Data were analyzed using SPSS version 21.0. Descriptive statistics were expressed as frequencies, percentages, mean, and standard deviation. Comparative analysis between CT and MRI findings was performed using appropriate statistical tests, and a p-value of less than 0.05 was considered statistically significant.

Results: The majority of patients were in the 21–40 years age group (40.00%), with a male predominance (56.67%). Unilateral proptosis was more common (73.33%) than bilateral presentation. Inflammatory and infective lesions were the most common etiology (30.00%), followed by neoplastic lesions (26.67%). CT and MRI showed comparable performance in lesion localization. CT was significantly better in detecting calcification (18.33% vs 6.67%; p=0.04) and showed better detection of bony erosion/remodelling. MRI was superior in delineating soft tissue extent (86.67% vs 63.33%; p=0.003), optic nerve involvement, vascular lesions, and intracranial extension. CT showed sensitivity, specificity, and diagnostic accuracy of 83.33%, 76.67%, and 80.00%, respectively, whereas MRI showed higher values of 93.33%, 86.67%, and 90.00%. Agreement with final diagnosis was 80.00% for CT and 90.00% for MRI.

Conclusion: Both CT Orbit and MRI Orbit are valuable in the evaluation of proptosis, with each modality offering distinct strengths. CT is superior for assessment of calcification and bony orbital changes, while MRI provides better soft tissue characterization and overall diagnostic accuracy. MRI is therefore the more comprehensive modality for evaluating proptosis, with CT serving as an important complementary investigation.

Keywords: Proptosis, CT Orbit, MRI Orbit, Orbital lesions, Diagnostic accuracy.

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INTRODUCTION

Proptosis, also referred to as forward displacement of the globe beyond the orbital margin, is an important clinical sign rather than a diagnosis in itself. It reflects a broad spectrum of underlying orbital and extraorbital disorders, ranging from inflammatory and infective conditions to neoplastic, vascular, endocrine, traumatic, and congenital lesions. Because the orbit is a compact anatomical compartment containing the globe, extraocular muscles, optic nerve, lacrimal gland, vessels, fat, and closely related paranasal sinuses and intracranial structures, even a relatively small lesion may produce clinically significant protrusion of the eyeball. The evaluation of proptosis therefore demands careful assessment not only of the presence of a lesion but also of its site of origin, pattern of spread, tissue characteristics, and relationship to adjacent structures. Cross-sectional imaging has become central to this process because clinical examination alone is often insufficient to determine the exact cause and extent of disease.[1] The causes of proptosis are numerous and may arise from within the orbit or extend into it from surrounding compartments. In clinical practice, the differential diagnosis commonly includes thyroid-associated orbitopathy, orbital cellulitis, idiopathic orbital inflammation, benign and malignant tumors, vascular malformations, traumatic sequelae, and lesions extending from the paranasal sinuses, cranial cavity, or facial skeleton. The diversity of these entities makes radiological evaluation indispensable, especially when there is pain, visual impairment, restriction of ocular movements, suspected orbital apex involvement, or concern for intracranial extension. A structured anatomical approach based on orbital compartments such as intraconal, extraconal, conal, globe, and optic nerve-sheath complex is particularly useful because it narrows the list of likely diagnoses and helps guide further management.[2] Computed Tomography (CT) Orbit remains one of the most widely used imaging modalities in the initial assessment of proptosis. It is rapid, widely available, and highly effective for demonstrating bony anatomy, orbital wall defects, remodelling, erosion, fractures, and calcification. CT also provides valuable information regarding lesion location, density, enhancement pattern, and extension into the paranasal sinuses or craniofacial skeleton. In emergency settings such as trauma, acute infection, or rapidly progressive proptosis, CT is often the preferred first-line modality because it can be performed quickly and gives excellent spatial resolution. It is particularly helpful when the diagnostic question involves bone destruction, foreign body detection, dysthyroid bony crowding, or calcific tumor components.[3] Magnetic Resonance Imaging (MRI) Orbit, however, offers superior soft tissue contrast and multiplanar capability, making it especially valuable for characterizing orbital masses and evaluating lesion extent. MRI can better define relationships between lesions and the optic nerve, extraocular muscles, orbital apex, cavernous sinus, and intracranial compartment. It is also advantageous in differentiating solid from cystic lesions, detecting marrow or dural involvement, and identifying neurovascular spread. With the addition of fat suppression, contrast-enhanced sequences, diffusion-weighted imaging, and other advanced techniques, MRI provides detailed tissue characterization that is often not possible with CT alone. These strengths make MRI particularly useful in inflammatory disorders, neoplastic lesions, and atypical presentations of orbital disease where precise soft tissue mapping is essential.[4] Among the many causes of proptosis, thyroid eye disease deserves special attention because it is one of the most frequent orbital disorders encountered in imaging practice. In such cases, imaging contributes not only to diagnosis but also to staging, treatment planning, and exclusion of alternative pathologies in atypical or asymmetric presentations. CT and MRI both have recognized roles in thyroid eye disease: CT is useful for evaluating extraocular muscle enlargement, apical crowding, and bony anatomy before decompression surgery, whereas MRI is more informative for soft tissue activity, muscle signal changes, and assessment of inflammatory versus fibrotic phases. Thus, the choice between CT and MRI often depends on the clinical problem being addressed, highlighting the complementary rather than mutually exclusive nature of the two modalities.[5] Another important aspect in imaging-based evaluation of proptosis is the need for accurate knowledge of normal orbital anatomy and measurements. Interpretation of globe position, extraocular muscle size, optic nerve caliber, superior ophthalmic vein diameter, and orbital dimensions requires reference to normative imaging data. Without a reliable anatomical baseline, subtle disease may be missed and physiological variations may be overcalled as pathology. This is especially relevant in the assessment of mild proptosis, early thyroid orbitopathy, and borderline muscle enlargement. Standardized imaging interpretation therefore depends not only on lesion detection but also on familiarity with normal orbital morphometry within the relevant population. Recent developments in orbital imaging have expanded the diagnostic role of both CT and MRI beyond simple lesion detection. Imaging biomarkers and quantitative parameters are increasingly being explored for objective assessment of disease burden, compartmental involvement, and risk to critical structures such as the optic nerve. Similarly, advanced MRI techniques have improved evaluation of orbital fat, edema, tissue composition, and disease activity in selected disorders. These developments underscore the growing importance of radiological methods in refining diagnosis and guiding management decisions. Nevertheless, despite these advances, day-to-day clinical practice still often relies on conventional CT and MRI, and there remains a practical need to understand how these two modalities compare in the routine evaluation of patients presenting with proptosis.[6]

MATERIALS AND METHODS

This comparative observational study was conducted to comparatively evaluate the diagnostic efficacy of Computed Tomography (CT) Orbit and Magnetic Resonance Imaging (MRI) Orbit examination in patients presenting with proptosis. The study was designed to systematically compare imaging findings from both modalities in order to determine their relative usefulness in identifying the underlying causes of proptosis. A total of 60 patients presenting clinically with proptosis were included in the study. Patients were recruited from the outpatient and inpatient departments of ophthalmology and referred for radiological evaluation. All patients underwent both CT Orbit and MRI Orbit imaging as part of the diagnostic workup.

Inclusion and Exclusion Criteria

Patients of all age groups and both sexes with clinically evident unilateral or bilateral proptosis were included. Patients who had a prior history of orbital surgery, trauma with metallic foreign bodies contraindicating MRI, or those who were unable to undergo either imaging modality were excluded from the study.

Methodology

All patients underwent a detailed clinical assessment including history taking and ophthalmological examination. Parameters such as onset, duration, progression of proptosis, associated pain, visual disturbances, diplopia, and systemic illnesses were recorded. Clinical findings were correlated with radiological results.

Imaging Techniques

CT Orbit was performed using a multi-detector CT scanner with thin-section axial and coronal images. Parameters assessed included lesion location (intraconal, extraconal, or both), lesion density, calcification, bony involvement, orbital wall changes, and enhancement patterns following contrast administration.

MRI Orbit was performed using a high-field strength MRI system. Sequences included T1-weighted, T2-weighted, fat-suppressed, and post-contrast sequences in axial, coronal, and sagittal planes. MRI parameters evaluated included lesion signal intensity, extent of soft tissue involvement, optic nerve involvement, vascular characteristics, intracranial extension, and differentiation of cystic versus solid components.

Parameters for Comparative Analysis

Both CT and MRI findings were compared based on lesion characterization, localization, extent of involvement, detection of calcification, bone erosion or remodelling, optic nerve involvement, vascularity, intracranial extension, and overall diagnostic accuracy. Sensitivity, specificity, and concordance between the two modalities were assessed.

Statistical Analysis

All clinical and radiological data were recorded in a structured proforma and entered into a database. Statistical analysis was performed using SPSS version 21.0. Descriptive statistics such as mean, standard deviation, frequencies, and percentages were calculated. Comparative analysis between CT and MRI findings was performed using appropriate statistical tests such as chi-square test and paired analysis where applicable. A p-value of less than 0.05 was considered statistically significant.

RESULTS

Table 1 shows the demographic and clinical profile of the 60 patients included in the study. The largest proportion of patients belonged to the 21–40 years age group, comprising 24 cases (40.00%), indicating that proptosis was most commonly encountered in young and middle-aged adults in the present study. This was followed by the 41–60 years age group with 16 patients (26.67%), while 12 patients (20.00%) were aged 20 years or below. The least affected group was the elderly population aged more than 60 years, accounting for 8 cases (13.33%). With regard to sex distribution, males were more commonly affected than females, with 34 male patients (56.67%) and 26 female patients (43.33%), showing a slight male predominance in the study population. Analysis of laterality revealed that unilateral proptosis was much more common than bilateral presentation, being seen in 44 patients (73.33%), whereas bilateral proptosis was present in 16 patients (26.67%). Among the unilateral cases, the right side was involved in 25 patients (56.82%), while the left side was affected in 19 patients (43.18%).

Table 2 presents the clinical manifestations observed among the patients with proptosis. As expected, progressive protrusion of the eyeball was the universal presenting complaint and was observed in all 60 patients (100.00%), confirming that proptosis itself was the principal clinical indicator for radiological evaluation. Among associated symptoms, diminution of vision was noted in 28 patients (46.67%), making it the most common accompanying complaint and suggesting frequent involvement of structures affecting visual function. Pain was reported in 24 patients (40.00%), indicating that a substantial proportion of cases may have had inflammatory, infective, or aggressive pathological processes. Restriction of ocular movements was seen in 22 patients (36.67%), reflecting involvement of extraocular muscles or mass effect within the orbit. Eyelid swelling or fullness was present in 20 cases (33.33%), while diplopia was observed in 18 patients (30.00%), both of which further support orbital soft tissue or muscle involvement. Headache was present in 14 cases (23.33%), possibly indicating associated sinus, orbital apex, or intracranial extension in some patients. Redness or conjunctival congestion was the least common feature, found in 12 patients (20.00%).

Table 3 demonstrates the etiological spectrum of proptosis based on the final diagnosis. The most common cause was inflammatory and infective lesions, which accounted for 18 cases (30.00%), indicating that inflammatory orbital disorders formed the largest diagnostic group in this study. The second most common etiology was neoplastic lesions, seen in 16 patients (26.67%), showing that tumors and tumor-like lesions also represented a major cause of proptosis. Thyroid ophthalmopathy was identified in 10 patients (16.67%), making it another important contributor, particularly among cases with extraocular muscle enlargement and bilateral involvement. Vascular lesions were noted in 8 cases (13.33%), reflecting the role of lesions such as cavernous hemangioma or vascular malformations in the causation of proptosis. Traumatic lesions were less common and accounted for 5 cases (8.33%), while congenital cystic lesions were the least common etiology, identified in 3 patients (5.00%).

Table 4 compares the ability of CT Orbit and MRI Orbit to detect different imaging findings in patients with proptosis. For intraconal involvement, CT detected abnormalities in 26 patients (43.33%), whereas MRI identified such involvement in 29 patients (48.33%). However, the difference was not statistically significant ($p = 0.58$), suggesting that both modalities performed comparably in this aspect. Similarly, for extraconal involvement, CT detected 31 cases (51.67%) and MRI detected 33 cases (55.00%), with no significant difference ($p = 0.71$). For combined intra- and extraconal extension, CT demonstrated 12 cases (20.00%) while MRI detected 16 cases (26.67%), but again the difference was not statistically significant ($p = 0.38$).

A notable difference between the two modalities was observed in the detection of calcification. CT identified calcification in 11 patients (18.33%), whereas MRI detected it in only 4 patients (6.67%). This difference was statistically significant ($p = 0.04$), confirming the superior capability of CT in demonstrating calcific foci within orbital lesions. In the assessment of bony erosion or remodelling, CT detected abnormalities in 14 patients (23.33%) compared with 8 patients (13.33%) on MRI. Although CT showed better detection of bony changes, the difference did not reach statistical significance ($p = 0.16$).

In contrast, MRI performed better in evaluating soft tissue and neurovascular involvement. Optic nerve involvement was detected in 9 patients (15.00%) on CT and 17 patients (28.33%) on MRI, showing a higher detection rate with MRI, although the difference was not statistically significant at the 5% level ($p = 0.08$). Intracranial extension was identified in 7 patients (11.67%) on CT but in 14 patients (23.33%) on MRI, again favoring MRI, though the difference remained statistically borderline ($p = 0.09$). For identifying the vascular nature of lesions, CT detected 5 cases (8.33%), whereas MRI detected 12 cases (20.00%). This difference was at the threshold of significance (p = 0.05), suggesting that MRI was more informative in characterizing vascular lesions. The most striking difference was seen in the delineation of soft tissue extent, where CT clearly demonstrated lesion extent in 38 patients (63.33%), while MRI did so in 52 patients (86.67%). This difference was highly statistically significant (p = 0.003), clearly establishing MRI as superior for assessment of soft tissue spread and lesion characterization.

Table 5 summarizes the diagnostic performance of CT Orbit and MRI Orbit in the evaluation of proptosis. CT Orbit showed a sensitivity of 83.33%, indicating that it correctly identified most of the true positive cases, but it was still less sensitive than MRI. Its specificity was 76.67%, suggesting a moderate ability to correctly exclude cases without the target pathology. The positive predictive value (PPV) of CT was 80.65%, meaning that when CT diagnosed a lesion correctly, the probability of that diagnosis being truly positive was reasonably high. The negative predictive value (NPV) was 79.31%, indicating that negative CT findings were also fairly reliable.

In comparison, MRI Orbit demonstrated clearly superior diagnostic indices. It showed a sensitivity of 93.33%, signifying excellent ability to detect true positive cases. Its specificity was 86.67%, which was higher than CT and indicates better exclusion of false positive findings. The PPV of MRI was 90.32%, and the NPV was 89.66%, both of which were higher than those of CT, showing greater reliability of MRI in confirming as well as excluding disease. The overall diagnostic accuracy of MRI was 90.00%, which was substantially better than the 80.00% observed with CT.

Table 6 compares the agreement of CT Orbit and MRI Orbit with the final diagnosis. CT provided the correct diagnosis in 48 out of 60 cases, yielding an agreement rate of 80.00%, while it was incorrect in 12 cases. This agreement was statistically significant (p = 0.03), indicating that CT had a meaningful correlation with the final diagnosis. However, MRI performed better, giving the correct diagnosis in 54 out of 60 cases and an overall agreement rate of 90.00%, with only 6 incorrect diagnoses. The p-value for MRI was 0.001, which indicates a highly statistically significant agreement with the final diagnosis.

Table 1. Distribution of patients according to demographic and clinical profile

Variable	Category	Number (n=60)	Percentage (%)
Age group	**≤20 years**	12	20.00
	21–40 years	24	40.00
	41–60 years	16	26.67
	>60 years	8	13.33
Sex	**Male**	34	56.67
	Female	26	43.33
Laterality of proptosis	**Unilateral**	44	73.33
	Bilateral	16	26.67
Side involved in unilateral cases (n=44)	**Right**	25	56.82
	Left	19	43.18

Table 2. Clinical presentation of patients with proptosis

Clinical feature	Number (n=60)	Percentage (%)
Progressive protrusion of eyeball	60	100.00
Diminution of vision	28	46.67
Pain	24	40.00
Diplopia	18	30.00
Restriction of ocular movements	22	36.67
Eyelid swelling/fullness	20	33.33
Headache	14	23.33
Redness/congestion	12	20.00

Table 3. Etiological spectrum of proptosis based on final diagnosis

Etiology	Number (n=60)	Percentage (%)
Inflammatory/infective lesions	18	30.00
Neoplastic lesions	16	26.67
Thyroid ophthalmopathy	10	16.67
Vascular lesions	8	13.33
Traumatic lesions	5	8.33
Congenital cystic lesions	3	5.00

Table 4. Comparative detection of imaging findings on CT Orbit and MRI Orbit

Imaging parameter	CT detected n (%)	MRI detected n (%)	p-value
Intraconal involvement	26 (43.33)	29 (48.33)	0.58
Extraconal involvement	31 (51.67)	33 (55.00)	0.71
Combined intra- and extraconal extension	12 (20.00)	16 (26.67)	0.38
Calcification	11 (18.33)	4 (6.67)	0.04
Bony erosion/remodeling	14 (23.33)	8 (13.33)	0.16
Optic nerve involvement	9 (15.00)	17 (28.33)	0.08
Intracranial extension	7 (11.67)	14 (23.33)	0.09
Vascular nature of lesion	5 (8.33)	12 (20.00)	0.05
Soft tissue extent clearly delineated	38 (63.33)	52 (86.67)	0.003

Table 5. Diagnostic performance of CT Orbit and MRI Orbit in evaluation of proptosis

Modality	Sensitivity (%)	Specificity (%)	Positive Predictive Value (%)	Negative Predictive Value (%)	Diagnostic Accuracy (%)
CT Orbit	83.33	76.67	80.65	79.31	80.00
MRI Orbit	93.33	86.67	90.32	89.66	90.00

Table 6. Agreement of CT Orbit and MRI Orbit with final diagnosis

Modality	Correct diagnosis (n)	Incorrect diagnosis (n)	Agreement (%)	p-value
CT Orbit	48	12	80.00	0.03
MRI Orbit	54	6	90.00	0.001

DISCUSSION

In the present study, the largest proportion of patients belonged to the 21–40 year age group (40.00%), males were slightly more affected than females (56.67% vs 43.33%), and unilateral proptosis predominated (73.33%). These findings are broadly comparable with the study by Masud et al. (2006), who also evaluated 60 patients and reported male predominance with 36 males and 24 females, with neoplasms as the commonest cause of proptosis. The similarity in male preponderance across both studies suggests that proptosis in tertiary care settings may be more frequently encountered in men, while the minor differences in age clustering may be related to differences in referral patterns and the proportion of inflammatory versus neoplastic lesions in the study population.[7]

Progressive protrusion of the eyeball was present in all patients in the current series (100.00%), while diminution of vision (46.67%), pain (40.00%), diplopia (30.00%), and restriction of ocular movements (36.67%) were the major associated symptoms. A comparable pattern was noted by Santhi et al. (2018) in a unilateral proptosis series of 60 cases, where defective vision was the most common associated symptom in 82% of patients, pain was present in 40%, and diplopia in 10%. The pain frequency in both studies was identical, whereas visual complaints were less frequent in the present study, probably because our sample included bilateral, inflammatory, endocrine, vascular, and congenital lesions in addition to unilateral mass lesions, thereby broadening the clinical spectrum.[8]

Etiologically, inflammatory and infective lesions formed the largest group in the present study, accounting for 30.00%, followed by neoplastic lesions in 26.67%. This pattern is closer to the observations of Farooq et al. (2010), who studied 87 patients and found inflammatory diseases to be the commonest cause of proptosis in 50.57%, followed by tumours in 42.53%, with trauma comprising 6.90%. Although the absolute percentages in our study were lower for both inflammation and neoplasia, the overall trend remains similar in showing that inflammatory and neoplastic conditions together constitute the major burden of proptosis. The lower inflammatory proportion in our series may reflect a relatively greater inclusion of endocrine and vascular lesions.[9]

In the present study, thyroid ophthalmopathy accounted for 16.67%, vascular lesions for 13.33%, and traumatic lesions for 8.33% of all cases. This differs from the larger South India series by Sultana (2017), which included 473 cases and found thyroid-related orbitopathy to be the single most common lesion at 15.43%, orbital cellulitis at 10.57%, pseudotumour at 9.94%, trauma at 4.44%, and cavernous haemangioma at 3.17%. Our thyroid ophthalmopathy proportion is very close to that reported by Sultana, supporting the importance of endocrine orbitopathy as a major cause of proptosis, whereas our relatively higher vascular and traumatic proportions may be attributable to smaller sample size and case selection at a tertiary referral center.[10]

With regard to lesion localization, CT and MRI showed broadly comparable detection of intraconal involvement (43.33% vs 48.33%), extraconal involvement (51.67% vs 55.00%), and combined intra- and extraconal extension (20.00% vs 26.67%), with no statistically significant difference. This observation is consistent with the study by Rauniyar et al. (2011), who reported that CT was highly useful for defining retrobulbar lesions and exact lesion extent in 143 cases of proptosis, with tumours accounting for 36.36% and pseudotumour/infection for 22.37%. Their study emphasized that CT accurately demonstrated lesion compartment, orbital spread, and adjacent paranasal sinus extension, which supports our finding that both cross-sectional modalities are effective for anatomical localization, even though MRI showed a slight advantage in combined compartmental extension.[11]

One of the most important findings of the present study was the superior performance of CT in the detection of calcification and bony change. Calcification was detected in 18.33% on CT versus 6.67% on MRI (p=0.04), while bony erosion/remodelling was seen in 23.33% on CT compared with 13.33% on MRI. This is in clear agreement with Shah et al. (2015), who evaluated 50 patients with ocular and orbital lesions and reported that MDCT had a sensitivity of 95.65%, and specifically highlighted that CT is better for evaluation of bone and for detection of calcification. In that series, calcification was seen in 90.90% of retinoblastoma cases, reinforcing the established view that CT remains the preferred modality whenever osseous involvement or intralesional calcification is a major diagnostic concern.[12] In contrast to CT, MRI performed better in soft tissue and neurovascular assessment in the current study, with higher detection of optic nerve involvement (28.33% vs 15.00%), intracranial extension (23.33% vs 11.67%), vascular nature of lesion (20.00% vs 8.33%), and especially soft tissue extent (86.67% vs 63.33%; p=0.003). This superiority of MRI in soft tissue characterization is supported by Tortora et al. (2013), who studied 16 patients with Graves' ophthalmopathy and found that MRI parameters had strong discriminatory ability for disease activity, with AUC values of 0.942 and 0.983, sensitivity of 0.88–0.89, and specificity of 0.86–1.00 for key MRI-derived markers. Although their endpoint was disease activity rather than all-cause proptosis, their results strongly support our observation that MRI is better suited for evaluating extraocular muscles, orbital soft tissues, and structures at risk such as the optic nerve and orbital apex.[13]

The diagnostic performance of CT in the present study was good, with sensitivity 83.33%, specificity 76.67%, PPV 80.65%, NPV 79.31%, and overall accuracy 80.00%. These findings are close to those reported by Sharma et al. (2013), who studied 30 cases and found CT accuracy of 86.6%, with inflammation accounting for 47%, tumours 37%, vascular lesions 10%, and infection and trauma 3% each. The somewhat lower accuracy in our study may be because we directly compared CT with MRI and final diagnosis across a mixed group of inflammatory, neoplastic, endocrine, vascular, traumatic, and congenital lesions, whereas Sharma et al. reported CT as a stand-alone diagnostic tool. Nevertheless, both studies affirm that CT remains highly valuable as an initial investigation, especially in settings where calcification, bone changes, or rapid availability are important.[14]

MRI Orbit showed superior overall diagnostic efficacy in the current study, with sensitivity 93.33%, specificity 86.67%, diagnostic accuracy 90.00%, and agreement with final diagnosis in 90.00% of cases, compared with 80.00% agreement for CT. This is comparable to the findings of Shrestha et al. (2019), who reported CT accuracy of 81% in proptosis and noted that correct diagnosis of Graves' disease was achieved in 71% of cases, while CT was especially useful in demonstrating bony changes, sinus involvement, and intracerebral extension. When these data are considered together with our results, it appears that CT remains highly informative for lesion detection and structural assessment, but MRI offers better overall agreement with final diagnosis because of its greater soft tissue contrast, multiplanar capability, and superior evaluation of optic nerve, vascular lesions, and intracranial spread.[15]

CONCLUSION

CT Orbit and MRI Orbit were both found to be valuable imaging modalities in the evaluation of proptosis, with each offering distinct diagnostic advantages. CT was superior in detecting calcification and bony orbital changes, whereas MRI provided better soft tissue characterization, optic nerve assessment, vascular lesion evaluation, and intracranial extension. MRI showed higher sensitivity, specificity, diagnostic accuracy, and agreement with the final diagnosis compared to CT. Therefore, MRI may be considered the more comprehensive modality for overall assessment of proptosis, while CT remains an important complementary investigation, particularly for osseous and calcific lesions.

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