COMPARATIVE STUDY OF COMPUTED TOMOGRAPHY AND MAGNETIC RESONANCE IMAGING TECHNIQUE IN DETECTION, CHARACTERIZATION AND ANALYSIS OF NECK MASSES

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ABSTRACT

Background: Study was plan to correlate the concordance between CT and MRI imaging technique in evaluation of neck masses. **Material &Methods**: 68 patients under went medical and radiological examinations, those are presenting with neck masses and referred to the department of radio-diagnosis. All the patients are analyzed with 64 slice CT Scan   machine (Siemen ,Somaton sensation). and 1.5 tesla MRI machine (Seimens Avanto). Results were analysed to find out any discordance between results of these imaging techniques. **Results:** Comparative evaluation of sensitivity, specificity and diagnostic accuracy of CT and MRI in different benign and malignant etiologies suggested that diagnostic accuracy and sensitivity of MRI shown to be superior to CT but in terms of specificity CT Scan shows better results, while Diagnostic accuracy of MRI varies from 95 to 100% whereas for CT diagnostic accuracy varies from 75% to 98%. **Conclusion:** Though in recent years MR imaging is considered to be imaging modality of choice for neck masses computed tomography is extremely useful in defining bony involvement and soft tissue extent of the lesion. It is fast, widely available and suitable for even patients in whom MRI may be contraindicated.
Keywords: Neck mass, CT scan, MRI

INTRODUCTION

Neck encompasses a wide variety of anatomical structures which belong to different organ systems and thereby neck masses include a spectrum of lesions of diverse origin and can be congenital or acquired, inflammatory, vascular or neoplastic.

The neck being an exposed area, the swellings there are easily observed and thus lead to a cosmetic problem, leading to an early presentation of the patients to clinicians, Mass lesion detection which is a diagnostic challenge, sometimes results in fatal complications like airways compression, vascular compression and metastatic compression

It is very essential to evaluate imaging of neck masses, along with other supportive investigations to reach a certain diagnosis & main primary imaging in neck includes USG, followed by CT & MRI. **(1, 2)**

USG being a limitation in certain groups of diseases cannot completely assess the extent of disease or diseases of regions, inapproachable by it. On other hand, CT and MRI help us to determine clearly the

extent of almost every pathology and anatomy. CT provides excellent differentiation of fat from other tissues and for evaluation of bone and calcifications, while MRI to a greater extent, is suitable for evaluation of soft tissue because of its intrinsic high soft tissue discrimination. **(3, 4)** The main disadvantage of MR includes lower patient tolerance, time consuming, more costly and of CT is lower contrast resolution and ionizing radiation. **(5, 6)**

Thus, to determine whether one of the two techniques is superior to other is critical for providing guidance for clinical practice. The purpose of this study is to assess the comparative analysis of CT and MRI in evaluation, detection and characterization of neck masses and help in deciding further course of management.

MATERIALS AND METHODS

Source of data: The main source of data for the study were the patients presenting with complain of neck masses, at tertiary health care institute in southern rajasthan.

Sample size: 68 patients.

Duration of study – 1 to 1.5 years from January 2016 to June 2017.

Methodology of study:

All patients referred to the department of radio-diagnosis with clinically palpable neck mass/swelling or neck metastases were clinically evaluated on the basis of history and local examination.

Scanning was done with :

1. Computed Tomography: CT scan will be done on 64 slice Siemen (Somaton sensation)   machine. Both plain and contrast enhanced CT were performed with minimum slice thickness of upto 1 mm, where needed.

2. Magnetic Resonance Imaging: 1.5 tesla Seimens Avanto machine. A three plane localizer in coronal, sagittal and axial planes was taken with T1W, T2W, STIR and DWI (wheresoever required) sequences.

Results and observations:

In our study, total 68 patients were included, out of which 52 were males and 16 were females.

Maximum occurrence of lesions was seen in age group of 51-60 years followed by 41-50 years i.e. 17 and 13 respectively. Minimum occurrence was observed in age group of 1-10 years and 71-80 years

Majority of patients comes with complain of neck mass belongs to malignant lesions (75%) while remaining (25%) present with benign lesions

The most common benign cause being tubercular lymphadenitis, followed by ranula, retropharyngeal abscess, carotid body tumor & other as shown above.

The maximum number of malignant causes being CA tongue, CA larynx with metastatic lymphadenopathy

Occurrence of benign and malignant tumours was more in male than females. There was 79% malignant and 21% benign neck lesions were observed in male whereas frequency of these lesions in female was 62.5% and 37.5% respectively

In case of malignant neck masses it was observed that diagnostic accuracy and sensitivity of MRI shown to be better than CT. CT was shown to be having good precision of specificity over MRI. Diagnostic accuracy of MRI varies from 95 to 100% whereas for CT diagnostic accuracy varies from 75% to 98%.

Comparison of sensitivity and specificity of MRI and CT in soft tissue contrast and bone infiltration showed that computed tomography (CT) was extremely useful in defining bony infiltration. It was found that Sensitivity (92%) and specificity (95%) of CT for detection of bone involvement was better than Sensitivity (91%) and specificity (94%) of MRI. In case of, soft tissue extent of the lesion can be better detected by MRI than CT

Table 9: Comparative evaluation of Sensitivity, specificity and Diagnostic accuracy of CT and MRI in different benign and malignant etiologies

Benign	CT			MRI		
	DA	SE	SP	DA	SE	SP
Tubercular lymphadenitis	96.10	99.00	100.00	99.00	100.00	100.00
Ranula	97.00	91.10	99.00	98.00	99.10	80.00
Retropharyngeal abscess	98.00	75.00	100.00	99.00	100.00	76.00
Laryngocele	92.00	90.86	100.00	99.00	99.86	91.00
Tubercular abscess	93.00	94.00	100.00	96.00	100.00	86.00
Parotid abscess	96.00	88.00	98.10	99.00	100.00	98.10
Carotid body tumor	92.00	97.00	100.00	95.00	100.00	91.00
Neurogenic tumor	86.00	76.00	100.00	99.00	100.00	68.00
Sialedinitis with sialolith	94.00	96.00	100.00	99.00	100.00	100.00
pleomorphic adenoma	98.00	96.00	100.00	100.00	99.00	90.00
Parotid hemangioma	97.00	94.00	99.40	98.86	99.00	95.00

Malignant	CT			MRI		
	DA	SE	SP	DA	SE	SP
CA larynx	90.00	70.00	100.00	98.00	99.00	99.00
CA Tongue	75.00	92.00	99.00	99.00	100.00	88.00
CA thyroid	85.00	70.00	98.00	100.00	100.00	96.00
CA tonsil	91.00	93.00	92.10	98.78	100.00	91.00
CA buccal mucosa	93.50	94.90	100.00	96.00	99.10	97.00
Lymphoma	96.00	98.00	99.10	96.00	99.00	98.10
CA supraglottic larynx	81.00	87.00	100.00	95.00	100.00	96.00
CA pyriform fossa	94.00	93.00	100.00	99.00	100.00	95.20
CA salivary gland	94.00	96.00	100.00	99.00	100.00	96.00
CA maxillary sinus	98.00	96.50	100.00	97.99	98.00	90.00
CA parapharyngeal	97.10	97.00	100.00	99.99	99.56	93.20
CA reteromolar trigone	97.75	97.56	100.00	99.43	100.00	98.00
CA post cricoid region	98.00	98.54	99.60	97.65	99.39	96.00
CA mandibular	97.00	96,50	98.00	100.00	98.46	95.00
Post radiotherapy changes	90.10	83.00	94.00	97.05	95.70	85.10

DISCUSSION

The occurrence of metastasis in patients with neck masses is very common (**Jemal** et al., 2010). Prognosis and optimal treatment depends on involvement of cervical lymph node metastasis, treatment includes selective or radical neck dissection followed by radiotherapy or radiotherapy (Ferlito et al, 2003; Tankéré et al., 2000)

For prediction of patient prognosis in neck cancer, cervical node metastasis is important(Golder et al.,

2004; O'Brien et al, 2002).various technique is available for detection neck cancer (Castelijns et al.2002; Castelijns et al. 2001). MRI and CT are usually preferred for the same purpose Kitagawa et al., 2003)

Imaging technique shows better accuracy than clinical palpation (Schöder et al., 2006). By differential enhancement after contrast cervical nodes can be separated in better manner from adjacent adjacent vessels. (Li et al., 2012)

Either CT or MRI can be perform under current routine health care setting, though MRI sometimes preferred because of evaluation of high soft tissue discrimination ability (Rumboldt et al., 2006)

Thus, to determine whether one of the two techniques is superior to the other is critical for providing guidance for clinical practice.

In the present study, 75% patients were diagnosed for the presence of malignant lesions and 25% were for benign lesions. Maximum numbers of benign lesions noticed in patients were of tubercular lymphadenitis fol1owed by ranula, retropharyngeal abscess and carotid body tumour

By efficient diagnostic methods, neck mass can be determined by family physician during their clinical practice.

Comparison of sensitivity and specificity of MRI and CT in soft tissue contrast and bone infiltration showed that computed tomography (CT) was extremely useful in defining bony infiltration. It was found that Sensitivity (92%) and specificity (95%) of CT for detection of bone involvement was better than Sensitivity (91%) and specificity (94%) of MRI. In case of, soft tissue extent of the lesion can be better detected by MRI than CT. MRI showed 95% and 98% sensitivity and specificity respectively for soft tissue contrast, which was observed to be superior to CT.

Thus, CT and MRI had acceptable diagnostic efficacy in detecting metastasis in patients with neck cancer., CT had a higher SP while MRI had a higher SE and DA . Our findings suggest that MRI is superior to CT in the diagnosis of soft tissue resolution metastasis. CT had a better efficacy in detection of bone infiltration.

CONCLUSION

Neck masses are frequently encountered in all age groups and can present a diagnostic dilemma for the clinicians involved. CT being particularly useful for assessing the patient in more acute scenarios. If required, additional acquisition by means of magnetic resonance imaging (MRI) and computed tomography (CT) can be considered.

Comparative evaluation of sensitivity, specificity and diagnostic accuracy of CT and MRI in different benign and malignant etiologies suggested that diagnostic accuracy and sensitivity of MRI shown to be superior to CT. CT was shown to be possess good specificity over MRI. Diagnostic accuracy of MRI varies from 98 to 100% whereas for CT diagnostic accuracy varies from 86% to 98%.

In case of malignant neck masses it was observed that diagnostic accuracy and sensitivity of MRI shown to be better than CT. CT was shown to be having good precision of specificity over MRI. Diagnostic accuracy of MRI varies from 95 to 100% whereas for CT diagnostic accuracy varies from 75% to 98%.

Comparison of sensitivity and specificity of MRI and CT in soft tissue contrast and bone infiltration showed that computed tomography (CT) was extremely useful in defining bony infiltration. It was found that Sensitivity (92%) and specificity (95%) of CT for detection of bone involvement was better than Sensitivity (91%) and specificity (94%) of MRI. In case of, soft tissue extent of the lesion can be better detected by MRI than CT.

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