



DIAGNOSTIC ABILITY OF MDCT IN EVALUATION OF NECK LESIONS

Radiology

Dr V. Vijetha

Assistant professor , department of radiology , Guntur medical college , Guntur , AP.

Dr.G.V.

Parvatheswara
rao*Professor & HOD , department of radiology , Guntur medical college , Guntur, AP.
*Corresponding Author

ABSTRACT

Objective- (a) To localize and characterize neck lesions with respect to anatomical delineation , extension into adjacent structures and bony involvement.(b)To correlate the findings of MDCT with final diagnosis.

Material and methods-50 patients with suspected neck lesions were subjected to CECT in our institution and the images were analyzed on plain scan and after the administration of non-ionic intravenous contrast. The lesions were studied with respect to enhancement pattern, local invasion, bony involvement and venous thrombosis. The present study was conducted in department of radiology , government general hospital , Guntur for a period of one year from May 2020 to April 2021 for patients coming with neck swellings. All the scans are performed with GE 16 slice CT scan machine.

Results- There were 28 malignant lesions and 22 benign lesions in our study. The imaging diagnosis of malignant and benign lesions was confirmed on histopathology. We had one false positive case in our study where a case of post radiation necrosis was inaccurately diagnosed as tumor recurrence and one false negative where one case of buccal carcinoma was wrongly interpreted as a benign lesion. MDCT had an overall accuracy of 96%.

Conclusion- From this study we conclude that , Multidetector Computed Tomography of the neck has improved the localization and characterization of neck lesions. Accurate delineation of disease by CT scan provides a reliable pre-operative diagnosis, plan for radiotherapy ports and post treatment follow up. The most important advantage lies in its ability to detect bony lesions (erosions and expansion).

KEYWORDS

1. INTRODUCTION

The development of computerized tomography (CT) has been called the most important contribution to medical diagnostic techniques since Roentgen discovered the X-ray in 1895. By the introduction of cross sectional imaging a new dimension in evaluation of neck lesions has evolved. CT is useful in evaluation of head and neck lesions such as lesions of nasopharynx, base of skull, the larynx and neck areas. CT has added the horizontal plane in the evaluation of these lesions. CT with its unique capacity to display osseous and soft tissue details has become an indispensable tool in evaluation of patients with neck mass.⁵ Spiral CT scanning is rapidly replacing conventional dynamic CT scanning (slice-by-slice acquisition) in most medical centers. Spiral CT permits rapid scanning of large volumes of tissue during quiet respiration. Spiral CT is less susceptible to patient motion than conventional CT.³ Volumetric helical data permits optimal multiplanar and 3D reconstructions.

2. Method/approach

OBJECTIVES

- To localize and characterize neck lesions with respect to anatomical delineation , extension into adjacent structures and bony involvement.
- To correlate the findings of MDCT with final diagnosis.

Study design

The present study was a hospital based prospective conducted during the period of 1 year from May 2020 to April 2021 at Department of Radio Diagnosis, government general hospital, Guntur

Source of data

- 50 patients with suspected neck lesions attending opd

Sample size

Fifty (50) cases of neck lesions

Selection criteria

MALIGNANT LESIONS	MALIGNANT LESIONS									
	Enhancement		Necrosis		Bony invasion		Vascular invasion		Adjacent space invasion	
	Homogenous	Heterogenous	Negative	Positive	Absent	Present	Absent	Present	Absent	Present
Laryngeal carcinoma	1	4	1	4	3	2	5	0	2	3
Buccal carcinoma	1	3	2	2	3	1	4	0	4	0
Nasopharyngeal carcinoma		1	0	1	0	1	1	0	0	1

Inclusion criteria

- All patients with neck lesions identified clinically or by examination

Exclusion criteria

- All antenatal cases.
- Seriously ill patients on ventilator support

Technique

All the scans were performed with GE 16 slice CT scan machine. Scanning parameters were identical to the manufacturer's standard recommended pre-setting for a thorax routine. Images were reconstructed with a 1-mm slice thickness in all cases using the classic filtered back-projection method with a soft tissue kernel of B20 and a lung kernel of B60. Coronal and sagittal multiplanar reconstructions were also available in all cases. Implementation of appropriate infection prevention and control measures were arranged in all suspected CT cases, consisting of prompt sanitation of CT facility and patient's isolation.

RESULTS :

NECK LESION	FREQUENCY	PERCENT
Masticator space	5	10%
Buccal space	5	10%
Parotid space	3	6%
Parapharyngeal space	12	24%
Retropharyngeal space	1	2%
Prevertebral space	2	4%
Carotid space	3	6%
Submandibular space	3	6%
Visceral space	9	18%
Pharyngeal mucosal space	5	10%
Posterior cervical space	2	4%

Malignant Lesions (n= 28)

Submandibular neoplasm		1	1	0	1	0	1	0	1	0
Oropharyngeal carcinoma		2	0	2	1	0	0	2	0	2
Maxillary carcinoma		1	0	1	1	1	1	0	0	1
Lymphoma	3		3	0	3	0	2	0	3	0
Paraganglioma	1		1	0	1	0	1	0	1	0
Metastatic carcinoma		8	0	8	8	0	8	0	8	0
Papillary carcinoma		1	0	1	1				1	0
Adenoid cystic carcinoma		1		1	0	1	1	0	0	1
Subtotal	6	22	7	21	22	6	26	2	20	8
Total		28		28		28		28		28

Benign Lesions (n= 22)

Neck Lesions	BENIGN LESIONS									
	Enhancement		Necrosis		Bony invasion		Vascular invasion		Adjacent space invasion	
	Homogenous	Heterogenous	Negative	Positive	Absent	Present	Absent	Present	Absent	Present
Hemangiomas	2	0	2	0	2	0	2	0	2	3
Nasopharyngeal angiofibroma	0	1	1	0	0	1	1	0	1	0
Abscess		6	6	0	6	0	6	0	2	3
Lymphnodes	2	0	2	0	2	0	2	0	2	0
Lymphangioma		2	0	2	2	0	2	0	2	0
Branchial cleft cyst	2	0	2	0	2	0	2	0	2	0
Adenoids	1	0	1	0	1	0	1	0	1	0
Parathyroid adenoma	0	1	0	1	1	0	1	0	1	0
Vagal schwannoma		2	2	0	2	0	2	0	2	0
Post radiation necrosis	1	0	1	0	1	0	1	0	1	0
Mandibular AVM		1	1		1	0	1		1	0
Trigeminal schwannoma		1	0	1	0	1	1	0	0	1
Total	8	14	18	4	20	22	28	0	16	6
		22		22		22		22		22

Most (73.33%) of the malignant lesions showed heterogeneous contrast enhancement. Necrosis was present in 70.6% of the malignant lesions.

Bony involvement was seen in 6 cases (20%) of the malignant lesions and in 3 (13.5%) cases of benign lesions.

Vascular involvement in the form of jugular vein thrombosis was seen in 6.66% of malignant lesions. Extension into the adjacent space was seen in 8 (26.66%) of malignant lesions and in 3 (13.5 %) cases of benign lesions.

Lesions according to space	Positive		Negative		Total
	TRUE	FALSE	FALSE	TRUE	
Submandibular space	3	0	0	45	50
Masseteric space	4	1	0	45	50
Buccal space	4	0	1	45	50
Parapharyngeal space	12	0	0	38	50
Carotid space	3	0	0	47	50
Parotid space	3	0	0	47	50
Pharyngeal mucosal space	5	0	0	45	50
Retropharyngeal space	1	0	0	49	50
Prevertebral space	2	0	0	48	50
Posterior cervical space	2	0	0	48	50
Visceral space	9	0	0	41	50

Lesions according to space	Sensitivity	Specificity	PPV	NPV	Accuracy	P value
Submandibular space	100	100	100	100	100	<0.001**
Masseteric space	100	97.8	80	100	98	<0.001**
Buccal space	80	100	100	98	98	<0.001**
Parapharyngeal space	100	100	100	100	100	<0.001**
Carotid space	100	100	100	100	100	<0.001**
Parotid space	100	100	100	100	100	<0.001**
Pharyngeal mucosal space	100	100	100	100	100	<0.001**

Retropharyngeal space	100	100	100	100	100	<0.001**
Prevertebral space	100	100	100	100	100	<0.001**
Visceral space	100	100	100	100	100	<0.001**

In the present study 48 out of 50 cases were correctly characterized by Computed tomography giving an accuracy of 96 %. One case of buccal carcinoma was wrongly diagnosed as benign lesion and another case of post radiation necrosis was inaccurately diagnosed as tumor recurrence

CONCLUSION

- From this study we conclude that ,Multidetector Computed Tomography of the neck has Improved the localization and characterization of neck lesions.
- Accurate delineation of disease by CT scan provides a reliable pre-operative diagnosis, plan for radiotherapy ports and post treatment follow up.
- The most important advantage lies in its ability to detect bony lesions (erosions and expansion).
- Recently developed Multidetector CT (MDCT) enables for thinner collimation with use of MPR, MIP and SSD images which improves the localization of the neck lesions
- The faster scan acquisition, less susceptibility to deleterious artefacts from patient motion, ability to be performed in patients with implanted electrical devices are its advantages.
- CT is a more practical imaging modality due to its relatively lower cost, making it more accessible to patients of lower socioeconomic strata.
- Since CT is fast, well tolerated, and readily available CT, it can be used for initial evaluation, preoperative planning, biopsy targeting, and postoperative follow-up and reserve MRI as a complimentary imaging modality or for those tumors that may have higher chance of perineural spread.
- However, histopathology still remains the gold standard as CT is not 100% accurate.

RESULTS

- Among 50 cases studied 22 (44%) were benign and 28 (56%) were malignant neck lesions.
- Overall there was a male preponderance with 30 (60%) males and 20 (40%) females and with a male to female ratio of 3:2.
- Among the neck lesions the most common was Metastatic lymph-node mass (26%) followed by laryngeal carcinoma (12%)

and oral cavity malignancy.

- Benign lesion were common in the age group of 21-30 with a female to male ratio of 1.44:1
- Malignant lesions were more common in the elderly age group of 61-70 years with a male to female ratio of 3:1
- The most common space involvement was parapharyngeal space (26%) followed by visceral space (18%).
- MDCT has 96 % accuracy in diagnosing neck lesions.
- MDCT has 100 % accuracy in predicting bony involvement in head and neck cancers.
- Advantages of MDCT includes ability to perform thin slice scanning with thinner reconstruction intervals and ability to perform MIP,SSD ,MPR and curved reformatted images.
- Thus MDCT has an excellent accuracy in localizing and characterizing of the neck lesions.