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Original Research Article

Evaluation of Neck Masses with Multidetector Computed Tomography Scan

Harshika Singh[1], Seema Pandey[2], Mariyam FatimaB[3], Ashish Kumar Pandey[4]

[1]Senior Resident, Department of Radiodiagnosis, Moti Lal Nehru Medical College, Prayagraj, Uttar Pradesh

[2]Associate Professor, Department of Radiodiagnosis, Moti Lal Nehru Medical College, Prayagraj, Uttar Pradesh

[3]Senior Resident, Department of Radiodiagnosis, Moti Lal Nehru Medical College, Prayagraj, Uttar Pradesh

[4]Senior Resident, Department of Radiodiagnosis, Moti Lal Nehru Medical College, Prayagraj, Uttar Pradesh

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Corresponding author: Dr Ashish Kumar Pandey
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Abstract

Aims and Objective: To find out multidetector computed tomography used to evaluate neck lesions in terms of tumour location and size along with tumor spread, invading nearby vascular and visceral tissues.

Material and Methods: Patients who had neck lesions that were clinically suspected or who had been identified as having neck lesions on ultrasonography were referred to CT for further characterization and underwent a prospective study. The patients had neck pain and a palpable neck tumor as their symptoms. Multidetector CT was used to evaluate the patients.

Result: There were 25 benign lesions and 15 malignant lesions in the current investigation. Histopathology supported the imaging diagnosis of malignant and benign lesions. One of our cases of mandibular osteosarcoma was mistakenly diagnosed as osteomyelitis, leading to a false negative.

Conclusion: The localization and characterization of neck lesions have improved thanks to multidetector computed tomography. An accurate CT scan disease delineation allows for a solid preoperative diagnosis, radiation port planning, and post-treatment follow-up.

Keywords: Malignant, Benign, CT, MDCT, Neck Masses

Introduction

Neck masses are often seen in both the general public and hospitals. Nodal masses and non-nodal masses are the two general categories used to describe neck masses. Nodal masses can be reactive or malignant in origin. Non-nodal masses might be of mesenchymal, congenital, inflammatory, neurological, neoplastic, and vascular origin [1].

In cases when the presence of a head/neck mass is either obvious or suspected, computed tomography is frequently the initial diagnostic imaging evaluation carried out. The ability of CT to show both osseous and soft tissue details makes it an invaluable tool for assessing patients with neck masses [2]. In the majority of medical facilities, MDCT scanning is quickly replacing traditional dynamic CT scanning (slice-by-slice acquisition). Spiral CT allows for the quick scanning of substantial amounts of tissue while respiration remains quiet. Patient motion is less of an issue with MDCT than it is with traditional CT [3].

Critical anatomical information on lesions affecting the neck is provided by CT. Determining the location, size, and nature of the lesion after contrast delivery is crucial because it aids in distinguishing between benign and malignant neck masses [4]. The extent of the disease in malignant lesions can be determined by CT, allowing for precise planning of the surgery and radiation ports [5].

With the use of multi-detector row computed tomography, the current study's goals were to anatomically localise and characterise neck masses as well as to categorise and ascertain the prevalence of neck masses in various age and gender categories.

Material and Methods

Patients with clinically suspected neck lesions or patients who were found to have neck lesions on ultrasonography and were referred to CT for further characterization from peripheral centres were the subjects of an observational prospective study. Patients who refused to participate in the trial, women who were pregnant, patients whose renal function tests were abnormal, patients who were receiving radiotherapy for neck masses, and post-operative neck mass patients were also excluded. 50 patients with neck lesions in all underwent a CT scan.

Prior to the scan, the patient was kept on an empty stomach for four to six hours. In addition, 80 ml of nonionic contrast at 300 mg/ml were used. When phasic scans were necessary, the monophasic injection strategy was followed, and contrast was injected at 3.5 ml/s either manually or with a pressure injector. The group of radiologist with experience reporting head and neck CT scans evaluated each scan obtained using the specified technique. The images were assessed using a networked workstation with multiplanar reconstruction capabilities (MPR). When reporting MDCT scans, a standard proforma was used.

The location of the lesion, the primary disease's size, the degree of involvement, the enhancing pattern, the calcification and necrosis of the lesion, as well as its local and distant metastases, were all recorded.

Results

In the present study maximum percentage of patients were in the age group of 21-30years (20%) followed by 31-40 years (17%) and 51-60 years (17%). The present study show male preponderance (55%) with male to female ratio of 1.25:1. Most common benign neck mass was in the age group of 21-30 years and 31 – 40 years as given in Table 1.

Table 1: Gender distribution according to age in Benign lesion (n=35)

Age group in years	Male		Female		Total	
	No.	%	No	%	No	%
< 10	2	11.1%	3	17.64%	5	14%
11 – 20	1	5.5%	3	17.64%	4	11%
21 – 30	5	27.7%	2	11.7%	7	20%
31 – 40	3	16.6%	3	17.64%	6	17%
41 – 50	2	11.1%	1	5.88%	3	8%
51 – 60	3	16.6%	3	17.64%	6	17%
61 – 70	2	11.1%	1	5.88%	3	8%
> 71	0	0.00%	1	5.88%	1	3%
Total	18		17		35	

The current study shows higher incidence of malignant lesions between 51-60 years and 61-70 years. Higher incidence among males was noted with a male to female ratio of 1.5:1. Table 2.

Table 2: Gender distribution according to age in Malignant lesion (n=15)

Age group (yrs)	Female		Male		Total	
	No	%	No	%	No	%
< 10	0	0%	0	0%	0	0%
11 – 20	0	0%	0	0%	0	0%
21 – 30	0	0%	0	0%	0	0%
31 – 40	1	20%	0	0%	1	6.6%
41 – 50	1	0%	2	20%	3	20%
51 – 60	1	20%	4	45%	5	34%
61 – 70	2	40%	3	35%	5	34%
> 71	1	20%	0	0%	1	6.6%
Total	6		9		15	

Out of 50 cases studied 35 (62.5%) were of benign etiology and 15 (37.5%) were of malignant etiology. Most (88%) of the benign lesions of the neck were below the age of 60 years except for a case of parapharyngeal and retropharyngeal abscess. Most common benign lesion in this series were benign lymph-nodes followed by benign thyroid lesion. Table 3.

Table 3: Distribution of Benign Lesion (n= 35)

Lesion	No	%
Nasopharyngeal Angiofibroma	1	5
Benign LN	9	25
Lymphangioma	2	8
Adenoids	2	7
Vagal Schwannoma	4	10
AVM	4	10
Abscess	3	8
CBT	3	7
Benign Thyroid Lesion	5	15
Lipoma	2	5

The most common malignant lesions in this series were laryngeal carcinoma and hypopharyngeal carcinoma. Table 4.

Table 4: Distribution of Malignant Lesion (n= 15)

Lesion	Number	Percentage
Larynx	4	26.66%
Thyroid gland	2	13.33%
Hypopharynx	4	26.66%
Lymph nodes	2	13.33%
Nasopharynx	2	13.33%
Mandible	1	6.66%
Total	15	

Discussion

Neck masses are frequently encountered in routine clinical practice and comprise a wide pathological spectrum with patients regularly presenting with a lump in the neck [6]. A strict protocol for diagnosis should be followed of which radiology is a crucial pillar. Importance of MDCT lies in its superior accuracy and the excellent anatomical Detail it provides of the complex anatomy of the neck.

A study done by Ozkiris M. *et al* also showed that in neck masses, neoplasms should be considered in older adults and inflammatory and congenital masses in children and young patients. In the present study, male predominance of malignant lesions was detected [7]. This could be attributed to the smoking and alcohol habits. A study done by Abhinanda Bhattajaree *et al* also showed a male preponderance of malignant lesions in neck [8].

Most common cause of metastatic adenopathy was from aerodigestive tract malignancies (63%), lymphadenopathy from unknown primary site (22%) and single cases of nodal masses were due to tonsillar abscess, retropharyngeal abscess, lymphoma and metastasis from mucoepidermoid carcinoma of the parotid gland (4%) each [9]. Out of the 27 nodal masses, 18 (66.6%) were found to be malignant and 9 (33.3%) were benign.

This was in accordance with study done by Ajay K Gautam *et al* [10]. where nodal masses comprised 38% of the total cases (19 out of 50) with aero digestive malignancies being the most common cause of nodal mass of the neck and in contradistinction of study done by Vijay Pratap *et al* [11]. where inflammatory masses were the most common cause of nodal masses where nodal masses comprised of 42% of the total cases.

The malignant tumors involving larynx and hypopharynx were all squamous cell carcinoma, which corresponds to the study done by the Becjer, shows that 90% of the lesions is SCC type of space [12]. Charan *et al* found in his study that in 47% have the primary type of neck nodes in patients, nodal metasis were observed in it.

In the study thyroid masses were found to be the most common cause of non-nodal masses accounting for 50% (N=14) of non-nodal masses followed by the salivary glands-25% (N=7) with masses of developmental and mesenchymal origin accounting for 11% (N=3) of total non-nodal masses each and a mass of vascular origin (Hemangioma of the sternocleidomastoid muscle) accounting for 4% (N=1) of the total non-nodal masses.

Conclusion

It was found that Multidetector Computed Tomography of the Neck has enhanced neck lesions' localisation, classification, and staging. CT can be used for initial evaluation, preoperative planning, biopsy targeting, planning for radiotherapy ports, and postoperative follow-up because it is quick, well-tolerated, easily accessible, and affordable.

MRI should only be used as a complementary imaging modality or for tumours that may be more likely to spread perineurally.

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