Original Article

Role of multi-detector computed tomography in evaluation of neck masses

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Abstract

Introduction/Background: Multi detector CT is currently one of the most versatile and powerful imaging procedures for the evaluation of neck masses. Aim And Objective: This study was aimed to assess the role of MDCT in detection, characterization and diagnosing neck pathologies which may help in deciding further course of management. Materials and methods: TYPE OF STUDY: Cross sectional study. TIME PERIOD: January 2014 to December 2015. STUDY SUBJECTS: 86 patients who presented with clinical suspicion of neck masses. PLACE OF STUDY: At Department of Radio-diagnosis, ASRAM medical college, Eluru. IMAGING PROCEDURE: 40 section MDCT scanner (Somatom sensation). Results: In the present study anterior mass was noted in 86.05% of the patients and CT findings revealed single space in 55.81%, well defined margins in 58.14%, and visceral neck space involvement in 27.91% and mass effect in 68.6% of the patients. Contrast enhancement was noted in 89.53% and bony infiltration was present in 19.77%. The commonest diagnosed was Ill defined neoplastic lesions (47.67%) and out of these, 68.29% had necrosis. Conclusion: Multi-detector computed tomography helps in localization and characterization of neck masses. It also helps in identifying various pathologies, contents and the characteristics of the lesions. Accurate delineation of pathologies by MDCT scan provides a reliable pre-operative diagnosis; helps in staging, aspiration cytology, planning of biopsy and post treatment follow up.

Keywords: Lymph Node, Multi-Detector Computed Tomography, Neck Spaces, Neck Masses, Visceral Space.

Introduction

MDCT has now found an increasing application in evaluation of neck masses and is currently one of the most powerful and versatile imaging procedures for the evaluation of the neck masses¹. Computed tomography is a non-invasive modality, non-operator dependent and permits accurate measurement of tissue attenuation coefficient.

Magnetic resonance imaging has technical advantages over CT in its contrast resolution and excellent soft tissue depiction, its multiplaner capability, its ability to with it. However, it has several limitations, e.g. inability to depict fine bone details and calcifications as well, compared to CT scanning and failure to detect small metastatic foci in a normal sized lymph node. The ability of CT scanning to depict such small metastatic foci in normal sized lymph nodes has been one of the main reasons for its superiority over the clinical examination in staging metastatic disease. Moreover, contrast enhanced CT holds superiority and greater sensitivity over MRI in detection of capsular penetration or subtle extra nodal spread in the neurovascular bundles or fat surrounding the nodes.

Advances in cross-sectional imaging, including conventional and multidetector (MDCT), helical (spiral) CT and MR imaging, now allow detailed evaluation of the pathology and anatomy of the neck and thoracic inlet.²

Materials and methods:

The present study is a one year cross sectional study (January 2014 to December 2015) which was carried out on a total of 86 patients at Department of Radio-diagnosis, ASRAM medical college, Eluru who presented with clinical suspicion of neck masses.

All the patients had underwent imaging on 40 section MDCT scanner (Somatom sensation).

Inclusion criteria:

✦ All patients of different age groups clinically suspected for neck masses.
✦ Patients with neck masses resulting from congenital, inflammatory, neoplastic and metabolic lesions.
Exclusion criteria:
- Post-radiation cases.
- All patients with history of trauma
- Post-operative cases.

Results:
In the present study male preponderance was noted that is, 69.77% of the patients were males compared to 30.23% females with male to female ratio of 2.3:1.

Figure 1: Gender Wise Distribution

The mean age was found to be 50.09 ± 17 years with most of the patients between 51 to 60 years (23.26%). The youngest patient in our study of was aged 4 years and oldest patient was noted in age of 78 years.

Fever was the commonest symptom (79.07%) followed by swelling/lump (72.09%). Most of the patients reported history of hypertension (55.81%) and diabetes mellitus (51.16%).

The presence of anterior mass was noted in 86.05% of the patients and more than half of the study population had single space (55.81%) and well defined margins (58.14%). Majority of the patients had mass effect (68.6%). Contrast enhancement was noted in 89.53% and bony infiltration was present in 19.77%. The visceral neck space, parotid space and pharyngeal mucosal space involvement was noted in 27.91%, 19.77% and 11.63% respectively.

In this study infective lesions were diagnosed among 12 cases (13.95%) and abscesses were noted commonly in this subset with 9 patients (75%).

The diagnosis of cysts was given in 5 cases and branchial cyst was seen in 2 patients.

The commonest diagnosed was Ill defined neoplastic lesions (47.67%) and out of these, 68.29% had necrosis. The next common diagnosis was well defined tumour (16.28%) with majority of the cases being pleomorphic adenoma (64.29%).

Discussion
Owing to the recent advances such as spiral and Multidetector (MDCT) and MR imaging, the detailed evaluation of the pathologies and anatomy of neck and thoracic inlet has become more specific. In order to interpret the pathological processes, there is a need for a thorough understanding of the normal cross-sectional anatomy.

In the present study male preponderance was noted that is, 69.77% of the patients were males compared to 30.23% females. In the present study the mean age was found to be 50.09 ± 17 years with most of the patients between 51 to 60 years (23.26%). In a study done by Baum U et al
(2005) showed that prevalence of head and neck malignancy was highest in patients belonging to 50-59 years age group. Cancers arise following progressive accumulation of genetic changes over a long period of exposure to carcinogens. Higher prevalence of malignancy in this age group could be due to carcinogenic effects of tobacco, betel nut chewing habit and smoking present among population who are referred to this tertiary care centre.

In present study we find that 17 lesions (19.77 %) show bony infiltration. These findings were consistent with a study done by Rydberg et al (1984) who reported benign tumours are slow growing and show bony expansion and bony destruction whereas malignant lesions and chronic granulomatous infections show bony destruction. A series by Wippold FJ et al (2000) in their study mediated with radiological and histological pattern of bony involvement of oral cancers classified bone resorption modes into negative erosive and invasive types and histological involvement as non invasive, expansive and invasive types. They concluded that CT was extremely beneficial in preoperative evaluation of tumour spread to bone and surrounding tissues.

In the present study CT findings revealed more than half of the study population with single space (55.81%) and well defined margins (58.14%). Majority of the patients had mass effect (68.6%) and contrast enhancement (89.53%). The visceral neck space, parotid space and pharyngeal mucosal space involvement was noted in 27.91%, 19.77% and 11.63% respectively. The best enhancement of vessels is evaluated with rapid infusion of contrast material given intravenously during single breath hold.

CT plays a vital role in the diagnosis of deep seated neck lesions and infections, such as location of abscesses and helps in mapping out the location and extent, which helps in planning of treatment. In this study infective lesions were diagnosed among 12 cases (13.95%) and abscesses were noted commonly in this subset with 9 patients (75%). Gleeson et al (2000) studied deep neck space abscess on 22 patients and identified neck abscess in six cases in their study. In all six cases of abscess, the CT scan accurately identified the anatomical location of the abscess, allowing a more accurate planning of the surgical approach.

The diagnosis of cysts was given in 5 cases (5.81% and branchial cyst was more common seen in 2 patients (40%). Silverman PM, et al stated that in various pathological conditions of neck like lymphangioma, thyroglossal duct cyst, brachial cleft cyst, laryngocele, necrotic lymphadenopathy, cavernous lymphangioma and asymmetric jugular veins computed tomography was helpful in correctly predicting the etiology by the determination of the exact location of these masses in relation to the surrounding normal anatomic neck structures. In contrast to solid lesions, cystic masses show a varied spectrum of pathologies, and their characteristic locations and appearances with respect to normal neck anatomy allow a confident narrowing of differential diagnosis to be made.

In the present study more than one fourth (27.91%) of the patients had visceral neck space involvement. This could be attributed to higher incidence of pyriform fossa and thyroid carcinomas in the present study. This corresponds to the study performed by Maurea S et al in which maximum number of lesions in the suprathyroid neck were recorded in the pharyngeal mucosal space (n=21) and in the infrahyoid neck maximum cases (40) were confined to the visceral space.

**Conclusion**

MDCT with its multiplanar imaging helped in identifying various pathologies and localizing their extent, contents and to characterize the lesions, which play a useful role in arriving at proper diagnosis in identifying neck masses. Multidetector CT (MDCT) enables for thinner collimation with use of MIP and MPR images, which improves the localization of the neck lesions. Hence, it will be a method of choice for initial evaluation, preoperative planning, and biopsy targeting and postoperative follow-up of neck masses.

**References**


