Original Research Article

To assess the status of cervical lymph nodes by Multislice CECT and Doppler USG in patients With Thyroid carcinoma

Dr Brahmanand Lal[1] (Assistant Prof.), Dr. Rakhee Sharma[2] (Assistant Prof.) & Dr. AK Kakkar[3] (Ex Director Professor)
GS Medical College & Hospital, Hapur, U.P.[1]
UCMS and GTB Hospital, Delhi[2]
MAMC and LN Hospital, Delhi[3]
Corresponding Author: Dr. Rakhee Sharma

Abstract:

Background & Method: The aim of present study is to assess the status of cervical lymph nodes by Multislice CECT and Doppler USG in patients With Thyroid carcinoma. All patients underwent total thyroidectomy and neck dissection. The neck dissection sample was labeled separately according to the cervical levels II–VI. Lateral compartment neck dissection (levels II–V) was performed in 14 of 20 patients with at least one lymph node metastasis in the neck from level II to level V. Six of twenty patients underwent central compartment neck dissection including level VI or VI and VII after cytological confirmation of the benign status of any suspicious lymph node on either side of the lateral neck, as determined by preoperative CT or USG.

Result: The detection of cervical lymph node in carcinoma thyroid by CECT was 18/20(90%) cases and by USG/ Doppler it was 15/20 (75%) with p value 0.025 for USG/ Doppler and 0.011 for CECT Neck both was significant. A total of 68 nodal levels were detected in the 20 patients. Metastatic lymph nodes were found from 42 nodal level by multi slice CECT and 34 nodal levels by USG/ Doppler.

Conclusion: The study group consisted of 14 female patients and 6 male patients. The youngest patient in this study was 16 years old and the oldest was 78 years old and the mean is 47 years. Papillary carcinoma thyroid is the commonest followed by Follicular and Medullary carcinoma. Clinical palpation is the most common method of evaluation of cervical lymph nodes. FNAC is an excellent first line investigation in the diagnosis of carcinoma thyroid. On FNAC the most frequent diagnosis is papillary carcinoma.

Keywords: cervical, lymph nodes, Multislice CECT, USG & Thyroid carcinoma.

Study Designed: Prospective Observational Study.

1. INTRODUCTION

Thyroid cancer accounts for less than 1% of all malignancies (2% of women and 0.5% of men) western world. Thyroid cancer is among the most curable of human cancers. Most patients of carcinoma are euthyroid. Lymph node metastases are common especially in children and young adults.[1] Suspicion of thyroid cancer often originates through physical examination of patients and a review of the patient's history. Regional lymph node metastasis

is present at the time of diagnosis in 20-50% of patients with papillary carcinoma and to a lesser proportion in patients with other histotypes.[2,3]

There are many methods of evaluating the cervical lymph node status in thyroid cancer, the most common of which is by clinical palpation. The imaging modalities used nowadays are USG neck/ MRI/ CECT / Doppler USG /PET-CT. For correlative analysis of the nodal status on CT and USG and to establish the histopathology reference standard, the neck was divided into levels bilaterally from level II to VI according to an imaging-based nodal classification.[4] Nodes found on multislice CT were considered metastatic if they contained central necrosis or cystic change, dense cortical enhancement more than that of muscle, or if calcification was present.[5] Despite the many advantages of USG, such as its high resolution imaging capability and easy acceptability it has some drawbacks, including its subjectivity, operator dependency, and an examination field limited to superficial area. In contrast to USG, CT can overcome all of these disadvantages and has been proven to be an accurate imaging modality for the detection of lymph node metastases from head & neck squamous cell carcinoma.[6,7] However, to the best of our knowledge there have been only a few reports regarding the diagnostic accuracy of CECT for lymph node staging of thyroid cancer.[8]

2. MATERIAL & METHOD

The present study was conducted in the Department of surgery and Department of Radio diagnosis, Maulana Azad Medical College and associated Lok Nayak Hospital, New Delhi. Twenty patients of thyroid carcinoma presenting to the surgery OPD between October 2010 to March 2012, in a period of 18 months were included in this study.

INCLUSION CRITERIA:
1. All cases of thyroid carcinoma proven preoperatively on FNAC.
2. All patients with thyroid carcinoma with clinically palpable/ non palpable cervical Lymph nodes.

EXCLUSION CRITERIA:
1. Pregnancy
2. Proven diagnosis of thyroiditis
3. Patient presenting with Recurrence after Neck Dissection

Surgical procedures or histology:
All patients underwent total thyroidectomy and neck dissection. The neck dissection sample was labeled separately according to the cervical levels II–VI. Lateral compartment neck dissection (levels II–V) was performed in 14 of 20 patients with at least one lymph node metastasis in the neck from level II to level V. Six of twenty patients underwent central compartment neck dissection including level VI or VI and VII after cytological confirmation of the benign status of any suspicious lymph node on either side of the lateral neck, as determined by preoperative CT or USG. In addition to lymph nodes in the central and /or lateral cervical compartment, retropharyngeal lymph node dissection was performed when the retropharyngeal lymph node was suspicious on preoperative CT. No study patient underwent lymph node dissection at either level I or the mediastinum because there were negative results on preoperative CT and/or USG Doppler. Primary tumors and lymph nodes were dissected from the specimens and were stained with hematoxylin and eosin for histopathology examination. Data recorded included the total number of lymph nodes presented in the specimen and the presence or absence of tumor within these nodes and at the

primary site. This information was used as the reference standard for comparison with the imaging modalities.

3. RESULTS

Table 1: Clinically palpable cervical lymph node

	No. of patients
Yes	18
No	2

Eighteen out of 20 cases had palpable cervical lymph nodes. However USG/ Doppler picked cervical lymphadenopathy in 15 cases and CECT in 18 cases respectively.

Table 2: Distribution of cases Based upon Final Diagnosis (N=20)

S No.	Diagnosis	No. of Cases	Percent
1	Papillary Carcinoma	18	90
2	Medullary Carcinoma	1	5
3	Follicular Carcinoma	1	5
Total		20	100

Papillary carcinoma thyroid was the commonest 18/20 (90%) cases the carcinoma followed by follicular carcinoma (5 %) and medullary carcinoma (5 %).

Table 3: Correlation of USG/ Doppler and CECT Neck for Cervical Lymph Node detection

	Enlarged	No	p value
USG Doppler Neck	15	5	0.025
CECT Neck	18	2	0.011

The detection of cervical lymph node in carcinoma thyroid by CECT was 18/20(90%) cases and by USG/ Doppler it was 15/20 (75%) with p value 0.025 for USG/ Doppler and 0.011 for CECT Neck both was significant.

Table 4: The Correlation of No. of cervical lymph node levels detected by USG / Doppler; CT and surgical dissection

Location	Surgically dissected nodal levels	Nodal level By USG/Doppler	Nodal level By CECT
Level II	19	14	17

Level III	20	13	12
Level IV	14	5	8
Level V	10	1	3
Level VI	5	1	2
Total	**68**	**34**	**42**

A total of 68 nodal levels were detected in the 20 patients. Metastatic lymph nodes were found from 42 nodal level by multi slice CECT and 34 nodal levels by USG/ Doppler.

4. DISCUSSION

Regional lymph node metastasis is present at the time of diagnosis in 20-50% of patients with papillary carcinoma and in a lesser proportion of patients with other histotypes.[2&9] There are many methods of evaluating the cervical lymph node stat us in thyroid cancer, the most common being clinical palpation. The imaging modalities used nowadays are USG/ CECT/ PET-CT. For correlative analysis of the nodal status on CT and USG and to establish the histopathology reference standard, the neck is divided into levels bilaterally from level II to VI, according to an imaging based nodal classification.[10] Our study revealed that the overall sensitivity, specificity, and diagnostic accuracy of USG/ Doppler according to per level analysis were 50%, 100%, and 66% and per patient analysis were 78.95%, 100%, and 80%. The overall sensitivity, specificity, and diagnostic accuracy of multislice CECT according to per level analyses were 61.76%, 100%, and 74% and according to per patient analysis were 94.74%, 100%, and 95%. The overall positive and negative predictive values according to per level analysis were 100% and 48.48% for USG/ Doppler and 100% and55.17% for CT. By per level analysis, the overall diagnostic accuracies of CT and USG/ Doppler were slightly lower than those of per patient analysis. However, multislice CECT was significantly more sensitive than USG / Doppler for the detection of cervical lymph node metastasis in whole neck compartments. Although there was no statistical significance, the specificities of USG were almost equal to those of CT for whole neck compartments in per level analysis. Our study revealed that the sensitivity, specificity and diagnostic accuracy of USG/ Doppler in level II analysis were 73.68%, 100% and 75% and in level III analysis were 64.92 %, 50% and 64.85% respectively[11]. Therefore, the sensitivity of level II is more than level III by USG/ Doppler, whereas the specificity of level III was more than level II. The sensitivity, specificity and diagnostic accuracy in level IV by USG/ Doppler was 35.70%, 100%, and 57.14%. The sensitivity, specificity and diagnostic accuracy in level V and VI analysis by USG/ Doppler were 10%, 100% and 55% and 20%, 100% and 80% respectively. The sensitivity and diagnostic accuracy by USG/ Doppler in level VI were more than level V.

In the report of Jeong et al., in addition to size criteria and central necrosis, they considered lymph nodes as metastatic when pathological contrast enhancement was depicted only in

those nodes of a borderline size.[12] They also did not define pathological contrast enhancement clearly in their report. However, pathologically, most thyroid malignancies and their metastatic lymph nodes are hyper vascular, a characteristic that could allow more sensitive detection of metastatic lymph nodes from reactive ones on the arterial or early equilibrium phase of dynamic CT, as occurred in our study. Also worth noting is the lower diagnostic accuracy for metastasis to the central compartment compared to the lateral one.

5. CONCLUSION

The study group consisted of 14 female patients and 6 male patients. The youngest patient in this study was 16 years old and the oldest was 78 years old and the mean is 47 years. Papillary carcinoma thyroid is the commonest followed by Follicular and Medullary carcinoma. Clinical palpation is the most common method of evaluation of cervical lymph nodes. FNAC is an excellent first line investigation in the diagnosis of carcinoma thyroid. On FNAC the most frequent diagnosis is papillary carcinoma.

6. REFERENCES

1. Brunicardi FC, Andersen DK , Billiar TR , Dunn DL , Hunter JG Mettewes JB, Pollock ER ; Swartz principles of surgery 9 thed , New york:mcgrawhill 20010;1344-7.

2. Grebe SK, Hay ID Thyroid cancer nodal metastases: biologic significance and therapeutic considerations . SurgOncolClin North Am 1996;5:43-63.

3. Mazzaferri EL, Kloos RT Clinical review 128: current approaches to primary therapyfor papillary and follicular thyroidcancer. J ClinEndocrinolMetab 2001;86:1447–63

4. Som PM, Curtin HD, Mancuso AA (2000) Imaging-based nodal classification for evaluation of neck metastatic adenopathy. AJR Am J Roentgenol 174:837–844

5. Som PM, Brandwein M, Lidov M et al (1994) The varied presentations of papillary thyroid carcinoma cervical nodal disease: CT and MR findings. AJNR Am J Neuroradiol 15:1123–1128

6. King AD, Tse GMK, Ahuja AT et al (2004) Necrosis in metastatic neck nodes: diagnostic accuracy of CT, MR imaging, and US radiology. Radiology 230:720–726

7. Sarvanan K, Bapuraj JR, Sharma SC et al (2002) Computed tomography and ultrasonographic evaluation of metastatic cervical lymph nodes with surgicoclinicopathologic correlation. J Laryngol Otol 116:194–199

8. Jeong H-S, Baek C-H, Son Y-I et al (2006) Integrated 18F-FDG PET/CT for the initial evaluation of cervical node level of patients with papillary thyroid carcinoma: comparison with ultrasound and contrast-enhanced CT. Clin Endocrinol 65:402–407.

9. Iida F, Yonekura M, Miyakawa M: Study of intraglandular dissemination of thyroid cancer. *Cancer* 1969; 24:764-771.

10. Katoh R, Sasaki J, Kurihara H, et al: Multiple thyroid involvement (intraglandular metastasis) in papillary thyroid carcinoma: a clinicopathologic study of 105 consecutive patients. Cancer 1992; 70:1585-1590.

11. Pacini F, Agate L, Elisei R, et al: Outcome of differentiated thyroid cancer with detectable serum Tg and negative diagnostic 131-I whole body scan: comparison of patients treated with high 131-I activities versus untreated patients. J ClinEndocrinolMetab 2001; 86:4092-4097.

12. Chan JKC, Saw D: The grooved nucleus: a useful diagnostic criterion of papillary carcinoma of the thyroid. Am J SurgPathol 1986; 10:672-679.