

**Original article:**

## **Ultrasonography evaluation of benign and malignant neck masses**

**<sup>1</sup>Dr.Pallavi Anandrao Mankar , <sup>2</sup>Dr.Ajay Vare , <sup>3</sup>Dr.Varsha Rote-Kaginalkar**

<sup>1</sup>JR III , <sup>2</sup> Associate Professor , <sup>3</sup>Prof. and HOD

Institute: Government Medical college and hospital, Aurangabad.

Corresponding Author: Dr.Pallavi Anandrao Mankar JR III

### **Abstract:**

**Introduction:** Neck masses are any swellings or enlargements in the region between inferior border of mandible and clavicle. Neck masses are a common cause of diagnostic dilemma to clinicians.

**Material and methods:** The present is observational study with total 100 patients scanned on Ultrasound machine in supine position with slight neck extension after proper informed consent. FNAC was done for correlation.

**Results :**Out of 100 patients of neck lesion maximum 49 (49 %) cases showed thyroid lesions of which 30 were malignant and 19 were benign. Lymph node lesions were the second most common lesions i.e. 24 (24 %) of which 15 cases constitutes malignant followed by 9 which were benign. Sensitivity of USG in diagnosing Benign and malignant lesions was 81% with a Specificity 92 % PPV 94% NPV 78%. Therefore, the diagnostic accuracy was 86%.

**Conclusion:** Ultrasonography is a useful modality for diagnostic evaluation of neck masses in every age group. It is simple, non-invasive and inexpensive diagnostic imaging modality. It provides accurate and reproducible results.

**Keywords:** Neck mass , Ultrasonography

### **Introduction:**

Neck masses are any swellings or enlargements in the region between inferior border of mandible and clavicle<sup>(1)</sup>. Neck masses are a common cause of diagnostic dilemma to clinicians<sup>(2)</sup> The differential diagnosis of swelling in the neck is broad and extensive and includes both malignant and benign aetiologies<sup>(3,4)</sup> Sonography is the initial imaging modality after clinical examination for evaluation of neck masses.To permit early recognition of neck pathology, detailed anatomic correlation is mandatory. Current imaging permits a detailed analysis of the complex anatomy in this region and is the key to understanding many of its disorders including mass lesions.<sup>(5,6)</sup> The present study aims to determine the role of USG in diagnosing patients with neck soft tissue swellings as well as differentiating benign and malignant swellings with the help of FNAC correlation.

### **Material and methods:**

The present observational study has been carried out in department of Radiodiagnosis at tertiary care centre. Approval from institutional ethics committee was taken prior to the commencement of the study. Informed consent was taken from each participating patient. Patients were scanned in supine position with slight neck extension from the level of mandible to clavicles in transverse and longitudinal plane.

### **Study population:**

Patient with complaints of neck swelling.

### **Sample size:**

A total of 100 patients diagnosed with various neck swellings attending the OPD of multidisciplinary tertiary care center.

**Method of selection of study population:**

All the patient with the complaints of neck swelling and fulfilling the following criteria.

**Inclusion criteria:**

1. All patients with palpable neck swelling.
2. Patients of all age groups.

**Exclusion criteria:**

1. Swelling caused by trauma or fracture
2. Primary swellings arising from bone.
3. Apical chest lesions with extension into neck.

**Aims and objectives:**

1. To characterize the neck mass as benign and malignant.
2. To determine the accuracy of ultrasound in diagnosing neck masses.

**Results:**

Maximum patients were found amongst the age group of <30 years with 31 (31 %) patients followed by age group 41 to 50 years with 26 (26%) patients. Most of the patients were females (58%) followed by males (42%)

**Table No. 1: Distribution of cases according to Site of Mass**

Sr. No.	Site of Mass	Total N(%)	Benign N	Malignant N
1	Thyroid	49(49 %)	19	30
2	Parathyroid	2(2%)	2	0
3	Lymph Node	24(24%)	9	15
4	Anterior cervical space	1(1%)	1	0
5	Submandibular space	12(12%)	9	3
6	Interfacial plane of neck	1(1%)	1	0
7	Suprasternal location	1(1%)	1	0
8	Floor of mouth	1(1%)	1	0
9	Supraclavicular	1(1%)	1	0
10	Parotid	4(4%)	3	1
11	Carotid space	2(2%)	2	0

12	<b>Midline neck within strap muscle</b>	1(1%)	1	0
13	<b>Visceral Space</b>	1(1%)	0	1
	<b>Total</b>	100	50(50%)	50(50%)

**Table No. 1** shows Distribution of cases of neck lesion according to Site of Mass. Out of 100 patients of neck lesion maximum 49 (49 %) cases showed thyroid lesions of which 30 were malignant and 19 were benign. Lymph node lesions were the second most common lesions i.e. 24 (24 %) of which 15 cases constitutes malignant followed by 9 which were benign .

**Table No. 2 USG characteristics of benign lesions**

Sr. No	USG characteristics of benign lesions	N
1	<b>Number of lesions</b>	
	Solitary	30
	Multiple	16
2	<b>shape of lesion</b>	
	Taller than Wide	0
	Wider than Tall	16
3	<b>Margin</b>	
	Well defined	37
4	<b>Consistency</b>	
	Predominant Solid	20
	Predominant cystic	17
5	<b>Echogenecity</b>	
	Anechoic	20
6	<b>Calcifications</b>	
	Macrocalcifications	3
	Microcalcifications	0
	Absent	38

**Table No. 2 USG characteristics of malignant lesions**

Sr. No	USG characteristics of malignant lesions	N
1	<b>Number of lesions</b>	
	Solitary	24
	Multiple	26
2	<b>Shape of lesion</b>	
	Taller than Wide	4
	Wider than Tall	26
3	<b>Margin</b>	
	irregular	5
4	<b>Consistency</b>	
	Predominant Solid	47
	Predominant cystic	1
5	<b>Echogenecity</b>	
	Hypoechoic	7
	Heterogenous	10
6	<b>Calcifications</b>	
	Microcalcifications	7
	Macrocalcifications	4
	Absent	34

**Table No. 3 Distribution of benign pathologies**

	Benign pathologies	N
1	Abscess and other inflammatory lesions	12
2	Colloid nodule	5
3	Thyroid adenoma	3
4	Benign thyroid nodules	9
6	Benign neoplastic lesion	
	Pleomorphic adenoma	3
	Warthins tumor	1
	Nuerogenic	2
7	Lymph nodes	
	Reactive	5

	Tuberculous	4
8	Cystic lesions	
	Lymphatic malformations	3
	Plunging ranula	1
	Thyroglossal duct cyst	1
	Dermoid cyst	1

**Table No. 3 Distribution of malignant pathologies**

Sr no.	Malignant pathologies	N
1.	Suspicious thyroid lesions	30
2	Ca thyroid	2
3	Metastatic lymphadenopathy	14
4	Lymphoma	1
5	Ca esophagus	1
7	Other neoplastic lesions extending to neck	3

**Table no. 4 Correlation of USG and FNAC Findings**

Sr. No.	USG Finding	FNAC Finding		Total
		Benign	Malignant	
1	<b>Benign</b>	47	3	50
2	<b>Malignant</b>	11	39	50
<b>Total</b>		58	42	(100 %)

**Discussion:**

In the present research we studied 100 patients, clinically diagnosed with neck swelling attending to the tertiary care centre and medical college where the study was conducted. In our study , out of 100 patients with neck lesion maximum patients were found amongst the age group of <30 with 31 (31 %) no. of cases followed by 26 (26 %) cases were found amongst age group 41 to 50. The results are corresponds to study by Subramanyam.N et al<sup>(7)</sup> and another study by Md Atik bijapur et al<sup>(8)</sup>

Out of 100 patients of neck lesion maximum 49 (49 %) cases showed thyroid lesions followed by lymph node lesion in 24 (24 %), these observations are comparable to study by Md Atik bijapur et al<sup>(8)</sup> .

Out of 100 Patients 4 (4 %) cases were Taller than Wide, 42 (42 %) were Wider than Tall lesion, All 4 cases with Taller that wider shape were malignant. In study done by Manoj kumar et al<sup>(7)</sup> they showed significant number of cases with taller than wider were malignant and it was a significant criterion in differentiating malignant from benign nodules.

Out of 69 cases with well defined margins 37 were benign and 32 were malignant. All cases with irregular margins and with local invasion were malignant. In as similar study done by Naaz F et al<sup>(3)</sup>, 90% of the examined swellings had regular margin while only 10% had irregular margins.

In our study amongst the benign cases 20 cases were predominant solid and 17 cases were predominant cystic; whereas maximum no. of cases i.e. 47 were predominant solid in malignant category. This Corresponds to study done by Aparna et al<sup>(7)</sup>

All of the 20 cases in the present study of anechoic lesion were found to be benign whereas 10 heterogenous lesions were malignant. these observations are comparable to study by Naaz F et al<sup>(6)</sup>

Calcifications were absent in 38 cases of benign lesions and none of the benign lesions showed microcalcifications. All the 4 cases showing microcalcification were malignant in our study. In a similar study done by Akriti Rastogi et al<sup>(3)</sup> out 15 malignant cases 5 showed calcifications and in 10 cases calcifications were absent. Another similar study done by Naaz F et al<sup>(10)</sup> showed 78% (3 patients) evidence of calcification while 22% (11 patients) lacked calcification. Microcalcification helped in detecting 4 patients (8%) as having malignant features. Sensitivity of USG in diagnosing Benign and malignant lesions was 81% with a Specificity 92 % PPV 94% NPV 78%. Therefore, the diagnostic accuracy was 86%. Ajay K Goutam et al<sup>(11)</sup> in their study showed that Ultrasound made a correct diagnosis in 38 out of 50 cases, having a diagnostic accuracy of 76.0%.

### Conclusion:

Lesions which are anechoic, wider than tall, well defined margins, with macrocalcifications and cystic in consistency are suggestive of benign lesions. The lesions which are hypoechoic or heterogenous in echogenicity, irregular margins, predominant solid consistency and with microcalcifications are suggestive of malignancy. However in our case shape of the lesion was not very helpful in differentiation benign from malignant lesions. Ultrasonography is a useful modality for diagnostic evaluation of neck masses in every age group. It is simple, non-invasive and inexpensive diagnostic imaging modality. It provides accurate and reproducible results. It is also useful to guide the FNAC of neck lesions.

### References:

1. NARAYAN BIKRAM THAPA, Ultrasound in Diagnosis of neck masses journal of Nepal Health Research Council, Vol 4 no.1 April 04 2016 page 17,18.
2. Simo R, Jeannon JP. Benign Neck Disease. In: Bradley P, editor. Stell and Maran's Textbook of Head and Neck Surgery and Oncology. 5th ed. London: Hodder Arnold; 2012:217-38.
3. Rastogi A, SHARMA K, GAUBA N. An evaluation of efficacy of ultrasound in diagnosis of neck swellings. Int.J Otorhinolaryngology Head Neck Surg 2018;4:169-75
4. Chandak R, Degwekar S, Bhowte RR, Motwani M, Banode P, Chandak M, et al. An evaluation of efficacy of ultrasonography in the diagnosis of head and neck swellings. Dentomaxillofac Radiol 2011;40:213-21.
5. Shah JS, Asrani VK. Clinical applications of ultrasonography in diagnosing head and neck swellings. J Oral Maxillofac Radiol 2017;5:7-13
6. Mantri G, Jaiswal AA, Pal RK, Sharma N. Role of ultrasonography and fine-needle aspiration cytology in the evaluation of neck masses. Med J DY Patil Vidyapeeth 2020;13:486-97
7. Subramanyam N. Reliability of ultrasonography in neck masses evaluation. IOSR Journal of dental and medical sciences (IOSR-JDMS), Vol.16, no, 10, 2017, pp.33-40
8. Mohamed Atik Ahemad et al, ROLE OF HIGH RESOLUTION ULTRASOUND AND DOPPLE IN THE EVALUATION OF NECK MASSES WITH HISTOPATHOLOGICAL CORRELATION, international journal of medical and applied sciences: vol 4 suppl 5; 2015

9. Naaz F et al, Role of ultrasonography in the diagnosis of neck mass; *J Med Allied Sci* 2018; 8 (2): 66-72.
10. Manoj Kumar Palaniappan, Role of Gray Scale, Color Doppler and Spectral Doppler in Differentiation Between Malignant and Benign Thyroid Nodules; *Journal of Clinical and Diagnostic Research*. 2016 Aug, Vol-10(8): TC01-TC06
11. Misra D, Panjwani S, Rai S, Misra A, Prabhat M, Gupta P, *et al*. Diagnostic efficacy of color Doppler ultrasound in evaluation of cervical lymphadenopathy. *Dent Res J* 2016;13:217-24.

Date of Publishing: 05 September 2021

Author Declaration: Source of support: Nil, Conflict of interest: Nil

Ethics Committee Approval obtained for this study? YES

Was informed consent obtained from the subjects involved in the study? YES

For any images presented appropriate consent has been obtained from the subjects: NA

Plagiarism Checked: Urkund Software

Author work published under a Creative Commons Attribution 4.0 International License

