



Pathological Distribution of Lateral Neck Tumors – A Radiological Evaluation

Debadatta Majumder¹, Bonapart Chowdhury²

¹Department of Radiodiagnosis, Shri Ramkrishna Institute of Medical Sciences and Sanaka Hospitals,

²Department of ENT, Shri Ramkrishna Institute of Medical Sciences and Sanaka Hospitals, Durgapur, West Bengal, India

Background: The head and neck constitute a broad anatomic region, which encompasses many aero digestive, salivary gland, lymphatic, endocrine, nervous, and vascular structures. A substantial number of the pathologic conditions affecting these organ systems are accessible to ultrasound imaging. In combination with fine-needle aspiration cytology (FNAC), ultrasonography (USG) remains an indispensable tool for the clinician who works in this clinical arena. **Aim:** In view of the above, this study was undertaken to analyze the pathological distribution of lateral neck tumors by ultrasonographic evaluation taking FNAC examination as the gold standard. **Methods:** A prospective, cross-sectional prevalence study was conducted in a medical college and hospital in a rural setup in West Bengal, India, among patients attending the radiology outpatient department with lateral neck tumors. After estimating the sample size, 110 patients were included in this study. All the selected patients underwent USG evaluation, followed by FNAC. Both the USG and FNAC data were collected, tabulated, compared, and analyzed. **Results:** The overall frequency of lateral neck masses was more in males (60%) compared to females (40%). In the present study, a majority of the cases were neck nodes in the jugulodigastric chain. Out of these lymph nodes, the predominant pathology was tubercular lymph nodes (TBLN) with 52.81% relative frequency. **Conclusion:** This study has concluded that TBLN are the most common lateral neck tumors followed by metastatic neck nodes.

Key words: USG, cervical lymph node, tuberculosis, metastasis

INTRODUCTION

The head and neck constitute a broad anatomic region, which encompasses many aero digestive, salivary gland, lymphatic, endocrine, nervous, and vascular structures. A substantial number of the pathologic conditions affecting these organ systems are accessible to ultrasound imaging. In combination with fine-needle aspiration cytology (FNAC), ultrasound (USG) remains an indispensable tool for the clinician who works in this clinical arena. Evidence suggests that a neck mass in the adult patient should be considered malignant until proven otherwise.¹⁻⁸

Ruggiero⁹ introduced a classification developed and used by the Memorial Sloan Kettering Cancer Center to describe the lymph nodes grouped in six levels, noted with Roman numerals from I to VI. Lateral neck tumors belong to level IB, II, III, and IV.

Lymphadenopathy due to inflammatory diseases usually resolves within 4–6 weeks. Therefore, any node which

persists beyond 2 weeks requires further evaluation. Lymph nodes are a common site of metastases for different cancers. Thus, clinical recognition and urgent diagnosis of palpable lymphadenopathy are of paramount importance, especially to differentiate between inflammatory lesions and metastatic or primary neoplastic tumors. USG shows the origin of the lesion and characterizes the internal architecture of masses beyond simply distinguishing cystic from solid lesions and also provides information about the site of origin and infiltration into the soft tissue or vessel and mass effects.

Doppler is helpful to differentiate benign and malignant lesions by their flow pattern. Malignant lesions have peripheral/mixed vascularity with high resistive index and pulsatility index values. It is useful for the confirmation of vascular tumors. In this regard, it is important both to analyze the sonologic criteria that allow the differentiation between

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Corresponding Author: Dr. Bonapart Chowdhury, T1/7D, Salarpuria Gardenia, Bidhannagar, Durgapur - 713 212, West Bengal, India. Tel: +91-8017167596; Fax: +91-3432700082. E-mail: maildrbonapart@gmail.com

benign and malignant and to sonographically identify the anatomical landmarks that help decide the space to which the visualized lymph nodes belong.¹⁰

Apart from the cervical lymph nodes, major and minor salivary glands, branchial cleft cyst (BC), neck abscess (NA), lipoma (LP), and vascular neoplasm like hemangioma (HM) also contribute to lateral neck tumors. Even tumors from the tail of the parotid may present as a level II mass. Similarly, lateral aberrant ectopic thyroid, although rarely may present as a lateral neck mass, commonly at level III.

Although many diagnostic modalities have been put forward by many authors, many a time, the diagnosis of neck tumors eludes the clinicians causing delay in commencing definitive therapy.

In view of the above, this study was undertaken to analyze the pathological distribution of lateral neck tumors by USG evaluation taking FNAC examination as the gold standard.

Aims and objectives

The aim of this study was to analyze the pathological distribution of lateral neck tumors by USG evaluation taking FNAC examination as the gold standard.

MATERIALS AND METHODS

A prospective, cross-sectional prevalence study was conducted in a medical college and hospital in a rural setup in West Bengal, India, for 18 months among patients attending the radiology outpatient department (OPD) with lateral neck tumors.

Sample size

Buderer's formula¹¹ was used for sample size calculation as described below:

$$n = \frac{Z^2 \times SN \times (100 - SN)}{L^2 \times X P}$$

Where,

n = sample size

z = 1.96 (two-tailed at 95% confidence interval)

SN = sensitivity of the index test as reported in the previous study = 87.2²

L = acceptable error around the range = 3%

p = prevalence of the target disease = 4.86¹

By putting the above value,

$$n = \frac{(1.96)^2 \times 87.2 \times (100 - 87.2)}{(3)^2 \times 4.86} = 98,$$

Adding 10% nonrespondent rate, the sample size becomes $(98 + 9.8) = 107.8$. Hence, a total of 110 patients were included in the study.

Inclusion criteria

- i. Patients giving informed consent to participate in this study
- ii. Patients with lateral neck swelling of all age and sex.

Exclusion criteria

- i. Patients not giving informed consent to participate in this study
- ii. Patients having bony tumors
- iii. Patients having neck tumors extending into the mediastinum
- iv. Patients unfit for FNAC.

The study variables were age, sex, duration, and distribution of disease, socioeconomic status, and contributing factors.

Purposive sampling was done after considering the inclusion and exclusion criteria. Informed, written consent was taken from all the study participants.

All the selected patients underwent ultrasonography (USG) evaluation followed by FNAC. Both the USG and FNAC data were collected, tabulated, compared, and analyzed using the SPSS Inc 27 software by IBM, India.

Ethical clearance

The study was carried out after obtaining the approval of the Institutional Ethics Committee of Bankura Sammilani Medical College and Hospital, Bankura, West Bengal, vide Memo No. BSMC/Aca/162; dated: January 09, 2019. Written informed consent was obtained from the patients for this study.

RESULTS

The overall frequency of lateral neck masses was more in males (60%) compared to females (40%). Lateral neck masses were found highest in the age group of 21–30 years with 22.73%, followed by 11–20 years with 18.19%, 13.64% in 31–40 years, 12.73% both in 0–10 years and 51–60 years, 11.82% in 41–50 years, and 8.19% in >60 years' population [Table 1].

In the present study, a majority of the cases were neck nodes in the jugulodigastric chain (JD nodes) in level II, III, and IV (80.91%). Out of these lymph nodes, the predominant pathology was tubercular lymph nodes (TBLN) with 52.81% relative frequency among all lymph node pathologies. These were also with the highest frequency among the entire study population (42.73%).

Metastatic lymph nodes were the second-highest pathology noted in this study with a relative frequency of 31.46% and the overall frequency of 25.45%.

Among the other lymph node masses, reactive lymph nodes (RLN) were found in 10 (9.09%) patients predominantly in the young age group [Table 2].

Table 1: Pathology in relation to age

Age (years)	TBLN	MLN	RLN	LM	PLA	AT	BC	HM	LP	NA	EPD	Total
0-10	3	0	6	0	0	0	2	1	0	0	2	14
11-20	12	0	3	0	0	0	0	2	1	0	2	20
21-30	15	3	1	3	0	1	0	0	0	2	0	25
31-40	6	5	0	0	1	0	0	2	1	0	0	15
41-50	4	8	0	1	0	0	0	0	0	0	0	13
51-60	6	6	0	0	1	0	0	0	1	0	0	14
>60	1	6	0	0	0	0	0	0	2	0	0	9
Total	47	28	10	4	2	1	2	5	5	2	4	110

TBLN=Tubercular lymph node; MLN=Metastatic lymph node; RLN=Reactive lymph node; LM=Lymphoma; PLA=Pleomorphic adenoma of the parotid gland; AT=Aberrant lateral ectopic thyroid; BC=Branchial cleft cyst; HM=Hemangioma; LP=Lipoma; NA=Neck abscess; EPD=Epidermoid

Table 2: Pathological distribution

Pathology	n
TBLNs	47
MLNs	28
RLNs	10
LMs	4
PLA	2
Papillary CA aberrant thyroid	1
BC	2
HM	5
LP	5
NA	2
EPD	4

TBLNs=Tubercular lymph nodes; MLNs=Metastatic lymph nodes; RLNs=Reactive lymph nodes; LM=Lymphoma; PLA=Pleomorphic adenoma of the parotid gland; BC=Branchial cleft cyst; HM=Hemangioma; LP=Lipoma; NA=Neck abscess; EPD=Epidermoid

DISCUSSION

In the present study, a majority of the cases were neck nodes in the JD chain (nodes) in level II, III, and IV (80.91%), which is similar to the findings of Singh *et al.*¹² The predominant pathology was tuberculosis (TB), which is very common in the general population in India. Moreover, the poor socioeconomic background of the majority of the patients attending our OPD also contributes to these findings. In fact, in India and some other developing countries, TB is the first differential diagnosis for a patient who presents with chronic lymph node enlargement¹³⁻¹⁵ TBLN were found highest in the third decade with 31.91%, followed by the second decade (25.53%). These lymph nodes were less in both extreme age groups with 6.38% in the first decade and 2.13% in the above 60 years of population. This disease was more in men (67%) than women (33%).

Metastatic neck nodes were the second-highest pathology noted in this study with a relative frequency of 31.46% and the

overall frequency of 25.45%. This may be due to the amount of substance abuse, especially chewing tobacco, prevalent in the local community as well as their easy access to a tertiary health care facility at our hospital. Moreover, this hospital is the only center with a radiation oncology department in the entire district attracting more number of suspected malignant cases to attend the OPD here. This is not in agreement with the study conducted by Prasad *et al.*, who found that malignancies may account for about 1% of these cases.¹⁵ Males were affected more (78%) than females (22%). This is in agreement with similar findings of Haque and Talukder.^{16,17} Bhattacharjee *et al.* have also found that to be 2.9:1, which is of quite similar observation.¹⁸

This study agrees with the fact that the chance of malignancy increases after the age of 55 years as observed by Datta *et al.*¹⁹ Patients in the fifth and sixth decades and above were affected most with 28.57% and 21.43% of cases, respectively. The fourth decade had 17.86% and the third decade had 10.71% of cases. The first two decades did not have any case in the present study.

The present study has observed that in case of metastatic cervical lymphadenopathy, the primary was most frequent from the oral cavity (39%), followed by the oropharynx (31%), larynx (19.5%), and hypopharynx and nasopharynx (4.8% each). All of them were squamous cell carcinoma.

Among the other lymph node masses, RLN were found in 10 (9.09%) patients predominantly in the young age group.

Lymphomas were diagnosed in 4 (3.64%) patients in elderly patients with no gender predisposition.

There were 5 (4.54%) cases each of HM and LP and 4 (3.64%) cases of epidermoid.

In the present study, we had 2 (1.82%) cases each of BC, NA, and pleomorphic adenoma of the parotid gland.

The only case diagnosed as aberrant lateral ectopic thyroid has presented as a level III tumor at the anterior triangle of the neck turned out to be a case of papillary carcinoma of the thyroid.

CONCLUSION

TBLN are the most common lateral neck tumor followed by metastatic neck nodes.

Data availability statement

The data that support the findings of this study are available from the corresponding author, Dr. Bonapart Chowdhury, upon reasonable request.

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Nil.

Conflicts of interest

There are no conflicts of interest.

REFERENCES

- Olsen KD. Evaluation of masses in the neck. *Prim Care* 1990;17:415-35.
- Beenken SW, Maddox WA, Urist MM. Workup of a patient with a mass in the neck. *Adv Surg* 1995;28:371-83.
- Gray SW, Skandalakis JE, Androulakis JA. Non-thyroid tumours of the neck. *Contemp Surg* 1985;26:13-24.
- Lefebvre JL, Coche-Dequeant B, Van JT, Buisset E, Adenis A. Cervical lymph nodes from an unknown primary tumor in 190 patients. *Am J Surg* 1990;160:443-6.
- Rosenberg TL, Brown JJ, Jefferson GD. Evaluating the adult patient with a neck mass. *Med Clin North Am* 2010;94:1017-29.
- Bhattacharyya N. Predictive factors for neoplasia and malignancy in a neck mass. *Arch Otolaryngol Head Neck Surg* 1999;125:303-7.
- McGuirt WF. The neck mass. *Med Clin North Am* 1999;83:219-34.
- Haynes J, Arnold KR, Aguirre-Oskins C, Chandra S. Evaluation of neck masses in adults. *Am Fam Physician* 2015;91:698-706.
- Ruggiero FP. Neck Dissection Classification. Available from: www.emedi-cine.medscape.com. [Last cited on 2023 Jan 24].
- Lenghel LM, Baciut G, Botar-Jid C, Vasilescu D, Bojan A, Dudea SM. Ultrasonographic identification of the anatomical landmarks that define cervical lymph nodes spaces. *Med Ultrason* 2013, Vol. 15, no. 1, 29-34.
- Zaidi SM, Waseem HF, Ansari FA, Irfan M, Fahim S. Sample Size Estimation of Diagnostic Test Studies in Health Sciences Proc. 14th International Conference on Statistical Sciences Karachi, Pakistan – March 14-16 2016;29:239.
- Singh PK, Kumar A, Kumar D. Clinicopathological study of neck masses in patients attending ENT out patient department of Rajendra institute of medical sciences, Ranchi. *IOSR J Dent Med Sci (IOSR-JDMS)* 2017;16:38-41.
- Mohseni S, Shojaiefard A, Khorgami Z, Alinejad S, Ghorbani A, Ghafouri A. Peripheral lymphadenopathy: Approach and diagnostic tools. *Iran J Med Sci* 2014;39:158-70.
- Pandit S, Choudhury S, Das A, Das SK, Bhattacharya S. Cervical lymphadenopathy-pitfalls of blind antitubercular treatment. *J Health Popul Nutr* 2014;32:155-9.
- Prasad RR, Narasimhan R, Sankaran V, Veliath AJ. Fine-needle aspiration cytology in the diagnosis of superficial lymphadenopathy: An analysis of 2,418 cases. *Diagn Cytopathol* 1996;15:382-6.
- Haque MA, Talukder SI. Evaluation of fine needle aspiration cytology (FNAC) of lymph node in Mymensingh. *Mymensingh Med J* 2003;12:33-5.
- Steel BL, Schwartz MR, Ramzy I. Fine needle aspiration biopsy in the diagnosis of lymphadenopathy in 1,103 patients. Role, limitations and analysis of diagnostic pitfalls. *Acta Cytol* 1995;39:76-81.
- Bhattacharjee A, Chakraborty A, Purkaystha P. Prevalence of head and neck cancers in the North East-An institutional study. *Indian J Otolaryngol Head Neck Surg* 2006;58:15-9.
- Datta A, Guha T. Cervical Lymphadenopathy – Cytological Evaluation: A Hospital based Study in North-East India. *Indian Medical journal* 2010, vol 105. No.6. p. 189-93.