



## GROSS CHARACTERIZATION OF NEOPLASTIC LYMPHADENOPATHY.

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**ABSTRACT** **Background:** Neoplastic lesions are one of the causes of lymphadenopathy, which harbors a wide spectrum of diseases. It is essential to conduct a lymph node biopsy and histopathological examination of the enlarged nodes. Histological processing begins with noticing down the gross features. It is possible to recognize the disease process by grossly examining lymph nodes.

**Objectives:** The objective of this study is to characterize the neoplastic lymph node grossly on the premise of its size, shape, cut section appearance and pattern of involvement whether presenting as single, multiple or matted.

**Methods:** The study used cross-sectional, quantitative methods, conducted in a hospital over a one-year period from 30th April 2018 to 29th April 2019 at Department of Pathology, TUTH. Our study included participants with neoplastic lymph nodes who underwent excisional and lymph node biopsy node dissection, along with other radical procedures. We noted the gross features of a neoplastic lymph node.

**Results:** The mean diameter of the largest lymph node with a neoplastic lesion was  $2.02 \pm 0.86$  cm. The majority of neoplastic lymph nodes were round. Matted lesions were found in seven cases, discrete multiple lymph nodes involved in 16 cases, and single lymph node was involved in 16 cases. Metastasis involving lymph nodes was most common in invasive carcinoma of the breast, NST. Among primary tumors of lymph nodes, most were Hodgkin lymphomas. Typically, lymph nodes were irregular and showed homogenous brown and irregular grey white areas on cut sections.

**Conclusion:** Neoplastic lymph nodes are characterized by different gross characteristics depending on their shape, cut section, and location. Pattern of lymph nodes involved is associated with origin of cancer (metastatic or primary tumor of lymph node). For a more complete understanding of gross features of lymph nodes, a rigorous study is recommended to identify whether the gross appearance of lymph nodes correlates with neoplastic pathology and to do similar studies with larger sample sizes.

**KEYWORDS :** Biopsy, Gross, Lymph node, Neoplastic

### INTRODUCTION:

The enlargement of lymph node because of malignant infiltrate is neoplastic lymph node.<sup>1</sup> When a patient presents with enlarged lymph nodes, it becomes one of the major concern to rule out malignancy. Any nodules having features suspicious of malignancy, undergoes surgical dissection of histopathological evaluation.<sup>2</sup> The etiologies are lymphomas and metastatic tumors like adenocarcinoma, squamous cell carcinoma, small cell carcinoma, etc. The prevalence of neoplastic lesions in lymph nodes constitutes 40% in biopsy specimens.<sup>3</sup> Gross examination is the beginning of pathological evaluation. Gross examination of lesion is important to understand the nature of the disease. The gross aspect shows the size, shape, and nature of the process and helps to understand it in both structural sense and in a clinical context. Meticulous examination of lesion both macroscopically and microscopically helps in a more accurate and timely diagnosis. It is also helpful in triaging tissues by surgeon intraoperatively. Grossing pathology is also crucial for staging of the neoplastic process.<sup>4</sup> It should describe the gross specimen regarding its appearance and characteristics, taking care to size of the specimen, appearance of cut section, texture, whether discrete or matted. There are few studies to characterize neoplastic lymph nodes based on grossing, which is why we conducted this study.

### METHODS AND METHODOLOGY:

This study is a hospital based cross-sectional quantitative study conducted from 30th April 2018 to 29th April 2019 at Department of Pathology, TUTH. Study population were patients presenting to Department of Pathology, TUTH for lymph node biopsy with neoplastic lesion diagnosed on histopathological examination. We had collected data from proforma which was for study titled as "Histopathological evaluation of neoplastic lymphadenopathy". We included participants with neoplastic lymph node biopsy specimens of excisional and lymph node dissection, along with other radical

procedures. The characteristics that disqualified subjects were trucut biopsy, incisional biopsy and frozen section from the study as full gross feature could not be noted on such biopsy specimen. Lymph node biopsies were received at the Department of Pathology in 10% formalin. Lymph nodes were subjected to gross examination, noting the size, appearance, external surface, and cut surfaces. The gross shapes included variables such as round, oval and irregular.

Based on the cut section, the distribution of neoplastic lymph nodes was noted as hemorrhagic, homogenous brown, irregular grey white, homogenous solid grey, and partially cystic. The lymph node involvement pattern was either single, multiple, or matted. Based on the anatomic location of lymph nodes, we then assessed the common site involved. Afterwards, we identified which types of primary tumor metastasized to lymph nodes. The surgical procedure was noted. We, then, observed a primary tumor that had metastasized to lymph nodes. For neoplastic lymph nodes that underwent dissection with other radical procedures, site of primary tumors was available.

The data collection was done in pre-designed proforma and data entry was done in MS EXCEL 2016. Results were computed using IBM-SPSS 24 for Windows. The categorical data were expressed in percentage and proportion. We, then used chi square test to find an association between categorical variables. The probability value "p value" less than 0.05 was considered to be statistically significant.

### RESULT

A total of 39 study participants were recruited in the study with female predominance (56%). The mean age was  $46.44 \pm 18.43$  years, which ranged from eight years to eighty-six years. The mean size of lymph node with neoplastic lesion was  $2.02 \pm 0.86$  cm with smallest being five mm and largest being 4.50 cm.

The distribution of neoplastic lymph node as per gross shape was

according to Figure 1.

The neoplastic lymph node were distributed as in Figure 2 on the basis of their cut section appearance.

There were seven matted lesions, 16 discrete multiple lymph nodes involved and 16 cases had single lymph node involvement. The most common site involved was cervical (49%), followed by axillary (31%), intraabdominal (15%), intrathoracic (2.5%) and pelvic (2.5%). The most common type of tumor metastasizing to lymph node involvement were from invasive carcinoma of breast, NST (n=11), followed by papillary carcinoma of thyroid (n=8) and adenocarcinoma (n=7). In terms of surgical procedure, 28 lymph nodes were dissected with other radical procedures and 11 had underwent excisional biopsy.

Figure 3: illustrates the gross appearance of primary tumor metastasizing to lymph node.

The most common site of origin of primary tumor was breast (n=11), followed by thyroid (n=6), stomach (n=6), lung(n=1), lip(n=1), buccal(n=1), endometrium(n=1) and unknown(n=1). Among, 11 lymph nodes underwent excisional biopsy three out of 11 were Non Hodgkin lymphoma and four were Hodgkin lymphoma. Three out of 11 neoplastic lymph node that underwent excisional biopsy and were metastatic tumor which could not be assessed of their primary tumor origin. Out of primary tumor that metastasized to lymph node, the mean size of breast origin was 2.1± 0.8 cm, thyroid origin was 2.3 ±0.75 cm, and stomach origin was 1.44± 0.49 cm. Hodgkin lymphoma (n=3) was most common finding in age group of 21 to 30 years. Papillary carcinoma of thyroid (n=4) was most frequent in age group of 31- 40 years. Similarly, Invasive carcinoma of breast of no special type (n=5) was predominance in age group of 41 to 50 years. There was notable adenocarcinoma predilection in age group of 51 to 60 years. Non-Hodgkin lymphoma was the most common observation in age group of 61 to 70 years. The only study participant in age group 81-90 years presented with adenocarcinoma of stomach metastasizing to lymph node.

Cross-tabulation of pattern of involvement of neoplastic lymph node and type of neoplastic lymph node is shown in Table 1. There was association between pattern of involvement of neoplastic lymph node and type of neoplastic lymph node (p=0.001).

Crosstabulation of diameter of primary tumor that metastasize to lymph node and pattern of lymph node involvement is summarized in table 2. No association was noted between diameter of primary tumor that metastasize to lymph node and pattern of lymph node involvement (p=0.178).

**DISCUSSION**

Most of the neoplastic lymph nodes were round and exhibited irregularly grey-white coloration in sectioned sections. According to our study, primary neoplastic lymph node involvement is associated with single lymph node involvement.

Our study participants' mean age corresponded to the age of those in Pathy et al's study.<sup>5</sup> In the same vein as Vachhani et al., there was a female predominance. In this study, the neoplasia lesions had an average size greater than one centimeter, which corresponds to the finding that nodes with more than one centimeter are more likely to be metastatic. According to a study conducted by Sathyanarayan et al.<sup>7</sup>, in comparison with non-metastatic lymph nodes, more metastatic lymph nodes had diameters over 0.8 cm on average. According to the results of our study, mostly round lymph nodes were present, followed by oval and irregular nodes. Sathyanarayan et al.<sup>7</sup> found most of the neoplastic lymph nodes to be round (n=36/48, 75%), while the majority of benign lymph nodes were oblong (n=55/71, 77%).

This study found most neoplastic lymph nodes to be single or discrete multiples. Edema and matting are common features of adjacent soft tissues in tuberculous nodes, but these features occur less frequently in metastatic and lymphomatous nodes.<sup>8</sup> We also observed relationship between single lymph node involvement and neoplastic lymph node of primary origin (Lymphoma). However, diameter of neoplastic lymph node did not associate with single, multiple or matted.

Most of our neoplastic lymph nodes occurred in the cervical region,

just as in the Vacchani et al. study.<sup>6</sup> Cervical lymph nodes are the most commonly affected by metastasis.<sup>9</sup> Similar to Andea et al.<sup>10</sup>, we observed similar diameters in primary carcinomas of the breast. Andea et al, however, reported that the average of the largest diameter remained 2.53 cm and was combined to reach 4.2 cm in multifocal lesions. The unifocal lesion averaged 3.47 cm in size.

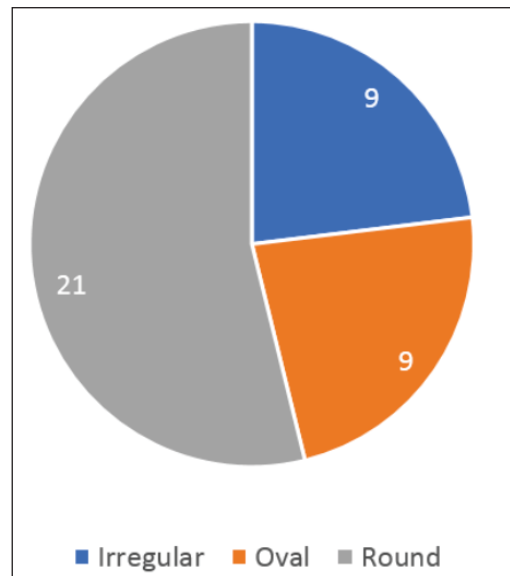
The average diameter of lymph nodes with metastasis measured 1.32± 0.62 cm in a prospective cohort study of lymph nodes removed from discarded cancerous lung resection specimens, Osarogiagbon et al.<sup>11</sup> reported. The non-metastasized lymph nodes were 0.69 ± 0.39 cm in mean diameter.

The current study has a strong point, which is that since we have shifted to molecular analysis, pathologists have forgotten the significance of gross examination of specimens. Therefore, we have taken the initiative to determine whether even the gross finding of specimens can be studied.

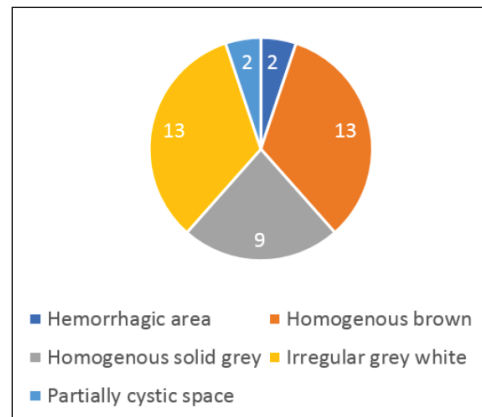
The study may be however criticized as using tumor diameters, when the likelihood of metastasis is more likely a function of volume or surface area.<sup>10</sup> Other limitations of the current study include subjective findings.

We recommend a larger, rigorous study to determine whether the gross appearance of lymph nodes correlates with the underlying pathology. Nevertheless, the use of tumor diameters as a size estimate is more practical since they are more readily measured and already taken into account by the current staging system. It is suggested to investigate the significance of the number of lymph nodes involved in the disease on prognosis.

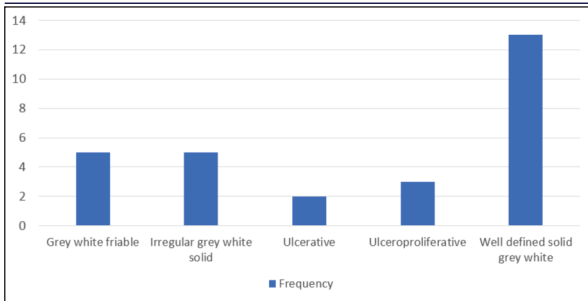
**Figures and Tables:**



**Figure 1. Distribution of neoplastic lymph node as per gross shape**



**Figure 2. Distribution of neoplastic lymph node as per cut section appearance (n=39)**



**Figure 3 illustrates the gross appearance of primary tumor metastasizing to lymph node.**

**Table 1: Cross-tabulation of pattern of involvement of neoplastic lymph node and type of neoplastic lymph node (n=35)**

	Neoplastic lymph node of (non-metastatic)	Neoplastic lymph node (metastatic)	
Single	7	6	13
Multiple	0	15	15
Matted	0	7	7
	7	28	35

**Table 2: Crosstabulation of diameter of primary tumor that metastasize to lymph node and pattern of lymph node involvement (n=28)**

	single	multiple	matted	
0-2 cm	1	2	4	7
2-4 cm	5	6	3	14
4-6 cm	1	4	0	5
6-8 cm	0	2	0	2
Total	7	14	7	28

**CONCLUSION:**

We conclude that the most frequent appearance on cut sections was both homogenous solid grey and irregular grey white areas of neoplastic lymph node, most common shape was irregular commonly encountered in cervical lymph nodes. We recommend similar studies with larger sample sizes to learn more about gross features.

**Conflict of Interest:** None

**Abbreviation:**

1. HPE: Histopathological examination
2. TUTH: Tribhuvan University Teaching Hospital

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