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Lymph node fine needle aspiration cytology reporting using Sydney system at tertiary care center

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Abstract
Background: Lymph node enlargement is a common clinical finding in a wide spectrum of diseases and its evaluation is essential for proper patient care. Fine needle aspiration cytology has been used as an initial diagnostic method in such conditions especially for infective conditions and also to differentiate between benign and malignant lesions. A standardized category based cytology reporting system was proposed by IAC in 2019 which gives 5 categories of cytological diagnosis and also provides management category for each class.
Materials and Methods: This single institution retrospective study included lymph node FNAC cases over 2 year duration. Clinical details of all included cases were recorded. Cytology aspirate slides were re-evaluated as per new reporting system. Statistical analysis was done.
Aims and Objectives: The present study aims to analyze and classify lymph node samples as per new proposed Sydney system and also to assess the risk of malignancy of each category.
Results: 100 lymph node aspirates were evaluated with cases having slight male predominance. Benign category diagnosis was most common. Overall the most common diagnosis was granulomatous lymphadenitis. Metastatic squamous cell carcinoma was most common malignant diagnosis. Risk of malignancy calculated after histopathological correlation was highest in malignant category.
Conclusion: Using standard categorical cytology reporting system will allow improved reports and clinical communication for better patient care.

Keywords: Lymph node, FNAC, risk of malignancy, category, metastatic

Introduction

Lymph nodes are most widely distributed, easily accessible and an integral component of the immune system. Their involvement is a common presentation and frequently examined for diagnostic purpose in the clinical practice [1].

Lymph node enlargement occurs in a wide spectrum of diseases ranging from reactive conditions to malignancy [2].

Therefore, management of cases depends on lymph node pathology, which can be studied by collecting material through Fine needle aspiration cytology (FNAC) method that can be used as an outpatient procedure [2].

FNAC is a safe, simple, reliable, relatively less invasive, well established and popular diagnostic aid for patients presenting with lymphadenopathies [3].

Previously no standardized reporting system or common terminology was available for lymph node cytology like those for cervical cytology [4] and thyroid cytology [5].

For better patient care future aim would be use of standardized and integrated reporting with more involvement of cytopathologists with treating clinicians [6].

In the 20th International Congress of Cytology held at Sydney in 2019 a panel of experienced cytopathologists from all over the world proposed a standardized category based lymph node cytology reporting system. This was endorsed both by IAC and EFCS. It provided a categorical classification of aspirates into five different categories based on specific cytological features. It also provides a management category for each class. The categories are as follows category I/L1: inadequate/non-diagnostic, Category II/L2: benign, category III/L3: atypical cells of undetermined significance/atypical lymphoid cells of uncertain significance, category IV/L4: suspicious for malignancy and category V/L5: malignant [7, 8].

Aim and objectives

The present study aims to analyze and classify lymph node samples as per new proposed Sydney system and also to assess the risk of malignancy of each category by correlating with histopathology report wherever possible.

Type of study: Retrospective study.

Materials & Methods

- **Place of study:** The present study was carried at the department of pathology in Cytopathology & Histopathology sections of our hospital.
- **Design of study:** A diagnostic Retrospective study.
- **Duration of study:** 2 years
- **Sample size:** Total 100 cases.
- **Sample types:** Lymph node aspirates in cytopathology section of the pathology department.
- Clinical work up, radiological investigations and detailed history of present complaint and local examination were taken from requisition forms in cytopathology section.

Inclusion criteria

1. All superficial enlarged lymph node including image guided FNAC
2. Patient giving consent for the study

Exclusion criteria

1. Patients not giving consent for the study
2. All non-lymphoid aspirates
3. Patient with bleeding disorders

Result

In the duration of the study from July 2020 to June 2022 FNA from the 100 lymph node cases were studied. Age range from 3 months to 90 years. The most common age group undergoing lymph node FNA in the study was age 11 to 20 years group shown in table III. The gender ratio in the study cases was 1.63:1 for male to female shown in table II. Cervical nodes were the most commonly aspirated lymph nodes in the study. 2 cases were included in the category L1 of non-diagnostic /inadequate for interpretation. 1 case showed necrotic material without presence of any lymphoid cells. 1 case showed only blood. The category of benign cytological diagnoses category L2 was given in 84 cases. This formed the most common category in the study. The most common benign cytological diagnosis was granulomatous lymphadenitis (Figure-1) seen in 45 cases (45.0%). Other benign diagnoses were, reactive lymphadenitis (Figure-2), acute lymphadenitis and chronic nonspecific lymphadenitis. Granulomatous lymphadenitis and necrotizing granulomatous lymphadenitis was diagnosed in a combined total of 45 cases. The L3 category called as atypical cells of undetermined significance/atypical lymphoid cells of uncertain significance (ALUS) category. The suspicious for malignancy category L4 was given in 2 cases. The malignant category L5 was diagnosed in 12 cases out of which 8 cases were diagnosed as metastatic deposits was from epithelial malignancy. The most common malignant cytological diagnosis of the study was metastasis from epithelial malignancy (Figure-3&4). 3 cases of NHL and 1 case of HL (Figure-5) were diagnosed by cytology in the study making it the most common lymphoid malignancy. Category wise cytological diagnoses in the study are shown in table I.

Table 1: Category wise cytological diagnosis in number

Sr. No.	Category	Cytological diagnosis	Number
1.	L1-Inadequate/non-diagnostic	Blood only	01
		Necrosis only	01
2.	L2- Benign	Granulomatous/Necrotizing lymphadenitis	45
		Reactive lymphadenitis	19
		Chronic non-specific lymphadenitis	17
		Acute lymphadenitis	03
3.	L3-Atypical cells of undetermined significance/ atypical lymphoid cells of uncertain significance	Atypical lymphoid cells	00
		Atypical non-lymphoid cells	00
4.	L4- Suspicious for malignancy	Suspicious for metastasis	02
5.	L5-Malignant	Metastasis from epithelial malignancy	08
		Non-Hodgkin's lymphoma	03
		Hodgkin's lymphoma	01

Histopathological slides were available for 40 cases out of the 100 cases whose cytology was considered in this study. Of these 30 were benign diagnoses while 10 were malignant diagnoses. The most common histopathological diagnosis was metastatic squamous cell carcinoma. The most common benign diagnosis was Granulomatous lymphadenitis.

In the L1 non-diagnostic category, histopathology correlation was not available. In the L2 category of benign cytology, histopathology was available for 30 cases out of which 5 showed features of malignancy. The ROM for this category was 16.67%. The L3 category of ALUS histopathological correlation was not available. There were 2 cases of histopathology available for correlation in category L4 of suspicious for malignancy out of which 1 were positive for malignancy on histopathology. The ROM in this category was 50%. In the L5 category of malignant diagnosis by cytology. Histopathological correlation was available in all 8 cases. Malignancy was diagnosed in 7 out of 8 cases. The most common primary lymphoid malignancy in the study on histopathology in the study was NHL. The L5 category ROM was 87.5%. As per cytology and histopathology correlation, sensitivity and specificity in this study was 61.53% and 92.59% respectively.

Table 2: Sex Distribution of lymphnode lesions (N = 100)

Sex	Frequency	Percentage
Female	38	38%
Male	62	62%
Total	100	100%

Table 3: Age Distribution of lymphnode lesions (N = 100)

Age(years)	Number of cases	Percentage
<1 year	01	1%
1-10	14	14%
11-20	24	24%
21-30	13	13%
31-40	17	17%
41-50	13	13%
51-60	8	8%
61-70	6	6%
71-80	2	2%
81-90	2	2%
Total	100	100%

Discussion

- Inflammatory processes whether it is symptomatic or asymptomatic are the most common causes of peripheral lymphadenopathy and it is of great clinical significance as underlying disease may range from treatable infectious etiology to malignant neoplasm and requires accurate diagnosis so that proper treatment guideline can be started as soon as possible.
- FNAC is the first line of investigation in the diagnosis of lymph node lesions. It is safe, inexpensive and highly acceptable to the patient and can be used as a safe alternative to excision biopsy.
- The cytology results can help in early distinction of benign and malignant lesions. Also it is helpful in diagnosis of early diagnosis of granulomatous lesions which are common in India [13]. The IAC has proposed a standardized categorical lymph node cytology reporting system which has defined criteria for diagnosis and it also provides management guidelines for each category. Its aim is improved clinical integration and overall better disease management [7, 8].
- As the proposed reporting system is a recent development in cytopathology field, only few publications are available for comparison. The present retrospective study included cases of FNA of superficial lymphadenopathy over a period of 2 years duration and included 100 cases. All of these were non guided as well as USG guided FNA procedures. In comparison to the retrospective study by Gupta P *et al.* [9] which included 6983 cases, ours is a smaller study as per number of cases. The retrospective study by Rivas HE *et al.* [10] and Vigliar E *et al.* [11] also published in 2021 evaluated 363 and 300 cases respectively but included only ultrasound guided FNA of lymphadenopathy. In the current study the age range of patient undergoing FNA was from 3 months to 90 years. The current study had more number of male patients undergoing lymph node FNA. The cervical lymph nodes were the most common site to be evaluated and this was similar in study by Vigliar E *et al.* [11] and Gupta P *et al.* [9]. Rivas HE *et al.* [10] included all palpable and non-palpable lymphadenopathy cases visualized using ultra-sonography (USG).
- In the current study category L1 of insufficient aspirates was seen in 2 cases (2.0%) while Gupta P *et al.* [9] had 289 cases (4.1%) as they used rapid on-site evaluation (ROSE) [12] technique. The study by Rivas HE *et al.* [10] had 13 aspirates (3.58%) in this category which could be because of FNA being done using USG guidance.
- The L2 benign cytology category included most number of cases (84.0%) in our study that was comparable to the studies by Gupta P *et al.* [9] and Rivas HE *et al.* [10].
- The L3 category of ALUS no cases were given in our study. Study results of Gupta P *et al.* [9] and Rivas HE *et al.* [10] who had 0.5% and 1.93% cases in this category respectively.
- The suspicious for malignancy category L4 had 2.0% cases in the current study which was comparable to the study result of Gupta P *et al.* [9] (1.4%) but a bit lower than Rivas HE *et al.* [10] (5.79%).
- The last category of malignant cytology L5 was diagnosed in 12 cases (12.0%) in the current study. This is a much smaller number than studies by Gupta P *et al.* [9] and Vigliar E *et al.* [11] who had 41.76% and 46% malignant cytological lesions respectively. This could be due to larger number of cases included in study by Gupta P *et al.* [9]. Also Vigliar E *et al.* [11] used USG guided FNA in all lymphadenopathy cases that was additional help.
- The most common cytological diagnosis in our study was granulomatous/ necrotizing lymphadenitis. The most common malignant lesion diagnosed on cytology was metastasis from epithelial malignancy. In the study by Gupta P *et al.* [9] the most common cytological diagnosis was metastatic squamous cell carcinoma. In the present study histopathological correlation was available in 40 cases (40.0%) cytologically evaluated cases. 8.8% cases available with histopathological correlation in the study done by Gupta P *et al.* [9] while this number was 80.6% in Study by Vigliar E *et al.* [11]. ROM was calculated in each category using available data. In our study, 2 cases of non-diagnostic category, histopathological correlation was not available. In category L2 of benign cytology, histopathological correlation showed malignancy in 5 out of the 30 evaluated cases. The ROM was 16.67% in our study which was higher than study results of both Gupta P *et al.* [9] (11.5%), Rivas HE *et al.* [10] (3%). The L3 category termed as ALUS/AUS we not found any cases. The L4 category termed as suspicious for malignancy had histopathology available in 2 cases out of this 1 case was found malignant. The ROM of 50.0% was obtained in the current study which was 88% and 100% seen in the studies by Gupta P *et al.* [9] and Rivas HE *et al.* [10] respectively. The last category of cytologically malignant lesions showed ROM of 87.5%. 7 out of 8 histopathologically evaluated cases confirmed malignancy. This high ROM is closets to the results of Rivas HE *et al.* [10] (100%) and Gupta P *et al.* [9] (99.6%). On basis of all calculated data the sensitivity, specificity and diagnostic accuracy in the current study were 61.53%, 92.59% and 82.50% respectively. These values are compared with other study results in table IV.

Table 4: Comparison of statistical values with other study results (All values in percentage)

	Current study	Gupta P *et al.* [9]	Vigliar E *et al.* [11]
Sensitivity	61.53	79.9	98.47
Specificity	92.59	98.7	95.33
Diagnostic accuracy	82.50	89.3	97.06

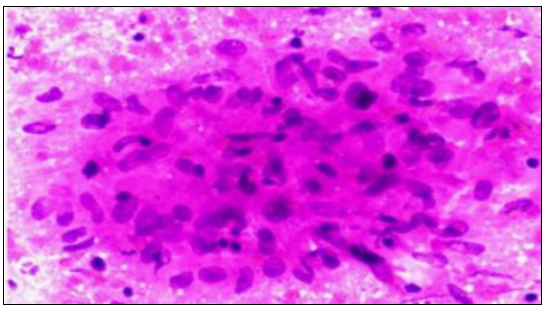

Fig 1: Smear from right side cervical lymph node shows Granuloma formation comprising of epithelialis histiocytes with caseous necrosis (H & E 40x)

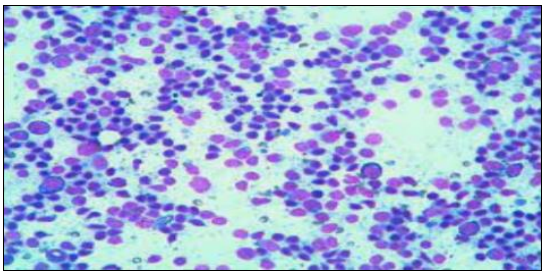

Fig 2: Smear from right side inguinal lymph node shows polymorphus lymphoid population (MGG 10x)

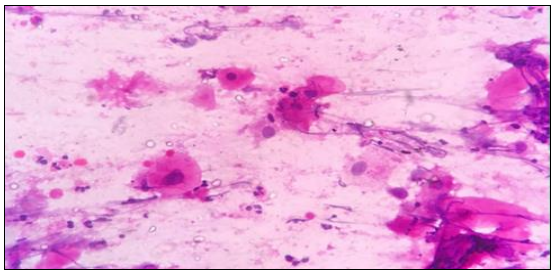

Fig 3: Smear from cervical lymph node showing squamous cell with abundant eosinophilic cytoplasm & pleomorphism in known case of carcinoma of buccal mucosa (H & E 40x)

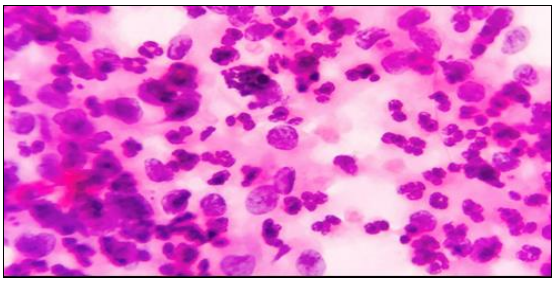

Fig 4: Smear from axillary lymph node shows inflammatory cells, (Grade-II) many malignant cells with nuclear pyknosis, nuclear hyperchromasia and lymphocytic infiltration in a known case of ductal carcinoma breast post radiotherapy. (H & E 10x)

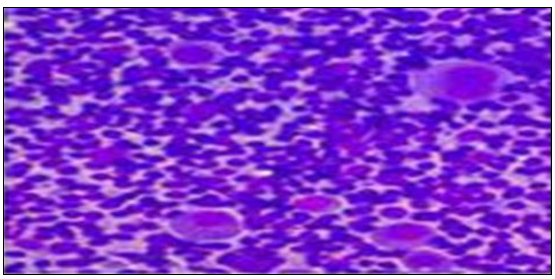

Fig 5: Smear from left cervical lymph node shows scattered Reed-sternberg cells with multilobed nuclei and prominent nucleoli on mixed inflammatory background. (H & E 40x)

Conclusion

FNAC has important application and diagnostic significance in lymph node swellings. The new proposed Sydney reporting system provides defined diagnostic categories and helps in evaluating risk of malignancy. Its use will be beneficial both in improving cytology practice with uniform reporting and also allow better understanding of cytology report by the treating physician ultimately leading to improved patient management

Conflict of Interest

Not available

Financial Support

Not available

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