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# Application of Sydney System for Lymph Node Cytology in a Day-to-Day Practice

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**ABSTRACT**

The evaluation of lymphnodes (LN) by fine needle aspiration cytology (FNAC) is routinely used as an initial diagnostic tool. LN-FNAC interpretation and its correlation with ancillary tests are not widely accepted due to lack of guidelines and cytopathological classification that directly relates to management. To categorize LN FNAC reporting into diagnostic classes as in proposed Sydney system LN-FNAC was performed on 57 patients whose request typically originated from Physicians/Pediatricians, ENT /General Surgeons in the past one year. Detailed history and examination was done. Ultrasound report was noted for available cases. All palpable nodes were aspirated and smears were stained with Giemsa, Hematoxylin and eosin, Papanicolaou, Ziehl-Neelsen and material was sent to district hospital for CBNAAT (Cartridge Based Nucleic Acid Amplification Test) in clinically/ cytologically suspected cases Patients age ranged from 2 to 100 years. Mean age group was 21-30 with slight female preponderance. Majority (51) had cervical lymphnode enlargement, 3 each had axillary and inguinal lymphnodes. Of the 57 cases 24 were suspected to be of tubercular etiology of whom 17 were granulomatous with /without necrosis and 7 suppurative lymphadenitis. Two were CBNAAT positive of the eight cases tested. Acid Fast Bacilli (AFB) was positive in two. Of the 7 metastatic lymphnodes one case had deposits from PTC (Papillary Thyroid Carcinoma). Twenty five were reactive lymphadenitis and one lymphoproliferative process. Further cases were categorised into benign (49), suspicious (1) and malignant (7) according to proposed Sydney system Proposed Sydney system speeds up the reporting and helps to maintain uniformity in the reporting format and to follow treatment guidelines for patients.

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**Key Words**
LN- FNAC, Sydney system

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## INTRODUCTION

The evaluation of lymph nodes (LN) by fine needle aspiration cytology (FNAC) is routinely used in many institutions but it is not uniformly accepted mainly because of the lack of guidelines and a cytopathological diagnostic classification[1]. FNAC gives basic material for cytological evaluation as well as facilitates multitude of ancillary techniques such as, cell block preparation, flowcytometry and immunocytochemistry[2,3]. Lymphadenopathy may be a sign of a self-limited infection in children while in adults it may be a sign of metastatic malignancy. The aetiology of infectious pathology varies based on geographical areas[4,5]. Most lymph node lesions are non neoplastic, the smaller subset of neoplastic lesions need to be identified for optimal management[4,6]. The diagnosis of metastatic malignancy in lymph node cytological smear is highly reliable[7]. After the successful establishment of Bethesda system for cervical and thyroid cytology and Milan system for salivary gland cytology, in 2020 proposal of Sydney system for lymph node was proposed to keep uniform reporting and better communication[2]. According to this system, the cytologic aspirates from lymph nodes should be categorised into 5 categories based on the specific cytologic features. The cytology report should provide one of the five first-level diagnostic categories followed by a clear description of cytomorphology[8].

**Objective:**

- To categorize LN FNAC reporting into diagnostic classes as in proposed Sydney system.

## MATERIALS AND METHODS

LN-FNAC was performed on 57 patients in the past one year. Detailed history and examination was done. Ultrasound report was noted for available cases. All palpable nodes were aspirated and smears stained with Giemsa, Hematoxylin and eosin, Papanicolaou, Ziehl-Neelsen and material was sent to district hospital for CBNAAT in suspected cases. The smears were reported and classified into 5 different diagnostic categories based on the proposed Sydney system of reporting and includes

- Inadequate /non diagnostic
- Benign
- Atypical cells of undetermined significance/atypical lymphoid cells of uncertain significance (AUS/ALUS)
- Suspicious
- Malignant 1

## RESULTS AND DISCUSSIONS

Patients age ranged from 2 years to 100 years. Mean age group was 21-30 years with slight female preponderance. Majority had (51) cervical lymphnode enlargement, 3 each had axillary and inguinal lymphnode enlargement (Table 1). Of the 57 patients, 24 were suspected to be of tubercular etiology of whom 17 had granulomatous lymphadenitis with or without necrosis and 7 had suppurative lymphadenitis. Two were CBNAAT positive of the eight cases tested. AFB was positive in two. Of the 7 metastatic lymphnode cases, one had deposit from papillary thyroid carcinoma (PTC). Twenty five had reactive lymphadenitis and one had lymphoproliferative process. Further cases were categorised into benign (49), suspicious (1) and malignant (7) according to proposed Sydney system as shown in Table 2

**Benign:** Benign cytologic diagnoses were rendered in 49 cases and included reactive lymphadenitis, suppurative lymphadenitis, granulomatous lymphadenitis with or without necrosis.

**Reactive Lymphadenitis:** Reactive lymphadenitis was diagnosed in twenty five cases. Ultrasound report of these patients revealed discrete oval shaped enlarged lymphnode with preserved central fatty hilum. Microscopic examination showed polymorphous population of lymphoid cells as shown in Figure 1.

**Granulomatous Lymphadenitis:** Seventeen cases of Granulomatous lymphadenitis (figure2) with or without necrosis was diagnosed of whom 9 had caseous necrosis and granulomas but 8 had only granulomas. All cases were stained for AFB but only one case was positive for acid fast bacilli. 20 year male patient was suspected to be having tubercular lymphadenitis both clinically and radiologically. Smears showed caseous necrosis and granulomas with AFB positive. However tubercular bacilli were not detected in CBNAAT.
CBNAAT was sent for 8 cases of which two were positive of the seventeen cases. Of the 17 cases of granulomatous lymphadenitis, tubercular etiology was proved for eleven cases and for the remaining 6 cases ultrasound, ancillary test (quanteferon TB) were suggested.

**Suppurative Lymphadenitis:** Suppurative lymphadenitis was diagnosed in seven cases. Five patients were below 10 years and had cervical lymphnode enlargement and one was a 35 year female and had axillary lymphnode enlargement. Smears studied from all patients showed numerous neutrophils (Fig. 3a), negative for AFB and suspected cause was bacterial infection, antibiotics were suggested. A 45 year old female who had completed her anti-tubercular treatment for 6 months had cervical lymphnode enlargement and smears showed numerous neutrophils without granulomas or necrosis and was positive for acid fast bacilli (figure 3b)

**Suspicious:** 100 years male patient had bilateral cervical lymphnode enlargement. Smears showed small to medium sized atypical lymphoid cells (Fig. 4). Complete blood count was within normal limit. Repeat FNAC/ excision biopsy was advised for further management.

**Malignant:** Malignancy was diagnosed in seven cases. All were male patients with history of smoking and tobacco chewing. One had metastasis from papillary thyroid carcinoma. Smears showed cells arranged in papillae having irregular nuclei with few showing intranuclear pseudoinclusion ( Fig. 5) Remaining six had metastatic deposits from unknown primary. Smears from these patients showed malignant epithelial cells in clusters with moderate to severe nuclear pleomorphism as shown in figure 6. For these patients chest X- ray, ultrasound neck and abdomen and evaluation of upper aerodigestive tract was suggested. It has been seen that the application of standardised reporting systems in cytopathology reduces intra-observer variability in reporting and helps in the

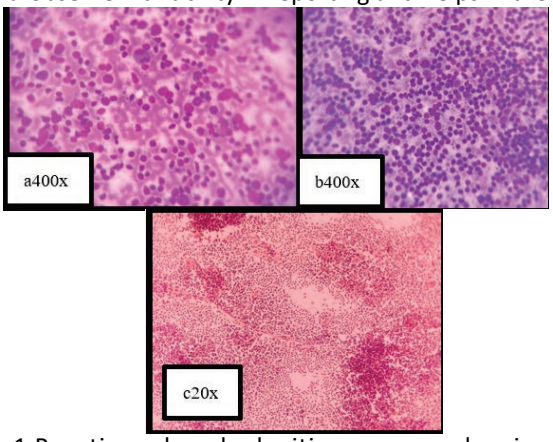


Fig. 1:Reactive lymphadenitis: smears showing polymorphous population of lymphoid cells. USG revealed discrete oval shaped enlarged lymphnode with preserved central fatty hilum

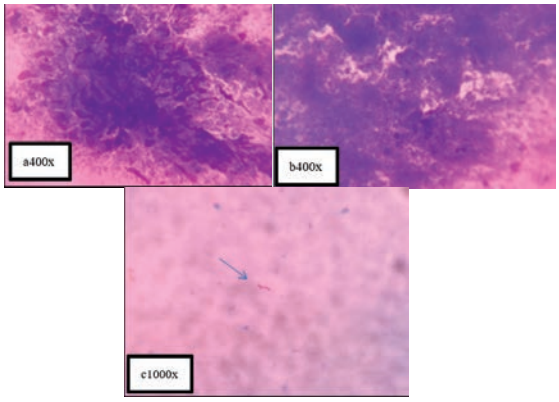


Fig 2: Granulomatous lymphadenitis (a-smears depicting clusters of epithelioid histiocytes, b-caseous necrosis, c-arrow mark-acid fast bacilli)

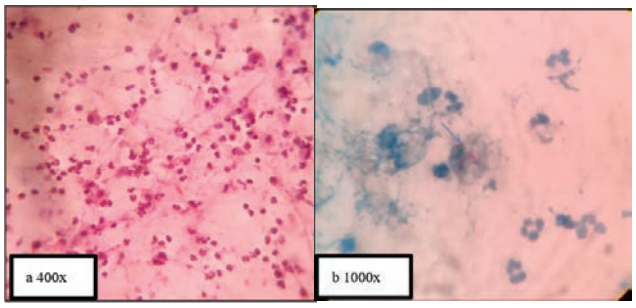


Fig 3: Suppurative lymphadenitis (a-smears showing numerous neutrophils, b-arrow mark-acid fast bacilli)

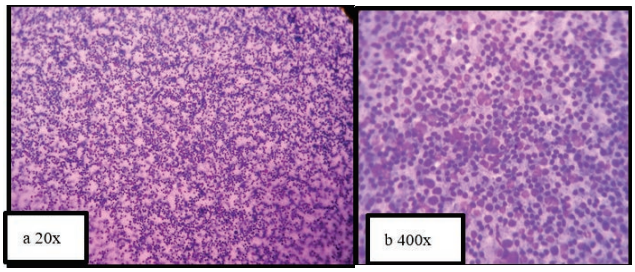


Fig. 4:Suspicious. Smears showing small to medium sized atypical lymphoid cells

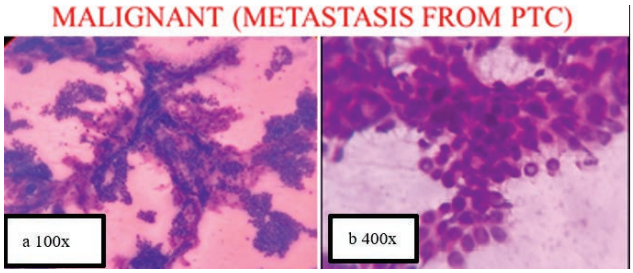


Fig 5: Malignant-cells arranged in papillae(a) having irregular nuclei with few showing intranuclear pseudoinclusion

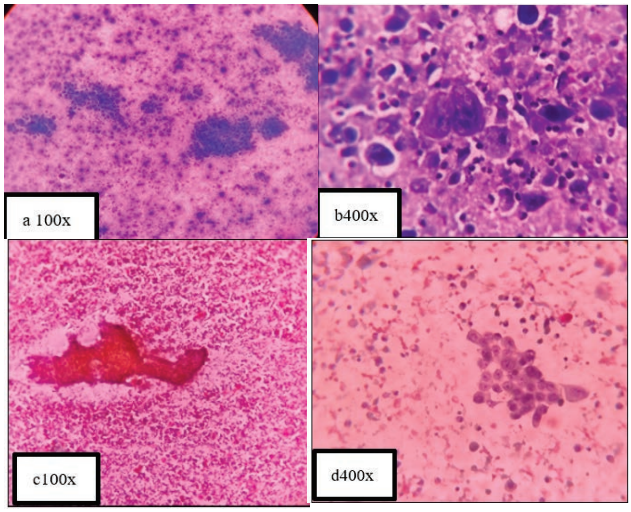


Fig 6: Metastasis from Unknown Primary: smears depicting malignant epithelial cells with moderate to severe nuclear pleomorphism

**Table 1: Age, Gender and Site distribution**

| Age in years | Male (30) | Female (27) | Frequency 57 (n) | Site | | |
|---|---|---|---|---|---|---|
| | | | | Cervical (51) | Axilla (3) | Inguinal (3) |
| 0-10 | 5 | 3 | 8 | 8 | 0 | 0 |
| 11-20 | 4 | 2 | 6 | 6 | 0 | 0 |
| 21-30 | 8 | 10 | 18 | 15 | 2 | 1 |
| 31-40 | 1 | 7 | 8 | 7 | 1 | 0 |
| 41-50 | 4 | 5 | 9 | 8 | 0 | 1 |
| 51-60 | 3 | 0 | 3 | 3 | 0 | 0 |
| 61-70 | 4 | 0 | 4 | 3 | 0 | 1 |
| 71-100 | 1 | 0 | 1 | 1 | 0 | 0 |

**Table 2: Diagnosis**

| Age in years | | | 0-10 | 11-20 | 21-30 | 31-40 | 41-50 | 51-60 | 61-70 | 71-100 |
|---|---|---|---|---|---|---|---|---|---|---|
| Male (30) | | | 5 | 4 | 8 | 1 | 4 | 3 | 4 | 1 |
| Female (27) | | | 3 | 2 | 10 | 7 | 5 | 0 | 0 | 0 |
| Frequency 57 (n) | | | 8 | 6 | 18 | 8 | 9 | 3 | 4 | 1 |
| Diagnosis | Benign (49) | Reactive lymphadenitis (25) | 3 | 2 | 8 | 6 | 5 | 0 | 1 | 0 |
| | | Granulomatous lymphadenitis with or without necrosis (17) | 0 | 4 | 10 | 1 | 1 | 1 | 0 | 0 |
| | | Suppurative lymphadenitis (7) | 5 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |
| | Suspicious(1) | | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| | Malignant (7) | | 0 | 0 | 0 | 0 | 2 | 2 | 3 | 0 |

**Table 3: Comparision**

| Category | Present study(57) | Pandya D *et al*[2] (194) | Gupta *et al*[10] (23335) | Vigiliar E *et al*[4] (300) |
|---|---|---|---|---|
| Non diagnostic | 00 | 4.12% | 4.1% | 6.7% |
| Benign | 86% | 61.34% | 48.6% | 34.7% |
| Atypical | 00 | 3.09% | 0.5% | 8.3% |
| Suspicious | 1.7% | 13.4% | 1.4% | 4.3% |
| Malignant | 12.3% | 18.04% | 45.5% | 46% |

communication of clinically relevant information in a reproducible manner. Moreover, it enhances the interpretation of cytopathological reports by clinicians with regard to risk assessment. The Sydney system for fine needle aspiration biopsy of lymph nodes has five categories, stressing the role of correlation of cytopathology with clinical, ultrasound and ancillary findings to achieve diagnosis. The five categories constitute a hierarchical system with increasing risk of malignancy from benign to atypical, suspicious, and malignant categories, which informs recommendations for further workup to achieve a final diagnosis as possible. The aim of this reporting system is to provide clearly described terminology and defined categories, key diagnostic cytopathological criteria, and best practice recommendations for the use of ancillary testing[9]. In the present study most commonly aspirated lymphnodes were cervical followed by axillary and inguinal, similar observation was made in study conducted by Gupta et al10 and Pandya[2]

Out of the 57 aspirates obtained, there were 30 (55.60%) males and 27 (44.40%) females, with an overall male to female ratio of 1.1:1. Number of females out numbered males in the age group of 21 to 30 years and in 31-40 years similar observation was made in the study conducted by Sreelekshmi et al8 and Qadri[11]. In the present study of the 49 benign cases, there was reactive lymphadenitis in 25 (51.02%), granulomatous lymphadenitis in 17 (34.69%) and suppurative lymphadenitis in 7 (14.28%) cases. Similar observation was made in the study conducted by Sreelekshmi[8], Qadri[11] and Shanmugasundaram[12]. On the contrary study conducted by Pandya[2] showed more prevalence of tubercular lymphadenitis which could be due to increased prevalence of tuberculosis in the area where they have conducted study. In the present study of the 17 cases of granulomatous lymphadenitis with or without necrosis only one case was AFB positive similarly in a study conducted by Sreelekshmi[8] where only 9 cases were positive out of 53 granulomatous lymphadenitis.

In the present study, benign category showed more prevalence (86%) which could be due to low sample size. Similar observation was made by Pandya[2] and Sreelekshmi[8]. On the contrary, studies by Gupta P *et al.,* Vigilar[10,4] showed equal distribution between benign and malignant lesion catagories [Table3].

The studies are very heterogeneous with marked variation in case numbers, different clinical settings, institutions, and population cohorts that may have different spectrums of disease and pretest rates of malignancy, different anatomical sites, varying use of Rapid On site Evaluation(ROSE) and varying use ancillary testing to make the diagnosis and establish categorization[9]. The category definitions of the Sydney system were applied prospectively, for example, a case showing only necrosis in a country like ours where mycobacterial infection is endemic led to a diagnosis of caseous necrosis with appropriate special stains, but this may be regarded as nondiagnostic in a different country where mycobacterial infection is not endemic, or a case was

regarded as “atypical lymphoid cells of uncertain significance” in our setting where ancillary testing was not available and was diagnosed as suspicious of malignancy based on the cytopathology and but with appropriate ancillary testing in a country where this is available would have been called a lymphoma. There is a long and successful history of using FNAB of superficial lymph nodes by palpation with correlation with clinical information, and in experienced hands, this is perfectly adequate. A preliminary categorization should be made and recorded, and in situations where ancillary tests are not available, this may be the end of the process or the patient may go on to excision biopsy[9].

## CONCLUSION

Proposed Sydney system speeds up the reporting and helps to maintain uniformity in the reporting format and to follow treatment guidelines for patients.

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