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Original Research

Diagnostic Approach and Application of Proposed 2020 Sydney System of Reporting Lymph Node Cytology: A Retrospective Study

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ABSTRACT

Background: Fine needle aspiration cytology (FNAC) is the primary, quick, less invasive procedure in diagnosing suspected and unsuspected primary and metastatic lymph nodes lesion.

Aim: To categorise cytological aspirate from lymph node according to Sydney system and to evaluate the applicability of Sydney system.

Methods: The study was done at Department of pathology, Karwar institute of medical sciences, Karwar from March 2023 to September 2023. Patient with clinical history of lymphadenopathy from any site were subjected to FNAC.Smears were fixed in alcohol and stained with H&E and Pap stain and examined under microscope.

Results: Of 83 lymph node FNAC mean age was 40 years with male predominance. According toSydney System, lesions were classified as L1 Unsatisfactory-4 cases (4.9%), L2 Benign-64 cases (79%), of which Reactive lymphadenitis- 49 cases (76%), Necrotising lymphadenitis-2(3.1%), Suppurative lesions-10(15.6%), Granulomatous lesion -4(6.25%). L3AUS/ALUS-1 case (1.2%), L4 Suspicious -4 cases (4.8%), L5 Malignant-9 cases (10.8%).

Conclusion

The proposed 2020 Sydney system provides clear cut terminologies in producing reports and calculating risk of malignancy in each category and alerting the clinicians for further follow up.

Keyword: FNAC, Sydney system, lymphadenopathy, benign, malignant.

INTRODUCTION

The cytological diagnosis of lymph node pathology is very challenging because of diverse diseases both benign, primary and secondary malignancy. Fine needle aspiration cytology (FNAC) is the primary quick approach used routinely for diagnosing lymph node pathology. It is minimally invasive, rapid, cost effective and capable of providing material to other ancillary techniques. The conventional method of reporting lymph node cytology lacks standardized diagnostic classification. Large number of cases with benign and malignant conditions presents as lymphadenopathy. The knowledge of clinical history, physical examination and radiological/ultrasonographic features are pivotal for a cytopathologist to arrive at the diagnosis. Also, use of a standardized categorization and communication to clinicians is required.[1,2] Hence in the year 2020, a categorical system for performance, classification, and reporting of lymph node cytopathology was proposed at the 20th International Congress of Cytology in Sydney.[3] This system was referred to as the Sydney system. It is based on well-documented internationalcytopathology studies with years of experience of the contributing authors from all over the world. It allows for the categorization of lymphnode-FNA diagnosis, provides a management algorithm, and has been endorsed by the International Academy of Cytology and the European Federation of Cytology Societies[3]. It is proposed based on wide spectrum of lymph node pathologies, a second

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diagnostic level, aimed at the identification of specific diagnostic entities.

AIM

To categorise cytological aspirate from lymph node according to Sydney system and to evaluate the applicability of Sydney system.

MATERIALS AND METHODS

The study was done retrospectively in the department of pathology, Karwar institute of medical sciences, Karwar from March 2023 to September 2023. Ethical clearance was obtained from institutional Ethics committee at Karwar institute of Medical Sciences, Karwar.

Inclusion criteria: Data of all cases of Lymph node fine needle aspirates irrespective age and sex were included.

Exclusion criteria: Non lymph node aspirates were excluded from the study. Patient presenting with lymphadenopathy from any site were subjected to FNAC. Aspiration was done using 22-23 gauge needles with aseptic precautions andsmears were prepared. Smears were fixed in isopropyl alcohol and stained with H&E and Pap stain, then examined under microscope. Special stains for acid fast bacilli were done for suspected tuberculosis cases. It was reported and classified into 5 categories based on proposed Sydney system of reporting. L1: Inadequate/Nondiagnostic, L2: Benign, L3: atypical cells of undetermined significance/atypical lymphoid cells of uncertain significance (AUS/ALUS), L4: Suspicious, L5: Malignant.Both cytological and histopathological finding (where ever available) were noted and correlated. Risk of malignancy (ROM) for each category was calculated by dividing the number of cases confirmed malignant on histopathology by number of total cases with available histopathology in the category.

Statistical analysis: All quantitative parameters were described through descriptive analysis and was done using SPSS version 21

RESULTS

A total of 83 cases of lymphadenopathy were analysed. The age of the patients ranged from 4 months to 81 years (Table-1). Mean age was 40 years. Majority were >60 years. Less number of patients were seen in 41-50 years. Males were 49 (59%) cases and females were about 34 (40.9 %) cases with M:F ratio of 1.4:1.

According to site of lymphadenopathy (Table 2), Majority being cervical of 40 cases (49%), axilla-14(16.8%), inguinal-10(12.3%), postauricular-4(4.9%), submandibular-5(6.1%), submental-3(3.7%), multiple lymph node 2 cases (2.4%), 1 case each in periumbilical, supraclavicular, parapharyngeal and occipital region.

Diagnostic categories according to Sydney system classification was done (Table-3). Majority 65 cases (78%) were in benign category. One case with atypical cells of undetermined significance/ atypical lymphoid cells of uncertain significance (AUS/ALUS). 4 cases were in suspicious category and 9 cases were in malignant category. (Table 3).

L1 category-Inadequate category had only 4 cases (4.8%) which showed only blood and no cellularity and there was no histopathological correlation. Repeat aspiration/ biopsy was recommended.

L2 category-Benign were 65 cases (78%), which were reactive lymphadenitis-49 cases (59%),Necrotizing lymphadenitis- 2 cases(0.02%),granulomatous lymphadenitis- 4 cases(0.04%) and suppurative lymphadenitis-10 cases(0.12%).14 cases (0.16%)from benign category were followed up with CBNAAT , of which 4(0.04%) were positive which were diagnosed and reported as granulomatous lesion in FNAC. Rest cases lost follow up. L3 category (AUS/ALUS). -1 case (0.01%) diagnosed with atypical lymphocyte. histopathologically confirmed as Non-Hodgkin's lymphoma and was correlated. L4 category-Suspicious of malignancy were 4 cases (4.8%), of which only 3 cases were histopathologically correlated and was diagnosed as Infiltrating ductal carcinoma- breast, Squamous cell carcinoma and Hodgkins's lymphoma each. L5 category- Malignancy were 9 cases(10.8%), of which 1 case was metastasis from ovarian adenocarcinoma, 1 case of metastasis from adenocarcinoma-sigmoid colon, 2 cases with squamous cell carcinoma, 2 cases with infiltrating ductal carcinoma-breast correlated with histopathology and had clinical follow up. 3 cases lost follow up (Table 4). Risk of malignancy (ROM)was calculated and shown below (Table 5).

AGE GROUP(n-83)	No of cases(n-83)	Percentage
0-13 years	12	(14.4%)
14-20 years	12	(14.4%)
21-30 years	9	(10.8%)
31-40 years	13	(15.6%)
41-50 years	8	(9.6%)
51-60 years	13	(15.6%)
>60 years	16	(19.2%)

Table 1: Distribution of Lymph node FNAC cases according to age group

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Site of lymphadenopathy	No of cases(n-83)	Percentage
Cervical	40	(19.2%)
Axillary	14	(16.8%)
Inguinal	10	(12%)
Submandibular	5	(6%)
Others	14	(16.8%)

Table 2: Distribution of FNAC cases according to site of lymphadenopathy

Diagnostic category of Sydney system	No of cases	Percentage
L1 Inadequate	4	4.8%
L2 Benign	65	78%
L3 AUS/ALUS	01	1.2%
L4 Suspicious	4	4.8%
L5 Malignant	9	10.8%

Table 3: Distribution of cases according to proposed 2020 Sydney system of classification

Sl no	Category	Cytological diagnosis (n-83)	No of cases	Correlated histopathological cases
1	L1(4 cases)	Blood and scant aspirate	-	-
2	L2 (65 cases)	Reactive lymphadenitis	49	3
		Necrotising lymphadenitis	2	-
		Granulomatous lesion	4	2
		Suppurative lymphadenitis	10	3
3	L3 (1 cases)	Atypical lymphocytes	1	1
4	L4 (4 cases)	Suspicious of metastasis	3	2
		Suspicious of Hodgkins lymphoma	1	1
5	L5 (9 cases)	Metastatic lymph node deposits	9	6

Table 4: Category wise cytological diagnosis and histopathological correlation with clinical follow up

Diagnostic category of Sydney system	No of cases in each category	Confirmed histopathological cases	ROM
L1 Inadequate	4 (4.8%)	Nil	0%
L2 Benign	65 (78%)	Nil	0%
L3 ACUS	01 (1.2%)	1	100%
L4 Suspicious	4 (4.8%)	3	75%
L5 Malignant	9 (10.8%)	6	65%

Table 5: Risk of malignancy (ROM) for each Sydney system category in the present study

Sydney System Categories	Our study (n=80)	Pandya D et al[9](n=194)	Vigliar E et al[7](n=300)	Gupta P et al[6](n=6983)	Sreelekshmi et al[5](n=250)	Joshee et al[10] A (n=1409)
L1 Inadequate	4.8%	4.12%	6.7%	4.1%	5.6%	10.6%
L2 Benign	78%	61.34%	34.7%	48.6%	66.4%	57.3%
L3 ALUS	1.2%	3.09%	8.3%	0.5%	1.6%	0.6%
L4 Suspicious	4.8%	13.4%	4.3%	1.4%	2%	13%
L5 Malignant	10.8%	18.04%	46%	45.5%	24.4%	30.14%

Table 7: Comparison of category wise lesion according to Sydney system

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Site of lymphadenopathy	Our study	Gupta et al[6]	Vigilar E et al[7]	Pandya D et al[9]
Cervical	48%	66.8%	45.3%	67.5%
Axillary	16.8%	14%	18.3%	12.3%
Inguinal	12%	8.1%	9.7%	5.15%
Submandibular	6%	2%	13.3%	5.15%
others	16.8%	9.1%	13.4%	9.7%

Table 6: Comparison of different site of lymphadenopathy with other studies

Sl. No	Categories	Cytological diagnosis(n-83)	Frequency	Sreelekshmi et al[5]
1	L1-4 cases	Blood and scant aspirate- 4 cases	4.8%	5.6%
2	L2-65 cases	Reactive lymphadenitis-49 cases	59%	34.4%
		Necrotizing lymphadenitis-2 cases	2.4%	-
		Granulomatous lesion-4 cases	4.8%	21.3%
		Suppurative lymphadenitis-10 cases	12%	6.4%
3	L3-1 cases	Atypical lymphocytes-1 case	1.2%	1.6%
4	L4-4 cases	Suspicious of metastasis-3 cases	3.6%	0.8%
		Suspicious of Hodgkins Lymphoma-1 case	1.2%	1.2%
5	L5-9 cases	Metastatic lymph node deposits-9 cases	10%	24.4%

Table-8: Comparison of category wise cytological diagnosis as per the proposed Sydney system

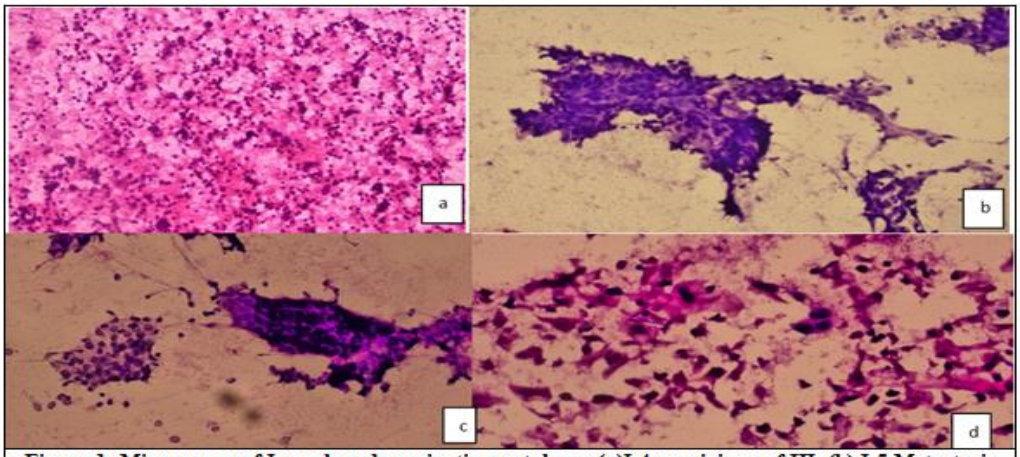

Figure 1: Microscopy of Lymph node aspiration cytology: (a)L4-suspicious of HL,(b) L5 Metastasis from Infiltrating ductal carcinoma,(c) L5- Metastasis from ovarian carcinoma,(d) L5 Metastasis from S quamous cell carcinoma(H&E 10X)

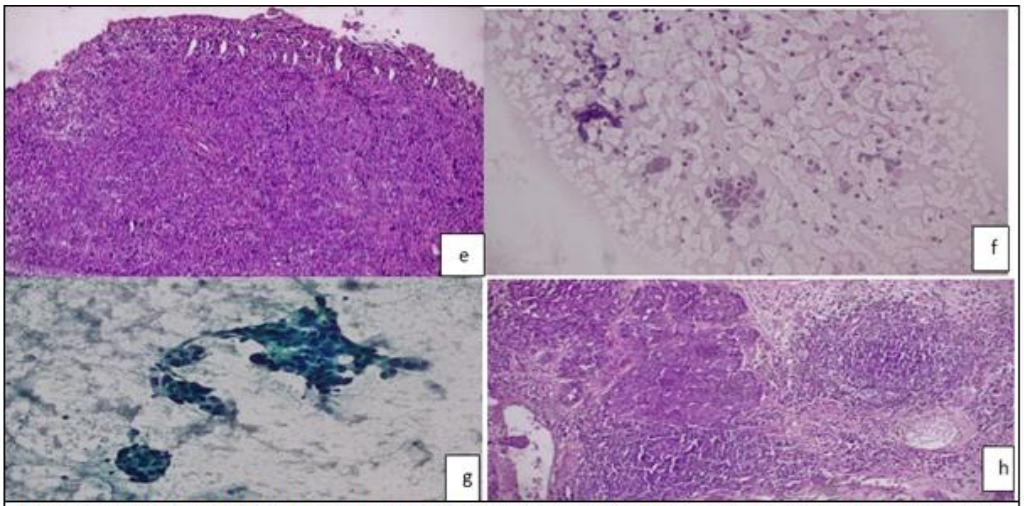

Figure 2 : MICROSCOPIC PICTURES:(e)Histopathology of Non ho dgkins lymphoma(f) L3 category showing atypical lymphoid cells,(g) cytology of Metastatic Adenocarcinoma deposits Pap stain 10X,(h) Histopathology of S q uamous cell carcinoma deposits in lymph node.H&E,10X

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DISCUSSION

Lymphadenopathy is the common and early presenting symptom for both benign and malignant lesion. FNAC becomes the first line of investigation in evaluation of lymphadenopathies. The proposed 2020 Sydney system allows categorization of LN-FNA diagnosis, provides a management algorithm and has been endorsed by the International Academy of Cytology and the European Federation of Cytology Societies[3].

There was a total of 83 cases of lymphadenopathy for which FNAC was performed. Majority were male with M: Fratio of 1.4:1. An observational study done by Qadri S Ket al[4] quoted M:F ratio of 1.5:1. Mean age was 40 years with majority patients were >60 years age group which was similar to the study done by Sreelekshmiet al[5] with mean age of 45.9 years. In our study cervical lymphadenopathy was the most common site. In study done by Gupta et al[6], Vigliar E et al[7], Rivas HE et al[8] and Pandya D et al[9] also showed cervical lymphadenopathy as most common site. (Table 6)

Distribution of cases according to Sydney system showed L1 were 4 cases with no histological follow up andrepeat aspiration was not possible, hence risk of malignancy could not be calculated. Joshee A et al[10] showed 10.6%, Gupta P et al[6] 4.1% with rapid on-site evaluation(ROSE) technique and Rivas HE et al[8] had 3.58% with USG guided FNA. Gupta P et al[6] and Vigilar E et al[7] showed a higher risk of malignancy in this category accounting to 27.1% and 50% respectively.

Comparison of Sydney system of different categories is shown below (Table 7). The L2 benign category included most number of cases (78%) followed by L5 which is similar with other studies shown below.Comparison of category wise cytological diagnosis as per the proposed Sydney system is shown below. (Table:-8)

Risk of malignancy in our study was 100%, 75%, 65% in category L3, L4 and L5 respectively. In category L3 studies by Pandya D et al[9] showed maximum discordant with false negative results with 50% ROM, Gupta P et al[6] also showed discordant results with 66.7% ROM and 58.3% by Vigilar E et al.[7] Study by Joshee A et al[10] had a significant lower ROM(15%) as compared to other studies. As the number of cases was too less, ROM is not correlated with any studies in L3 category. In category L4 and L5 Gupta P et al[6], Viligar E et al[7] have shown 100% ROM, Joshee A et al[10] with 78.5% and 96.7% respectively whereas Pandya D et al[9] have shown 88% and 99.6% respectively.

Lymphoid malignancy techniques such as flow cytometry, immunocytochemistry and molecular based tests are more conclusive towards final diagnosis.Studies by Vigliar et al[7], Joshee et al[10] has also concluded FNAC coupled with ancillary studies will be effective with Sydney system implementation. Gupta et al[6] and Sreelekshmi et al[5] has found FNAC having high diagnostic accuracy and application of Sydney system can help in achieving uniformity and reproducibility in cytologic diagnosis and help in risk stratification.

CONCLUSION

FNAC of lymph node lesion is quick, non invasive preliminary diagnostic investigation. Reporting and categorizing lymph node lesions according to new 2020 Sydney system helps in using uniform terminologies among the clinicians and cytopathologist calculating the risk of malignancy in each category for further follow up and management of the patients. The most significant limitation in our study was low number of cases therefore further studies with large sample size with ancillary techniques is required for accurate results andday to day diagnostic utility of Sydney system.

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Conflict of interest - Nil

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