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THE EVALUATION OF LYMPH NODE FINE NEEDLE ASPIRATION CYTOPATHOLOGY USING THE SYDNEY SYSTEM OF REPORTING – A TEACHING INSTITUTIONAL EXPERIENCE.

Pathology

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ABSTRACT

Background: Fine-needle cytology (FNC) is a useful diagnostic tool in the first line evaluation of lymphadenopathy of unknown etiology. Due to a lack of standard uniform criteria and reporting systems, the use of FNC in lymph nodes is still not universally acknowledged by clinicians. **Aims/objectives:** To categorize the lymph node lesions according to Sydney system of reporting the lymph node aspiration cytology cases and assess the risk of malignancy (ROM) for each diagnostic category wherever applicable. **Study Design:** Cross sectional retrospective study **Material and methods:** This study was conducted by including all the lymph node aspiration cases over a period of three years. All lymph node cytology the slides were retrieved and reviewed and categorized according to Sydney system of reporting. Corresponding histopathology slides were reviewed and risk of malignancy were calculated. **Results:** There were 422 lymph node cytology cases. Majority of cases (323) belonged to benign/L2 group followed by L5/malignancy (92 cases), L1/ Non diagnostic (04 cases), L3/ALUS (02 cases) and one case in L4/ suspicious category. **Conclusion:** By using standardized reporting methods, one can communicate clinically important information in a reproducible manner while limiting interobserver variability

KEYWORDS

Fine needle cytology, Lymph node, Sydney system, Risk of malignancy

INTRODUCTION

Fine-needle cytology (FNC) is a useful diagnostic tool in the first line evaluation of lymphadenopathy of unknown etiology.[1] Lymph node - Fine needle aspiration cytology LN-FNAC can assess whether lymphadenopathy (LAP) is benign or malignant and provide additional information regarding staging. In addition to cytomorphological information, it also provides material for ancillary testing. [2]

Despite the tremendous progress made in performing and interpreting LN-FNAC and its correlation with ancillary tests, the technique is not uniformly accepted by clinicians and pathologists. [3,4] This is mainly due to the lack of widely shared and accepted guidelines and a cytopathological classification that directly relates to management.[2]

In this context, an expert panel published the proposal of the Sydney system for performing classification and reporting of lymph node cytopathology at 20th International Congress of Cytology held in Sydney. According to this system, cytologic aspirates from lymph node masses should be categorized into five different diagnostic categories that includes Category I (L1): Non-diagnostic/ inadequate, Category II (L2): Benign, Category III (L3): atypical cells of undetermined significance/atypical lymphoid cells of uncertain significance (AUS/ALUS); Category IV (L4): Suspicious and Category V (L5): Malignant.[2,5]

However, the Sydney system is still underutilized and to date there are limited data in the literature. To fill this knowledge gap, the aim of the present study is to evaluate the applicability of the Sydney system to lymph node FNAC and to assess diagnostic accuracy and the risk of malignancy (ROM) for each diagnostic category.

MATERIALS AND METHOD

This retrospective study was carried out at Department of pathology, Adichunchanagiri institute of medical sciences focusing on patients who underwent lymph node FNC over 3-year period from Jan 2019-Jan 2021. Ethical clearance from the institutional ethics committee was taken before commencement of study. Pathology records were retrieved and data on patients age, sex, lymph node location, clinical history, ancillary studies and final diagnosis were recorded.

The original diagnoses were reviewed, and each case was assigned to a category based on the Sydney system classification (L1, inadequate/nondiagnostic; L2, benign; L3, atypical cells of undetermined significance/atypical lymphoid cells of uncertain significance (AUS/ALUS); L4, suspicious; L5, malignant)[1]. Any discrepancies in the classification were resolved by consensus between at least two pathologists. To assess the diagnostic accuracy and risk of malignancy for each diagnostic category, histopathologic diagnoses were correlated with FNC diagnoses.

Statistical Analysis

The data was analyzed by using SPSS software. Descriptive statistics was expressed in the form of frequency, mean, median and range. Finally, diagnostic accuracy of LN-FNA along with risk of malignancy was assessed for each category.

RESULTS

Over a period of three years, total number of FNAC were 3115 and out of which 422(13.5%) were of lymph nodes. The age of the patient ranged between 2 and 88 years (mean 42.5 years)

Out of 422 patients, 214 were male and 208 were female with male-to-female ratio of 1.02:1.

Most commonly aspirated lymph nodes were the cervical group of lymph nodes (n = 297; 70.3%) followed by axillary (n = 38; 09%) submandibular (n = 37; 8.7%), inguinal (n = 28; 6.6%), supraclavicular (n = 06; 1.4%), submental (n = 05; 1.1%), posterior auricular (n = 05; 1.1%), pre auricular (n = 03; 0.7 %), occipital (n = 01; 0.2 %) and 2 cases involved the multiple sites.

Out of 422 cases (Table 1), 04 (0.9%) cases were grouped as Non diagnostic/ inadequate category (L1) wherein all the cases showed only hemorrhage with no lymphoid and/or atypical cells identified.

323 cases (76.5%) grouped as Benign category (L2). Among which reactive lymphadenitis were predominant with 72.4%(234 cases) followed by suppurative (33 cases), granulomatous (27 cases), Caseating granulomatous (13 cases), tubercular (12 cases), Kikuchi (2 cases) and each case of Kimura, necrotizing lymphadenitis and acute on chronic with giant cell reaction. (Figure 1)

02 cases (0.4%) were belonged to L3 category; Atypical cells of Undetermined Significance/ Atypical Lymphoid cells of Uncertain Significance(AUS/ALUS)

L4 category comprised of 01 case (0.2%) with a suspicion of small blue round cell carcinoma.

L5 category consists of 92 cases (21.8%). Among which lymphomas were 09 cases (9.8%) and 83 cases (90.2%) were of metastatic deposits.

Among lymphomas, predominant was Non-Hodgkin's Lymphomas (08 cases; 8.8%). In metastatic malignancies, most frequently encountered were metastatic squamous cell carcinoma (53.2%) followed by ductal carcinoma breast metastasis (8.6%), poorly differentiated epithelial malignancy (6.5%), papillary thyroid carcinoma (2.1%), adenocarcinoma (1.08%) and small cell carcinoma (1.08%). In about 14 cases (15.2%) of metastatic malignancy cell of origin could not be identified. (Figure 2)

Corresponding histopathology slides were available for 25cases (5.9%). Of which 08 were of L5 category, 01 from L3 category and 16 were of L2 category. With reference to concordance rate 22 cases were concordant and 03 were discordant. 02 discordant cases were of L2 category, in which cytology diagnosis was reactive lymphadenitis whereas corresponding histological diagnosis was found to granulomatous lymphadenitis.01 case of L3 category was turned out to be Non-Hodgkin's lymphoma of corresponding histology.

Table 1: List of various cytological diagnosis as per proposed Sydney system in present study.

Category	Total number(percentage)		Lesions	Number
I	Non-diagnostic/ Inadequate	04(0.9%	Only blood	04
II	Benign	323(76.5%	Reactive	234 (72.4%)
			Suppurative	33(10.2%)
			Acute on chronic with giant cell reaction	01(0.3%)
			Kikuchi	02(0.6%)
			Kimura	01(0.3%)
			Caseating granulomatous	13(4.02%)
			Granulomatous	27(8.3%)
			Tubercular	12(3.7%)
III	ALUS/AUS	02(0.4%)	Lymphopro-liferative	02(0.4%)
IV	Suspicious	01(0.2%)	Suspicious of small blue round cell tumour	01(0.2%)
V	Malignant	92(21.8%)	Non-Hodgkin's lymphoma	08(8.6%)
			Hodgkin's lymphoma	01(1.08)
			Metastatic deposits – Not specified	14(15.2%)
			Metastatic deposits – Ductal carcinoma Breast	08(8.6%)
			Metastatic deposits – Squamous cell carcinoma	49(53.2%)
			Metastatic deposits – Poorly differentiated	06(6.5%)
			Metastatic deposits – Adenocarcinoma	01(1.08%)
			Metastatic deposits – Small cell carcinoma	01(1.08%)
			Metastatic deposits – Papillary thyroid carcinoma	02(2.1%)
Total		422		422

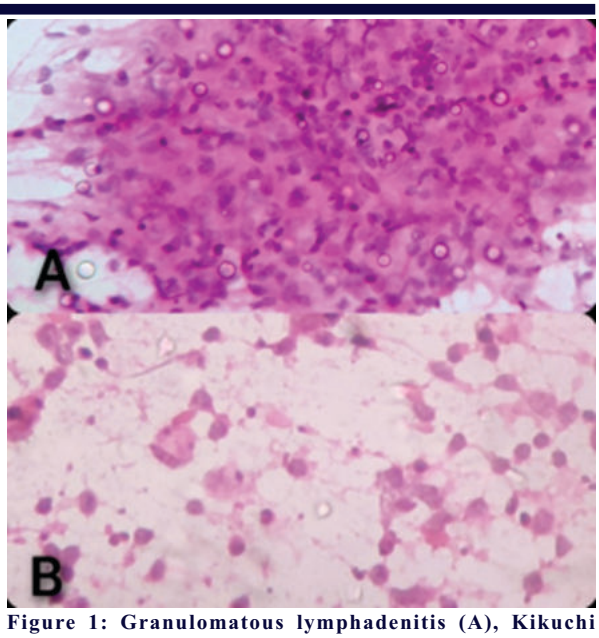

Figure 1: Granulomatous lymphadenitis (A), Kikuchi lymphadenitis (B)

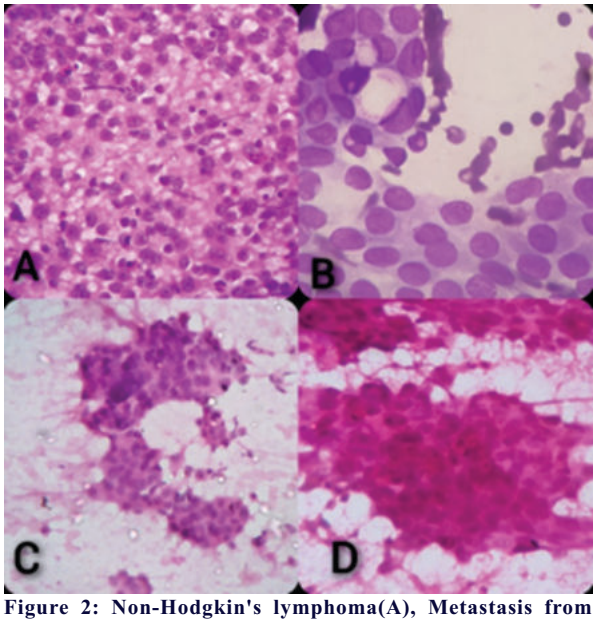

Figure 2: Non-Hodgkin's lymphoma(A), Metastasis from Papillary carcinoma thyroid (B), ductal carcinoma breast(C), Squamous cell carcinoma(D)

DISCUSSION

When FNAC is backed by clinical and radiographic data, it becomes a more accurate diagnostic technique that may differentiate between benign and malignant lesions and also helps to avoid needless aggressive surgery. [6-14] However, due to a lack of standard uniform criteria and reporting systems, the use of FNC in lymph nodes is still not universally acknowledged by clinicians.

By using standardized reporting methods, one can communicate clinically important information in a reproducible manner while limiting interobserver variability.[15-16]

Additionally, by employing management guidelines relevant to each diagnostic category, the rate of clinician misinterpretation of cytological results may be decreased. To achieve this, risk stratification must be performed and ROM values that are shared by several entities must be identified.[1]

To promote uniformity in reporting and to direct management, the Sydney method has been proposed in 2020 by an expert panel for reporting the lymph node cytology by introducing the five different diagnostic category.[2]

As with any other newly proposed classification system, its validity, reproducibility, and clinical utility need to be ascertained before it can be recommended for routine use

There are only few studies for validating the proposed Sydney system for LN-FNA. [1,5]

In the present study we evaluated 422 cases of lymph node FNAC over a period of 3 years. The age of the patient ranged between 2 and 88 years. Male to female ratio was almost equal, in contrast study by Gupta P et al [5] showed male predominance.

With respect to site, cervical region was the commonest location involved which is similar to Vigliar E et al[1], Gupta P et al[5] and Altınboğa AA et al[17].

When classified under category, majority of cases belonged to L2 category (323 cases) which is similar to study by Gupta P et al. In contrast study by Vigliar E et al [1] showed L5 as major category. Most of the cases in this category were diagnosed as reactive lymphadenitis (234 cases) followed by granulomatous lymphadenitis similar to Gupta p et al [5], Vigliar E et al [1].

Out of 323 cases of L2 category, only 16 (4.9%) corresponding histopathology slides were available. Of 16 available cases, histology diagnosis of 14 cases were same as cytology, whereas rest 2 cases had change in diagnosis from reactive lymphadenitis on cytology to granulomatous lymphadenitis on corresponding histopathology. However, none of the cases showed malignancy in corresponding histopathology. So risk of malignancy for L2 will become zero. In contrast study Vigliar et al [1]by showed risk malignancy as 1.96%. Less ROM in our case could be due to less sample size.

There were 2 cases of L3 on cytology. Only one case had corresponding histology slide and these turned out to NHL on histology. So risk of malignancy will become 100%. This overestimated ROM could be because less sample size.

L4 category comprised of 01 case (0.2%) with a suspicion of small blue round cell carcinoma and its corresponding histopathology was not available so ROM was not able to calculate.

In L5 category, majority of cases belonged to metastatic deposits similar to Gupta P et al [5], Vigliar E et al[1]. Squamous cell carcinoma deposits were most frequent followed by ductal carcinoma of breast. Among lymphomas NHL were predominant similar to Gupta P et al [5]. Of 92 cases in L5 category, corresponding histopathology slides with same site were available for 08 cases. All slides showed malignancy with risk of malignancy of 100%. Most of the cases had histopathology slides from the primary site.

In the present study, Corresponding histopathology slides were available for 25cases (5.9%) which is slightly lower compared to study done by Gupta P et el[5] in which histopathology slides were available for 8.8%.

With respect to category, 16 cases from L2 group, 01 case from L3 group and 08 cases from L5 group from had corresponding histopathology slides. None of the cases from L1 and L4 had histopathology slides.

With reference to concordance rate out of 25, 22(88%) cases were concordant and 03(12%) were discordant. 02 discordant cases were from L2 category, in which cytology diagnosis was reactive lymphadenitis whereas corresponding histological diagnosis was found to granulomatous lymphadenitis. 01 case of L3 category turned out to be Non-Hodgkin's lymphoma of corresponding histology.

CONCLUSION

FNAC coupled with ancillary technique is effective in evaluation of lymphadenopathy. By using standardized reporting methods, one can communicate clinically important information to clinician in a reproducible manner. However, the present study has its limitations, most important being it's a single institutional study, retrospective nature and less sample size. Other limitations are lack of histopathologic correlation, as well as relevant clinical, radiologic, and follow-up details for all the cases included in the study and we did not able to calculate the risk of malignancy for all category since there was no histopathology slides available for all categories. Future studies with a larger sample size need to be conducted for validation of our results.

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Conflicts of interest: NIL

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