Nepalese Medical Journal, (2019) Vol. 2, 138 - 140

Original Article

Diagnostic Role of Lymphnode Imprint: A Cyto-histopathological Correlation

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ABSTRACT

Introduction: Lymphadenopathy is a very common condition for which excision biopsy is often recommended when fine needle aspiration cytology is not conclusive. Lymph node imprint cytology is a useful and rapid alternative diagnostic tool. This study was conducted to assess the accuracy of lymph node imprint cytology as compared to the histopathology.

Materials and Methods: Imprint smears were made from all cases of lymphadenopathy. The smears were evaluated by three pathologists and categorized into, inflammatory lesions and primary and metastatic tumors. Imprint smears were made from lymph node excision specimens and were stained with PAP, and MGG stains. The diagnosis in imprints was compared with those given by histopathology. With the help of sensitivity, specificity & accuracy, the agreement between the imprint smear and histopathology was determined.

Results: Among the total 92 cases, 40 (43.4%) cases were chronic non-specific lymphadenitis, 22 (23.9%) were tuberculosis and metastatic lesions each. The overall accuracy of lymph node imprint cytology were 96.73%, 96.74%, 96.74% and 100% for tuberculosis, chronic non specific lymphadenitis, lymphoma and metastatic lesions respectively.

Conclusions: Lymph node imprint smears is a rapid diagnostic tool and can be used routinely as an adjunct to histopathology in the diagnosis of various lymph node disorders.

Keywords: Carcinoma; Imprint; Lymph node; Tuberculosis.

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Submitted: 6th May 2019
Accepted: 4th June 2019
Published: 20th June 2019

Source of Support: None
Conflict of Interest: None

Citation: Choudhary PK, Nepal N, Mainali N, Chhetri G. Diagnostic role of lymphnode imprint: a cyto-histopathological correlation. Nep Med J 2019;2(1):138-40. DOI 10.3126/nmj.v2i1.24053

INTRODUCTION

Lymphadenopathy is a common clinical presentation the cause of which may be infective and malignant. Fine needle aspiration cytology (FNAC) has been widely used to look for the cause of lymphadenopathy. However, on many occasions diagnosis could not be made mainly due to inexperience and in those cases where lymph nodes are deep seated.[1,2] Sometimes it becomes difficult to reach to the definite diagnosis on FNAC alone, especially in lymphoma cases. Excision biopsies are performed in all such cases. In such conditions, imprint cytology may be of great aid to reach to the definitive diagnosis.

Diagnosis from imprint cytology could be made on the same day the biopsy is received so that patient does not have to wait for histopathology report which usually takes 5-7 days in a good set up. Moreover, imprint cytology is inexpensive and requires less manpower. It has been used for diagnosing lymph adenopathies since several years. Use of imprint technique for the diagnosis of lymphadenopathy was first use by Forkner.[3] Later many studies had proven lymph node imprint cytology as a useful adjunct for histopathological diagnosis of inflammatory, granulomatous, lymphomatous and metastatic lesions of lymph nodes.This study was done to evaluate the diagnostic role of lymph node imprint cytology and correlate it with histopathology.

MATERIALS AND METHODS

This study was a hospital based prospective cross sectional study done from August 2017 to March 2019 in Nobel Medical College and Teaching Hospital. All lymph nodes excision specimen was

received fresh in normal saline. Process for imprint cytology was done on same day to prevent any formalin induced cytological artifacts. Gross findings such as size, color and presence of necrosis were noted. Each specimen was cut in to two halves. The sliced half was hold gently with forceps or by one hand so that flat cut surface face upwards. Four imprint smears were made on grease free glass slides. Lymph nodes were then fixed in formalin and further processed for histopathological examination as per the standard guideline. Both air dried and wet fixed smears were stained with MGG and PAP stains as per the recommended procedure. Special stain was used whenever required.

The smears were assessed by three pathologists and a diagnosis was made based up on the cellularity, distribution and cell types. An attempt was made in all cases to categorize the lesions in to inflammatory, primary tumors and metastatic tumors. Inflammatory category includes tuberculosis, chronic non-specific and acute non-specific cases. Primary tumors include Hodgkin and Non-Hodgkin lymphomas. An attempt was also made further to classify the type of metastatic tumors.

All datas were inserted in SPSS 17 software. Histopathological report was considered as the gold standard. Cytological report was correlated with histopathological diagnosis. Diagnostic accuracy of lymph node imprint cytology was obtained by using following formulas:

Sensitivity= TP/TP+FN x100 TP= True positive

Specificity=TN/TN+FP x100 TN= True negative

Positive predictive value (PPV) =TP/TP+FP x100
FP= False positive

Negative predictive value (NPV) =TN/TN+FN x100
FN= False negative

Accuracy= TP+TN/Total number of cases x100

RESULTS

This study was condulted on 92 cases of lymph node specimens received in department of histopathology in collaboration with department of surgery. The male to female ratio in our study was 1.2:1. Majority of cases was in the age group of 10-19 years of age. Inflammatory lesion was the most common condition in our study which includes chronic non-specific lymphadenits in 43.48% cases and tubercular lymphadenitis in 23.92% cases. Among metastatic tumor, 14 (15.2%) cases were of squamous cell carcinoma and 05 cases (5.4%) were of adenocarcinoma. Primary tumors including both Hodgkin and Non Hodgkin Lymphoma accounted for 7.6% of the cases. (Table 1)

Table 1: Incidence of various causes of lymphadenopathy (n=92)

Diagnosis	Total	Percentage (%)
INFLAMMATORY LESIONS	**63**	**68.48**
-Tuberculosis	22	23.92
-Chronic Non specific	40	43.48
-Acute Non Specific	01	1.08
PRIMARY TUMORS	**07**	**7.60**
-Hodgkin Lymphoma	02	2.17
-Non Hodgkin Lymphoma	05	5.43
SECONDARY TUMORS	**22**	**23.91**
-Squamous cell carcinoma	14	15.22
-Adenocarcinoma	05	5.43
-Other	03	3.26
Total	**92**	**100**

Sensitivity, specificity and overall accuracy of imprint cytology when compared to histopathology were found to be 90.90%, 98.57% and 96.73% respectively in tuberculous lymphadenitis. (Table 2) One case diagnosed as tuberculosis turned out to be Non Hodgkin Lymphoma on histopathology. In case of chronic non-specific lymphadenitis, sensitivity was 100%, where as specificity and overall accuracy was 94.23% and 96.75% respectively. Out of total 43 cases of chronic non-specific lymphadenitis, 2 were tuberculosis and 1 was Non Hodgkin Lymphoma on histopathology. There was one case where imprint cytology was inconclusive. It was lymphoma in histopathology with sensitivity of 57.14% for lymphoma. Imprint cytology correctly identified all cases of metastatic tumor giving it a 100% of sensitivity and specificity. (Table 2).

Table 2: Sensitivity, Specificity and accuracy of imprint smear diagnosis in various diseases

Imprint Smear Diagnosis	No of cases	Tuber culosis	Chronic Non-Specific	Acute Non-Specific	Lymphomas	Metastasis	Sensitivity (%)	Specificity (%)	Accuracy (%)
Tuber culosis	21	20	-	-	01	-	90.90	98.57	96.73
Chronic Non-Specific	43	02	40	-	01	-	100.00	94.23	96.74
Acute Non-Specific	01	-	-	01	-	-	-	-	-
Lymphoma	04	-	-	-	04	-	57.14	100.00	96.74
Metastasis	22	-	-	-	-	22	100.00	100.00	100.00
Inconclusive	01	-	-	-	01	-	-	-	-
Total		**22**	**40**	**01**	**07**	**22**			

DISCUSSION

Enlargement of lymph node is a very common clinical manifestation. It can be caused by various inflammatory diseases and primary and secondary tumors. Fine needle aspiration cytology is usually the first initial procedure performed and in most of the cases it is able to diagnose correctly. However, chances of failure of FNAC have been reported by several authors[1,4] Common causes of failure include inexperienced hand and deeper lymph nodes. Moreover, FNAC alone is not able to diagnose some cases especially that of lymphomas. Biopsy is often done in all such cases. Imprint cytology of lymph node is a cost effective diagnostic modality which is able to make quick diagnosis and patient does not have to wait for histopathology report which usually takes 5-7 days. This study was done to evaluate the role of lymph node imprint cytology with the histopathology.

Inflammatory lesions accounted for 68.48% of cases in our study. Other studies found similar findings.[5] Sensitivity, specificity and overall accuracy of lymph node imprint cytology for tuberculosis was 90.90%, 98.57% and 96.73% in our study which is in agreement with Arif et al[6] One case of tuberculosis given on imprint cytology turned out to be lymphoma on histopathology. Similar case has been reported by Sharma N et al where a case of plasmacytoma was misdiagnosed as tuberculosis.[7] Presence of occasional granuloma and sometimes even necrosis in lymphoma can creates dilemma between tuberculosis and high grade lymphoma in cytological diagnosis. Two cases of tuberculosis were falsely diagnosed as reactive lymphadenitis in this study. This could be due to variation in cellular yield on imprint smears.

Similarly, lymph node imprint cytology had a very high sensitivity, specificity and accuracy for lymphoma which is in agreement with Kundu et al and Al Muhim et al.[5,8] In contrast Feinberg M et al found a sensitivity of 83% only for Non Hodgkin Lymhoma and 66% for Hodgkin Lymphoma.[9] These discrepancies could be due to small size of sample in our study. Moreover, diagnosis of lymphoma both on imprint cytology and FNAC has been always challenging as the cytomorphological picture is not complete on cytological smear.

Lymph node imprint cytology had a 100% sensitivity, specificity and accuracy for metastatic lesions in our study. There was not a single case of false positive or false negative. Similar findings were also observed by Bhabra k et al and Arif S et al.[6,10]

The overall accuracy of lymph node imprint cytology in the diagnosis of various lymph node disorders was 94.2% in our study and is comparable with other studies.[8,9,11,12]

CONCLUSIONS

Lymph node imprint cytology is a very rapid and inexpensive diagnostic tool in the evaluation of lymphadenpathy. High sensitivity, specificity and accuracy of lymph node imprint cytology certainly confirms it's diagnostic role and we, therefore, recommend the routine use of lymph node cytology in various lymph node disorders.

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