

Comparative Evaluation of Cell Block Histopathology and Conventional Smear Cytology in FNAC of Clinically Suspected Cervical Lymph Node Malignancy

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Abstract

Introduction: Cervical lymphadenopathy is a common clinical presentation in various departments of clinical practice. Fine needle aspiration cytology (FNAC) is usually the first choice to diagnose superficial cervical lymphadenopathy. However, FNAC sometimes does not yield information for precise diagnosis, and the risk of false-negative and indeterminate diagnosis is always present. In order to overcome these problems, cell block technique has been resorted to make the best use of the available material. **Objective:** The aim of this article is to evaluate whether there are any diagnostic advantages of cell block histopathology over conventional smear cytology by corroborating with excisional biopsy. **Materials and Methods:** A descriptive study with cross-sectional design was performed among 106 cases with clinical suspicion of malignancy. FNAC was performed without anesthesia, and the aspirated material was flushed on slides and then fixed immediately. The remaining materials were processed into cell blocks followed by HE staining. The data obtained were analyzed using SPSS (IBM Statistics, Version 20.0, SPSS, Chicago, IL, USA) statistical software. Ethical approval was obtained from the Institutional Ethics Committee, and informed consent was taken from all the participants before the procedure. **Results:** Out of the 106 cases, 101 (95.28%) cases were diagnosed as malignant lesions and 5 (4.72%) cases diagnosed as non-malignant lesions. The majority of the patients were in the 40–59 year age group and were males. The sensitivity of cytology to provide specific diagnosis in malignant lesions was 90.57%, whereas those of cell block histopathology and cell block histopathology with cytology were 94.34% and 98.11%, respectively. **Conclusion:** Cell block as an adjunct to FNAC can be a useful diagnostic technique in cervical lymphadenopathy. Compared with FNAC, it gives more accurate diagnostic architecture and apparent histopathological features.

Keywords: Cell block, cervical lymphadenopathy, FNAC, histopathology

INTRODUCTION

Background

Cervical lymphadenopathy is a common clinical presentation in various departments of clinical practice.^[1] A large percentage of cervical lymphadenopathy in adults turns out to be malignant. Malignancies in lymph nodes in our country are predominantly metastatic in nature, with an incidence varying from 65.7% to 80.4% and lymphomas range from 2%.^[2]

Cervical lymph node metastasis from occult primary tumors constitutes about 5–10% of all patients with carcinoma of unknown primary site.^[4] The most common

types of metastatic malignancy in cervical lymph node are squamous cell carcinoma (80%), followed by poorly differentiated carcinoma (11%).^[3]

Fine needle aspiration cytology (FNAC) is usually the first choice to diagnose superficial cervical lymphadenopathy.

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The role of FNAC in the diagnosis, to point out the exact type and possible source of metastatic malignancies in lymph node, is well recognized. Diagnostic accuracy of FNAC is near about 90–95% in metastatic malignancy.^[4]

The FNAC procedure of cervical lymph node does not have any significant adverse effect on histopathological examination. However, according to the view of Zito *et al.*,^[5] FNAC sometimes does not yield information for precise diagnosis, and the risk of false-negative and indeterminate diagnosis is always present. An inconclusive diagnosis on FNAC may be due to poor spreading, air drying artifact, and presence of thick tissue fragments, despite aspiration of the adequate material.^[6]

In order to overcome these problems, cell block technique has been resorted to make the best use of the available material.^[7] The technique of cell block is simple, reproducible, and can be done in the same go with FNAC. It uses routine safe laboratory chemicals and techniques.^[8]

Cell block preparation in a way mimics the histopathological sections, thus help in subclassifying various neoplastic lesions. The benefit of cell block technique is the recognition of histologic pattern of diseases that sometimes cannot be reliably identified in smears.^[9]

Another advantage of the cell block is the potential to make many sections. On an average, 12 sections per cell block are obtained.^[10] Thus cell block provides the opportunity to perform ancillary studies such as histochemistry as well as immunohistochemistry, which can increase diagnostic efficacy. Cell block also ensures optimal preservation of histochemical and immunohistochemical properties. In addition, there are fewer aberrant positive staining, and much less background staining occurs in the cell block sections.^[11]

In this overview, the present study was undertaken to find out the spectrum of different clinically suspected malignant lesions of cervical lymph node by conventional cytology and cell block preparation and to evaluate whether there are any diagnostic advantages of cell block histopathology over conventional smear cytology by corroborating with excisional biopsy.

MATERIALS AND METHODS

An observational descriptive study with cross-sectional design was performed after obtaining approval from the Institutional Ethics Committee and after taking proper informed consent of the patients participating in this study. The study population included 106 cases who were referred to the Department of Pathology for FNAC of cervical lymph node with clinical suspicion of malignancy during the study period considering inclusion and exclusion criteria. Patients who had received treatment and with inaccessible lymph nodes were excluded from

the study. Additionally, cases in which FNAC yielded non-diagnostic material even after repeat aspirates were excluded.

For the purpose of data collection, a predesigned and pretested proforma was used to detail the clinical and epidemiological profile of the patient along with the findings of aspirate and also the interpretation of conventional smear cytology and cell block histopathology.

FNAC was performed without anesthesia, using an auto-vacuumed syringe, bearing a latch at the bottom of the tube and a slot in the plunger, to be used in a pencil-grip manner. The lymph node was held in between two fingers, and by employing this method, a large amount of the sample can be collected. The aspirated material was flushed on slides and then spread to make thin smears. The slides were fixed immediately with 95% ethyl alcohol and were stained using hematoxylin and eosin (HE), Gomori's methenamine silver, periodic acid Schiff, and acid-fast staining for cytological examination. The remaining materials were processed into cell blocks, if required, via ethanol coagulation and formaldehyde fixation. All cell blocks were treated in the same way as surgical biopsy specimens, including formalin fixation, paraffin embedding, and sectioning at 4–5 µm thickness, followed by HE staining and immunohistochemical staining. Immunohistochemical analyses were performed by the avidin-biotin-peroxidase method, with a Leica autostainer system on cell block sections.

Excisional biopsy of cervical lymph node was performed; routine processing and reporting were done with the tissue procured, following standard protocols in all the cases to calculate diagnostic efficacy of FNAC and cell block. The data were analyzed using SPSS (IBM Statistics, Version 20.0, SPSS, Chicago, IL, USA) statistical software.

Ethical approval

The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. It was carried out with patients verbal and analytical approval before sample was taken. The study

Table 1: Sociodemographic characteristics of the patients presenting with cervical lymphadenopathy, *n* = 106

	Frequency	Percentage
Age group		
Less than 20 years	8	7.5
20–39 years	21	19.8
40–59 years	41	38.7
60 years and above	36	34.0
Gender		
Male	75	70.8
Female	31	29.2
Total	106	100

protocol and the subject information and consent form were reviewed and approved by a local ethics committee according to the document number 56 (including the number and the date in 12/12/2020) to get this approval.

RESULTS

The majority of the patients were in the 40–59 year age group, followed by 60 years and above. Males outnumbered the females with almost 70% cases [Table 1]. The mean age of study population was 51.81 ± 16.99 years. Out of the 106 cases referred, 101 (95.28%) cases were diagnosed as malignant lesions and 5 (4.72%) cases diagnosed as non-malignant lesions [Figure 1].

In metastatic malignancies, among 55 cases of squamous cell carcinoma finally diagnosed histopathologically, 48 cases could be diagnosed cytologically and cell block categorized

51 cases. Cytologically, seven cases were diagnosed as poorly differentiated carcinoma and cell block histopathology diagnosed three cases of poorly differentiated carcinoma. Other cases of metastatic and lymphoid malignancies were correctly identified by both FNAC and cell block.

Among 74 (100%) cases of metastatic malignancy diagnosed with histopathology, 90.54% cases of cytological diagnoses show positive correlation with histopathology. Cell block and combination of cell block and histopathology show positive correlation with 94.59% and 98.65% cases, respectively. In the cases of lymphoma, cytology and cell block alone were diagnostic of 88.89% and 92.59% cases, respectively, whereas the combination of cytology and cell block was diagnostic of 96.3% cases. Among five cases of non-malignant lesion cytology, cell block combination of cytology and cell block was diagnostic of all five (100%) cases.

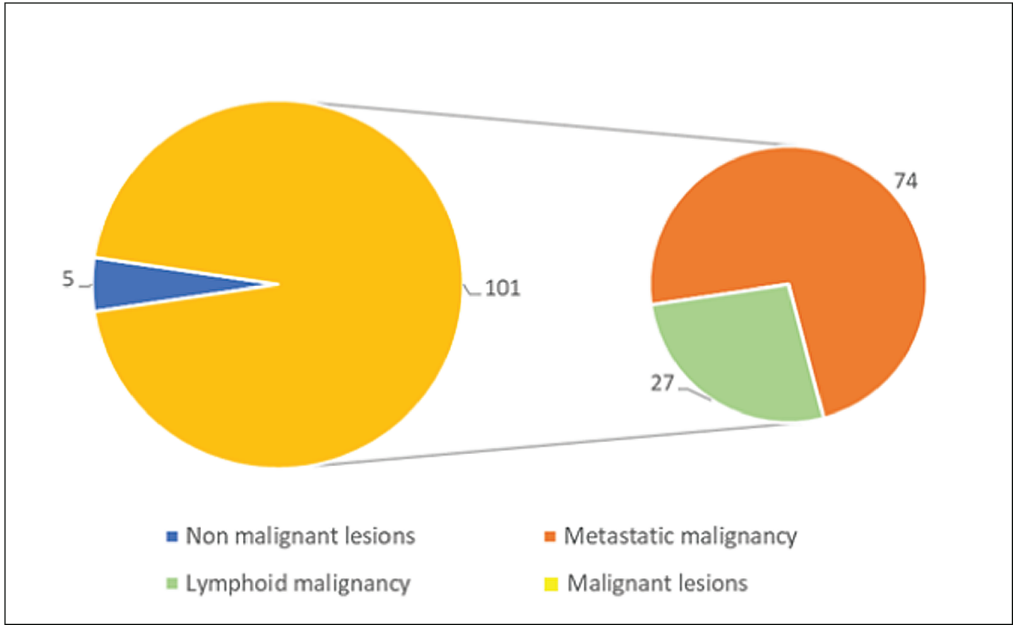


Figure 1: Distribution of cervical lymphadenopathy cases in the study population (n = 106)

Table 2: Histopathological corroboration of malignancies with cytology and cell block (n = 101)			
Diagnosis	Cytology	Cell block	Histopathology
Metastatic malignancy			
Squamous cell carcinoma	48	51	55
Poorly differentiated carcinoma	15	12	08
Nasopharyngeal carcinoma	03	03	03
Adeno carcinoma	03	03	03
Papillary thyroid carcinoma	02	02	02
Adenosquamous carcinoma	02	02	02
Small cell carcinoma	01	01	01
Lymphoid malignancies			
Non-Hodgkin lymphoma	22	22	22
Hodgkin lymphoma	05	05	05
Total	101	101	101

Table 3: Sensitivity of cytology and cell block of cervical lymphadenopathy compared with histopathology (n = 106)

Diagnosis	Cytology	Cell block	Cell block + Cytology	Histopathology
Metastatic malignancy	90.54%	94.59%	98.65%	100%
Lymphoid malignancies	88.89%	92.59%	96.30%	100%
Non-malignant lesions	100%	100%	100%	100%
Total	106	106	106	106

The sensitivity of cytology to provide specific diagnosis in malignant lesions was 90.57%, whereas those of cell block histopathology and cell block histopathology with cytology were 94.34% and 98.11%, respectively.

DISCUSSION

Cell blocks work as an adjunct tool to conventional smears for establishing a definitive cytopathologic diagnosis. Several authors have reported the advantages of cell blocks in cytology, which include valuable diagnostic evidence that cannot be observed in smears.^[12]

In this study, routine conventional smears and cell block from cervical lymph nodes were compared with FNAC for cellularity, architecture, cytological preservation, and its diagnostic utility.

Age and sex distribution

Experimental evidence indicates that lymph nodes in humans undergo alterations with age. The peak age of incidence in the present study was found to be between 51 and 60 years, which was similar to that documented in recent studies.^[13] There was an increased incidence in males with a male: female ratio of 2.42:1, which was comparable to a recent study (2.8: 1).^[14]

Distribution of cases

Malignant lesions were found to be much more common in this study than the non-malignant lesions. As there was clinical suspicion, the number of malignant lesions in this study is much more common than a recent study (23%).^[15]

Among the metastatic malignant lesions, the most common was squamous cell carcinoma. The findings were comparable to recent studies done by Mamatha and Arakeri,^[16] Mohan *et al.*,^[17] and Babu *et al.*,^[18] in which squamous cell carcinoma was the most common diagnosis of metastatic malignant lesion in lymph node. Non-Hodgkin's lymphomas, followed by Hodgkin's lymphomas, were the most common diagnoses for lymphoid malignancies, comparable to a recent study [Table 2].^[19]

Efficacy of cell block

Cell block histopathology had more efficacy in categorizing specifically malignant lesions in cervical lymph node than conventional smear cytology. The results correspond to studies by Ceyhan *et al.*,^[20] in which cell block has diagnostic efficacy of 93.5% and FNAC had efficacy of 84.8%. Basnet and Talwar^[21] found diagnostic accuracy of

conventional smear to be 83% whereas cell block to be as high as 100%. Kern and Haber^[22] studied 393 cases of cell block preparation. In 237 cases (60.3%), the findings were confirmatory and in 103 cases (26.2%) cell block provided additional information for diagnosis. However, Wojcik and Selvaggi^[23] showed that 84% of the cases had identical results on both smears and cell blocks [Table 3].

CONCLUSION

In case of cervical lymphadenopathy, a cost-effective, simple, and reliable technique of cell block prepared from residual tissue is a useful adjunct to FNAC smears. The contribution of cell block to the final cytological diagnosis supports the view that cell block should be considered in all FNA specimens.

Authors' contribution

1. Dr. CB: Data acquisition, analysis of data, initial draft of the manuscript;
2. Dr. SC: Conception and design of the study, analysis, and interpretation of data;
3. Dr. DK: Critically revising the manuscript for important intellectual content;
4. Dr. SB: Analysis and interpretation of data, final drafting the work, and revising it critically for important intellectual content.

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Conflicts of interest

The authors do not have any conflicts of interest to declare.

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