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UTILITY OF CELL BLOCK PREPARATION FOR CYTOMORPHOLOGICAL STUDY OF LYMPH-NODE LESIONS

Pathology

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ABSTRACT

Background: The lymph node is one of the major anatomic components of the immune system. Lymph nodes are the most widely distributed and easily accessible component of lymphoid tissue and hence they are frequently examined for diagnosis of lymphoreticular disorders. Diagnosis of lymphadenopathy depends mainly on excision and histopathological examination. For this, general anaesthesia and hospitalisation are required. Fine needle aspiration cytology, on the other hand, is free from these disadvantages and can safely be used as an alternative or complementary investigative technique. One of the constraints of the conventional Fine Needle Aspiration (FNA) smear is the limited material available for adjuvant diagnostic investigation. Smears prepared from these aspirates, may at times be inconclusive and difficult to interpret. Hence to make the best possible use of aspirate, smear should be combined with cell block preparation that in turn gives a better morphological and histological detail thus refining the diagnosis.1 The cell block technique employs the retrieval of small tissue fragments from a FNA specimen which are processed to form a paraffin block. Cell block technique combines the advantages of fine needle aspiration cytology in being fast and safe method and providing with a precise diagnostic architecture similar to the histological diagnosis.1 So, it's a bridge between cytopathology and histopathology.

Aims & objectives:

(1) To evaluate the efficacy of cell block technique and compare with conventional smear cytology.
(2) To establish, optimize and implement the cell block technique to routine diagnostic setting.
(3) To evaluate the accuracy of FNAC studies by means of cell block preparation.

Materials & Method: The present study was carried at the department of pathology with collaboration of the departments of TB & Chest Disease, Medicine, Surgery, ENT and Radiotherapy at M P Shah Medical College & G G Government Hospital. **Sample types:** Routine cytological FNAC cases, Radiological (CT scan & USG) guided FNAC whenever required. **Type of study:** Prospective study **Duration of study:** 2 years

Inclusion criteria:

(1) All superficial enlarged lymph nodes
(2) Tiny lymph nodes needed image guided FNAC.
(3) Very scanty FNAC material

Exclusion criteria:

(1) All non-lymphoid aspirate
(2) Patient with bleeding disorder.

Technique of cell block preparation:

There are several methods for cell block preparation, which includes mainly

- Cell block by histo-gel method.
- The plasma-thrombin method.

Conclusion:

- FNAC technique is useful in detecting lesions of various solid organs.
- But if all these FNAC are processed by only routine methods definitive diagnosis is not possible in all cases.
- Cell block bridges the gap between cytopathology and histopathology.
- Cell block technique retrieves even the scanty material which is generally lost in Conventional methods of processing.
- Therefore cell block technique is required for better and definitive diagnosis of various lesions.
- Cytological material is processed as histopathological section which can be used for special stain and immuno-histochemistry marker (IHC) study.

KEYWORDS

Cell block preparation, Lymph node lesions

INTRODUCTION:

The lymph node is one of the major anatomic components of the immune system. Lymph nodes are the most widely distributed and easily accessible component of lymphoid tissue and hence they are frequently examined for diagnosis of lymphoreticular disorders. There are many methods to sample lymph node lesions. Cell block technique is amongst all these methods which is used to diagnose lymph node lesions accurately.[1]

Some of the most common techniques of cell block preparation include inverted filter sedimentation, collodion bag, thrombin method, simple sedimentation etc.[2]

Cell block technique or paraffin embedding of sediments of fluids is among the oldest methods of preparing material for microscopic examination. [3]The method uses histological techniques for processing and thus offers many advantages: [2]

- Multiple sections of the same material may be processed for routine stains, such as hematoxylin and eosin,
- For Immuno-histochemistry.
- For identification of mucin, melanin, or other cell products and
- Identification of bacteria and fungi by special stains.

AIMS & OBJECTIVES:

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(3) To evaluate the accuracy of FNAC studies by means of cell block preparation.

MATERIALS & METHOD:

The present study was carried at the department of pathology with collaboration of the departments of TB & Chest Disease, Medicine, Surgery, ENT and Radiotherapy in our hospital.

Sample types:

Routine cytological FNAC cases, Radiological (CT scan & USG) guided FNAC whenever required.

Type of study: Prospective study

Duration of study: 2 years

OBSERVATION AND RESULTS

Table No: I Site Wise Distribution Of Cases (n=100).

Cell block specimen source.	Number of Specimen	Percentage
Cervical lymphnode	66	66%

Axillary lymphnode	15	15%
Inguinal lymphnode	07	07%
Submandibular lymphnode	06	06%
Supraclavicular lymphnode	08	08%
Postauricular lymphnode	01	01%
Total	100	100%

Above table shows, maximum no of FNAC smears are from cervical lymphnode (66%), followed by Axillary lymphnode (15%).

Table No: II Comparison Of Yield Of Cytological Specimens By Various Methods (n=100)

Yield of sample	Conventional method	%	Cell block method	%
Diagnostic	83	83%	86	86%
Non Diagnostic	17	17%	14	14%
Total	100	100%	100	100%

Above table shows that yield of sample by cell block method was more (86%) as compared to conventional smear method of cytological smear preparation (83%).

Table No. III Diagnosis Of Cell Block Preparation Of Lymph Nodes.

CYTOPATHOLOGICAL DIAGNOSIS	NUMBER OF CASES	% OF CASES
Non-specific reactive Lymphadenitis	10	11.63%
Granulomatous Lymphadenitis	12	13.95%
Tubercular lymphadenitis	20	23.26%
Hodgkin's lymphoma	02	2.32%
Non-Hodgkin's lymphoma	03	3.49%
Metastases	39	45.35%
Total cases	86	100%

In present study malignant lesions forms 51.16% of all the diagnostic cases. Among 44 cases 5 were primary malignancy, 39 cases were metastatic lymph node and rest of cases were either inflammatory or reactive.

DISCUSSION:

Table: I Comparison Of Sensitivity Of Smear And Cell Block Method

Study	Smear method	Cell block method
Nathan et al (2000)	88.0%	78.2%
Meena Aghara et al (2017)	87.80%	90.25%
Present study (2021)	83%	86%

In present study in cell block technique sensitivity was 86% which is more than Nathan et al46 study and almost similar to Meena Aghara et al, while in smear method it is comparable to both the studies.

Table: Iv Comparison Of Diagnostic Yield By Various Methods.

Method used	Nathan et al study (2000)	Ankur singh et al (2014)	Meena Aghara et al (2017)	Present study
Conventional smear	93.4%	80%	87.8%	83%
Cell block	88.9%	-	58.62%	86%
FNAC smear + Cell block method combined	-	89%	90.25%	89%

In present study only FNAC smear gave 83% of diagnostic yield while only cell block gave 86% yield (in small and scanty tissue bits) while FNAC and cell block both combined gave 89% of diagnostic yield.In the present study of effectiveness of cell block preparation in lymphnode lesions, one case showed improvement in diagnosis after the cell block was examined. In this case on smear examination we could not conclude the diagnosis of hodgkin's lymphoma which was confirmed by cell block method. This correlated with the **Basnet et al study (2012)**27in which amongst 12 cases of FNAC and cell block of lung aspirates, 2 cases showed improvement in diagnosis after the cell block was examined. One case that was diagnosed as adenocarcinoma on smear examination, the cell block showed as adeno-squamous carcinoma. Another case that was diagnosed as adenocarcinoma on the smear was confirmed as squamous cell carcinoma by cell block technique.

In the present study, simultaneous use of cell block technique and smear examination increased the diagnostic accuracy in cytological smear. The aspirated material can be processed not only for cytology but also for cell block and when use of smears and cell block was combined; diagnostic accuracy could be increased to around 89%.48

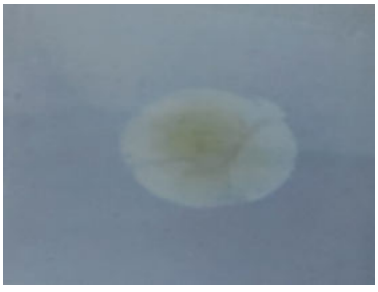
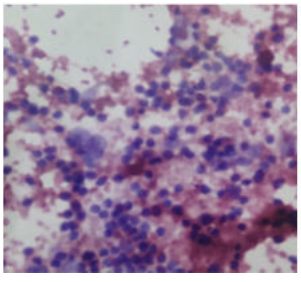


Figure I: Paraffin embedded cell block

Comparison of Conventional FNAC smear and Cell Block preparation in a case of Hodgkin's Lymphoma



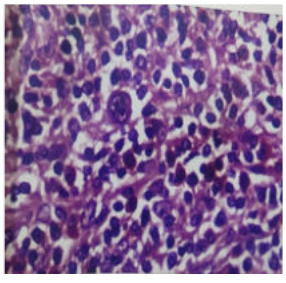


Figure II **Figure III**

FIGURE II: FNAC smear of lymph node of Hodgkin's lymphoma showing polymorphic tumour cells. (H & E X 40x) **FIGURE III**: Cell block of Hodgkin's lymphoma showing RS cell, eosinophils and polymorphic lymphoid population (H & E X 100x)

CONCLUSION:

- FNAC technique is useful in detecting lesions of various solid organs.
- In cases where scanty material is received with conventional FNAC smear then definitive diagnosis is not possible. Cell block technique retrieves even the scanty material which is generally lost in Conventional methods of processing. Therefore, cell block technique is required for better and definitive diagnosis of various lesions. Cell block bridges the gap between cytopathology and histopathology. Cytological material is processed as histopathological section which can be used for special stain and immuno-histochemistry (IHC) marker study.
- Direct FNAC smear and cell blocks complement each other and both are needed in diagnostic work up of patient. Cell block can also be used for molecular analysis in biomarker based targeted therapy. Role of cell block preparation in diagnostic pathology is without doubt of immense significance as it allows for multiple special investigations and consequently more refined diagnosis. Cell block technique is simple, reproducible and reliable technique which uses routine safe laboratory chemicals and is suitable for all type of cytological specimen as well tiny biopsies.

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