



"CYTO HISTOLOGICAL CORRELATION OF METASTATIC LESIONS TO SUPERFICIAL LYMPH NODES – A CROSS SECTIONAL STUDY"

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ABSTRACT

BACKGROUND: Fine Needle Aspiration Cytology (FNAC) is a simple and rapid diagnostic technique. Because of early availability of results, simplicity, minimal trauma and complications, the aspiration cytology is now considered a valuable diagnostic aid and is part and parcel of a pathologist's repertoire. **OBJECTIVES:** To study the role of FNAC in the evaluation of metastatic lesions to superficial lymphadenopathies. To study the various cytomorphological patterns in correlation with histopathology of various metastatic lesions to lymph nodes. To document the diagnostic accuracy of FNAC in correlation with histopathology. **MATERIALS AND METHODS:** All patients referred to the department of pathology, Kakatiya Medical College and MGM Hospital, Warangal, for FNAC of palpable lymph nodes were included in our study. FNAC was done and the standard method for the procedure adopted. All the slides were reviewed and their diagnosis was made. FNAC diagnosis was compared with histopathology in cases which underwent surgical excision and thus its diagnostic accuracy determined. This was two years Prospective study from August 2011 to July 2013. **RESULTS:** A total of 150 patients were included in our study, reported to various clinical departments with history of swelling. Lymph node biopsy was done in 50 cases of metastatic deposits. Statistical analysis was done in 50 cases, where FNAC diagnosis was correlated well with histopathological diagnosis. In our study maximum number of cases was in the age group of 50-60 years, Male preponderance, Cervical group of nodes were most commonly involved. Benign and inflammatory lymphadenopathies were diagnosed in 67.1% of cases. Maximum number of cases being reactive lymphadenitis. Metastatic deposit was diagnosed in 32.9% of cases. The overall correlation between FNAC and histopathology in primary and metastatic deposits was 98 %. **CONCLUSION:** FNAC is an accurate, sensitive, specific and cost effective procedure in the diagnosis of lymphadenopathies.

KEYWORDS : FNAC; Lymphadenopathies.

INTRODUCTION

Lymph nodes, the most widely distributed and easily accessible lymphoid tissue, are frequently examined for diagnostic purposes. Lymphadenopathy (Enlarged palpable lymph nodes) is one of the commonest and worrisome clinical presentation in patients attending the outdoor clinics in most hospitals. The etiology varies from an inflammatory process to a malignant condition^[1]

Lymph nodes are discrete encapsulated structures that contain well-organized B-cell and T-cell zones, which are richly invested with phagocytes and antigen-presenting cells. The activation of resident immune cells leads to morphologic changes in lymph nodes. The degree and pattern of the morphologic changes is dependent on the inciting stimulus and the intensity of the response. Trivial injuries and infections produce subtle changes, while more significant infections inevitably produce nodal enlargement and sometimes nodal scarring. For this reason, lymph nodes in adults are almost never "normal" or "resting". Infections and inflammatory stimuli often elicit regional or systemic immune reactions within lymph nodes^[2].

Enlarged Lymph nodes were the first organs to be biopsied by fine needle aspiration cytology. Today they are the most frequently sampled tissues. Aspiration of lymph nodes for diagnostic purposes was reported as early as 1904 by Greig and Gray^[3]. Ward and Chatard and Guthrie published reports on lymph node aspiration in 1914, the former to diagnose neoplastic diseases and the later for infectious diseases. In 1921, Guthrie first attempted to collate lymph node aspiration cytology with various disease processes causing lymphadenopathy^[4]. In 1927, Forkner published an elaborate study on lymph node cytology^[5]. Martin and Ellis of the Memorial hospital in New York were pioneers in this field. The primary purpose of fine needle aspiration cytology (FNAC) of an abnormal peripheral lymph node is to decide whether surgical excision for histological examination is needed. Over

the next 30 years the technique was slowly adopted by clinicians and pathologists resulting in a number of reports showing its usefulness. There is a large body of evidence supporting the use of spiration cytology as a primary method of diagnosis in reactive, infective and metastatic diseases^[6,7,8].

Although open biopsy with histological examination of excised tissue still remains the golden standard for diagnosis of lymph node lesions, yet FNAC has now become an integral part of the initial diagnosis and management of patients presenting with lymphadenopathy^[9]. FNAC gained wide acceptance since it offers several advantages-as simplicity, lending itself to outpatient diagnosis, rapid, safe with no anesthesia, less complications and minimal trauma^[10], relatively inexpensive reducing cost of hospitalization and has lower cost than surgical biopsy, immediate preliminary diagnosis with early availability of results varying from clear diagnosis or a firm request for histopathology with early direction of appropriate investigations, high degree of accuracy in well defined situations^[11] and has a very low morbidity. The cytomorphologic features collaborates with histopathology and has qualities of a micro-biopsy^[12,13].

Now-a-days, FNAC is a diagnostic tool in certain risk patients and establishes a more general role in the primary diagnosis and sub classification of lymphomas along with ancillary investigations as immunohistochemistry and molecular techniques which increase the diagnostic accuracy when compared to cytological examination^[7,14,15,16].

FNAC has also been advocated as a useful method in comparison to more expensive surgical excision biopsies in developing countries with limited financial and health care resources^[17,18].

A fine needle inserted into a mass samples both individual cells and tiny tissue biopsy specimens. The greatest advantage from this procedure is achieved when cytopathologist

personally performs the aspiration of the mass, prepares specimens for immediate microscopic study, and renders an immediate opinion about satisfactoriness of the specimen for diagnosis. By this procedure, the cytopathologist is able to talk directly to the patient, palpate the mass, and directly guide the passage of the needle into it.

Tuberculosis is the commonest cause of lymphadenopathy in developing countries like India and should be considered in every case of granulomatous lymphadenopathy unless proved otherwise, whereas evaluation of granulomas is a complex problem in developed countries. The most essential criteria for diagnosis of Hodgkins disease are based on cytological details especially the presence of Reed-Sternberg cells and its variants. Therefore the cytological smear obtained from needle aspiration may provide useful information during the course of disease. Despite the recent successful application of needle aspiration biopsy, there have been obstacles to its development and general acceptance. Those that criticize the technique based on their arguments on

1. The procedure is invariably inaccurate because of the limited amount of material obtained and difficulty of interpreting cytological findings and
2. The danger of seeding and spreading tumor by piercing it with needles. In-depth discussion about theoretical and practical considerations of tumor spread in needle tract seeding with the use of aspiration biopsy was done by many authors^[19,20].
3. The discipline of surgical pathology is based mainly on the studies of alterations in architecture of intact tissues while changes in individual cells are of secondary importance.

In some conditions, the cytological details in aspiration smears are not much useful. In NonHodgkin lymphoma of low malignancy, the cytological features of cells resemble those of reactive lymphocytes and without the benefit of nodal architecture a definitive morphologic diagnosis may not be possible.^[21,22,23,24]

Therefore, this evaluation of FNAC in comparison to histopathology of lymph nodes in a prospective cohort of patients with lymphadenopathy produces a powerful tool and results in distinctly improved diagnostic accuracy of Lesions of Lymph nodes.

RESULTS

A total of 150 cases were enrolled in the Department of Pathology Kakatiya. Medical College and Mahatma Gandhi Memorial Hospital, Warangal, during the study period. Age of the patient varied from 30 years to 80 years. Maximum numbers of patients were seen between the age group of 51 to 60 years.

Our study showed male preponderance of cases, out of 150 patients 80 were males and 70 were females.

TABLE 01- DISTRIBUTION OF CASES IN ALL AGE GROPS

Age in years	No. of cases	Percentage
30 – 40	30	20
41 – 50	37	24.7
51 – 60	51	34
61 – 70	22	14.7
71 – 80	10	6.6
Total	150	100

TABLE 02 – DISTRIBUTION OF NODES IN DIFFERENT REGIONS

SITE	NO.OF CASES	%
Cervical	105	69%
Axillary	32	22%
Inguinal	10	7%
Other groups	3	2%

SITE OF INVOLVEMENT:

Cervical lymphnodes (105 cases) were the most commonly involved group of lymph nodes in the study group of 150 patients. Axillary nodes (32cases), inguinal nodes (10 cases) and other nodes (03 cases) were involved. Other nodes included the pre-auricular, postauricular nodes. In 6 cases, lymph nodes were involved at more than one site.

DISTRIBUTION OF SYMPTOMS: Patients present with different symptoms showed in table 03

TABLE 03 - DISTRIBUTION OF SYMPTOMS IN ALL CASES

SYMPTOM	COUNT	%
Fever	7	4.6
Fever,swelling, weight loss	19	12.6
Fever,swelling	24	15.9
Swelling	85	56.3
Swelling,weight loss	15	9.9
Weight loss	1	0.7
Total	150	100

DIAGNOSIS OF LYMPHADENOPATHIES ON FNAC:

The total number of 150 cases constituted 100 cases of non-neoplastic lesions, and 49 cases of neoplastic lesions. Among neoplastic lesions, 39 cases were of metastatic deposits and 10 were of other tumors. In 1 case the aspirate was inadequate and hence inconclusive.

TABLE 04 - DISTRIBUTION OF CASES BY ETIOLOGY

FNAC DIAGNOSIS	NO.OF CASES	%
Benign and Inflammatory	100	67.1
Metastasis	39	26.1
Others	10	6.8
3 Poorly differentiated carcinomas		
3 Parotid tumors		
2 Semonimas		
2 Malignant melanomas		
TOTAL	149	100

DISTRIBUTION OF BENIGN AND INFLAMMORY LYMPHADENOPATHIES ON FNAC:

Reactive lymphadenitis constituted 64% of cases while granulomatous lymphadenitis constituted 29% of cases, 7% cases of suppurative lymphadenopathy were diagnosed. In one case the opinion was difficult as the aspirate was hemorrhagic and scanty, this is correlated by histopathological examination. These 100 cases were not correlated with histopathological findings.

TABLE 05- DISTRIBUTION OF CASES IN BENIGN & INFLAMMATORY LESIONS

FNAC DIAGNOSIS	NO.OF CASES	%
Reactive lymphadenitis	64	64
Granulomatous lymphadenitis	29	29
Suppurative lymphadenitis	7	7
TOTAL	100	100

DISTRIBUTION OF METASTATIC LESIONS:

Cytological evidence of metastasis was present in 33.3% of cases. Of this 48% of cases were from Squamous cell carcinomas, 32% of cases were from Adenocarcinomas, and 20% cases from other malignancies.

TABLE 06 - DISTRIBUTION OF METASTATIC CARCINOMAS

METASTASIS	NO. OF CASES	%
Squamous cell carcinoma	24	48
Adenocarcinoma	16	32
Others	10	20
3 Poorly differentiated carcinomas		
3 parotid tumors		
2 semonimas		
2 Malignant melanomas		

TOTAL	50	100
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DIAGNOSTIC ACCURACIES OF FNAC AND HPE:

Diagnostic accuracy of FNAC and HPE is 100% in Squamous cell carcinomas, Adenocarcinomas, Poorly differentiated carcinomas, Parotid tumors, Malignant Melanomas, and Seminomas, where as one small size lymph nodal scanty aspiration is inconclusive in FNAC, diagnosed as SCC in HPE.

TABLE 07 – DIAGNOSTIC ACCURACIES OF FNAC AND HPE IN DIFFERENT METASTATIC LESIONS

TYPE OF MALIGNANCY	FNAC	HPE
Squamous cell carcinoma	100%	100%
Adenocarcinomas	100%	100%
Poorly differentiated carcinomas	100%	100%
Parotid tumors	100%	100%
Malignant Melanomas	100%	100%
Seminomas	100%	100%
Inadequate smear	Non conclusive	Diagnosed as SCC

Overall diagnostic accuracy of FNAC and HPE is 98%

SENSITIVITY AND SPECIFICITY OF FNAC:

The sensitivity and specificity of FNAC in metastatic malignancies is 98%

The correlation between FNAC and HPE of malignant malignancies is 98%.

DISCUSSION

FNAC of lymph nodes is one of the routinely used diagnostic procedures in patients presenting with lymphadenopathy. In the present study extending over two years duration, 150 patients underwent FNAC of the nodes.

Age of the patient varied from 30 years to 80 years. Maximum number of patients were seen between the age group of 51 to 60 years. The ratio of number of males to females was 1: 0.8

Swelling was the presenting complaint in most of the patients. The other important modes of presentations were fever and weight loss.

Adequacy of aspirate:

Aspiration was done in 150 cases, 1 aspirate yielded inadequate sample for cytologic interpretation, due to small size of the node and scanty cellularity. These metastatic aspirates are correlated with histopathological findings.

Site of node involvement:

Cervical group of lymph nodes were the most common involved nodes (69%). This was followed by axillary nodes (22%), inguinal nodes(7%) and others(2%). The involvement of nodes correlated well with studies done by Anastasio Serrano et al. (2001) in which cervical lymph nodes were the most commonly involved nodes (67.48%) followed by axillary and inguinal nodes.

Incidence of lymphadenopathies:

Aspirates were benign and inflammatory in 67.1% of cases, metastatic deposits were found in 26.1% of the cases and other malignancies in 6.8% of the cases.

METASTATIC DEPOSIT:

Lymph node aspirates in 50 cases (32.9%) showed metastatic deposits.

The finding of metastatic deposit correlated well with other studies mentioned below:

TABLE 08 DISTRIBUTION OF METASTATIC DEPOSITS IN VARIOUS STUDIES

Metastatic deposit	% of cases
Arun Kumar et al(1991)	10%
Raghuvveer et al(1996)	28%
Anastasio Seranno Egea et al(2001)	22.6%
Rasheed study 2004 (Metastatic deposits and cytology)	23.5%
Present Study (2013) (Metastatic deposits and cytology)	32.9%

The comparison of metastasis of various types is as follows: **Squamous cell carcinoma**

Squamous cell carcinoma was diagnosed in 48% of metastatic deposits in lymph nodes (Fig 01 and 02). The primary sites of origin are malignancies of head and neck region and lung.

Adenocarcinoma

Diagnosis of adenocarcinoma was made in 32% of metastatic deposits. The primary sites of origin are from malignancies of breast and stomach. This was the most common form of metastasis in our study.

Other Malignancies

Poorly differentiated carcinomas, parotid tumors, malignant melanomas and seminomas (Fig 03 and 04) was made in 20% of metastatic deposits.

TABLE 09 DISTRIBUTION OF DIFFERENT METASTASIS DEPOSITS IN VARIOUS STUDIES

Type of metastasis	Anjali Dasgupta et al (1994)	Raghuvveer et al(1996)	Rasheed study (2004)	Present study (2013)
Squamous cell carcinoma	25%	66%	36.4%	48%
Adenocarcinoma	37.5%	23%	51.6%	32%
Other malignancies	37.5%	7%	6%	20%

CORRELATION OF FNAC AND HISTOPATHOLOGY:

There was good correlation between FNAC and histopathology in 50 cases. The overall correlation between FNAC and histopathology was 98 % (49 out of 50). The specificity of FNAC is 98 %.

In this study, the sensitivity and specificity of FNAC and HPE in squamous cell carcinomas is 100%, in adenocarcinomas is 100%, poorly differentiated carcinomas is 100%, parotid tumors is 100% , seminomas is 100% , malignant melanomas is 100% and the inconclusive smear in FNAC is diagnosed as squamous cell carcinoma by histopathological examination. The correlation between FNAC and HPE is 98%

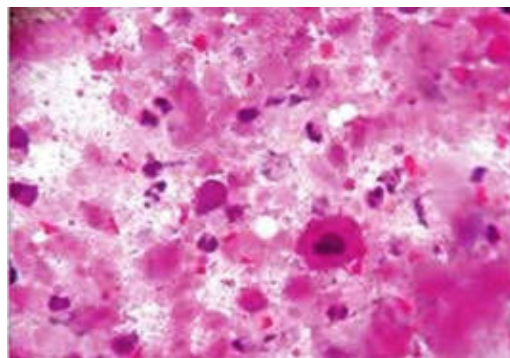


Fig: 01 H & E smear shows mostly malignant squamous cells with large hyperchromatic nucleus and large amount of cytoplasm with keratin material

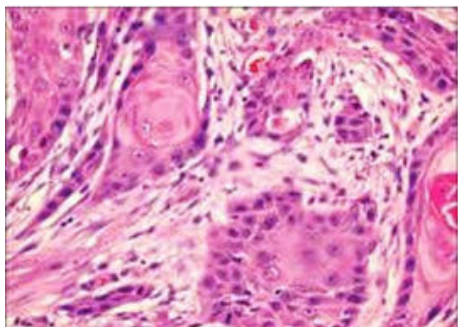


Fig: 02 H& E section shows tumor cells arranged in nesting pattern with pearl formation

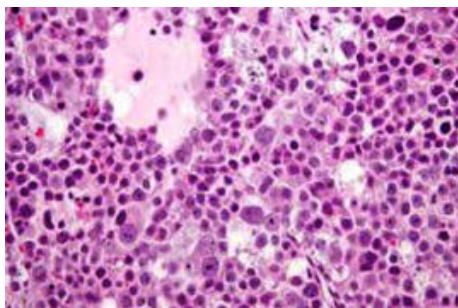


Fig: 03 H&E smear shows with uniform round tumor cells with prominent nucleoli (Seminoma)

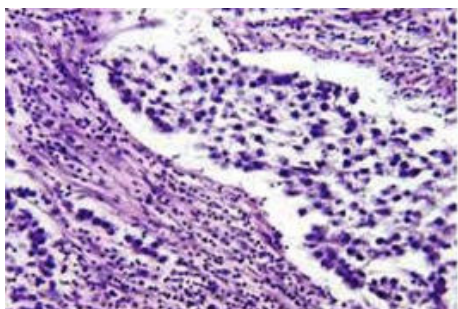


Fig: 04 H&E section shows Seminoma cells invading into the lymphnode

CONCLUSION

This study has been undertaken to evaluate the role of FNAC and HPE correlation in clinically suspected lymphnodes in the diagnosis of lymphadenopathies due to metastasis. Lymphadenopathy is one of the commonest clinical presentations of patients, attending the outpatient and inpatient Departments. Etiology varies from an inflammatory process to a malignant condition. FNAC diagnosis will help the clinician to confirm or exclude the clinical differential diagnosis made at first visit of the patient to the OPD. Speedy cytological diagnosis helps the clinician to further plan the treatment. Fine Needle Aspiration Cytology (FNAC) is an accurate diagnostic technique in diagnosing etiology of lymphadenopathies. It is simple, easy technique and reports can be made available within an hour. Before the advent of FNAC the diagnosis of lymphadenopathies was done after surgical excision followed by histopathological examination. With the introduction of FNAC all the peripheral nodes that are easily accessible can be assessed through a needle to arrive at a probable diagnosis and confirmed by surgical excision and histopathological diagnosis

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