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Research Article

Utility of FNAC in Diagnosis of Lymph Node Malignancies: An Audit from a Rural Medical College - 8

Manupriya Sharma*, Aruna Gupta and Rashmi Kaul

Assistant Professor (Pathology), DR RPGMC Kangra at Tanda (HP), India

***Address for Correspondence:** Manupriya Sharma, Assistant Professor (Pathology), DR RPGMC Kangra at Tanda (HP), Postal code: 176002, India, Tel: 91-8628000105;
Email: manupriya.priyasharma@gmail.com

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ABSTRACT

Fine needle aspiration cytology (FNAC) is a simple and rapid diagnostic procedure to identify an etiology in an enlarged lymph node. The procedure is quite effective in diagnosing malignancies in superficial lymph nodes.

Aim: To evaluate the role of FNAC as a first line investigation to identify malignancies in superficial lymph nodes.

Materials and Methods: This is a retrospective review of malignant lymph node aspirates identified in superficial lymph nodes over a period of two years from June 2014 to May 2016 in the Department of Pathology, Dr. RPGMC, Tanda, Himachal Pradesh, India.

Results: A total of 1026 lymph node aspirates were identified during this period. Out of all, 188 cases (18%) were identified as malignancies in lymph nodes. The age of patients in malignant lymph node aspirates ranged from 12 years to 92 years. There were 145 males (77%) and 43 females (23%). The male to female ratio was 3.5:1. Cervical lymph node (140/188; 74%) was the main group of lymph node involved. Metastasis to lymph nodes (158 cases; 84%) was more common than primary lymphomas (30 cases; 16%). Squamous cell carcinoma (96/158; 60%) was the most common metastatic malignancy identified. Lungs (51/158; 32%) were the most common primary malignancy site. In 12% cases, the primary site was unknown and the malignancy was first diagnosed on FNAC. Among primary lymphomas, Non Hodgkin Lymphoma was seen in 67% (20/30 cases) and Hodgkin's Lymphoma in 33% (10/30 cases).

Conclusion: Present study highlights the importance of FNAC in diagnosing malignancies in superficial lymph nodes. Majority of benign etiologies can be triaged, thereby focusing attention on more sinister cases like malignancies. It also helps to diagnose malignancy in advanced stage patients. Based on the FNAC diagnosis, these cases can be managed on palliative care thereby saving the patient from excision biopsy. In many cases, FNAC proves itself as a first investigation to clinch diagnosis in occult malignancy where there is no clinical suspicion.

Keywords: Fine Needle Aspiration Cytology(FNAC); lymphadenopathy (LAP); Malignancy

INTRODUCTION

FNAC is a safe, easy and minimally invasive diagnostic procedure which can be performed in office settings [1]. FNAC is gaining popularity as a first line diagnostic procedure. This cost effective procedure is especially useful in low-resource countries like India. Majority of cases can be diagnosed and managed on FNAC alone [2]. It also helps to triage the selective cases like malignancies which need further work up. It plays an important role to confirm or exclude metastasis in a lymph node in a known case of malignancy, thereby avoiding unwanted surgery. In many other circumstances, FNAC may be the first investigation to clinch a diagnosis of an occult malignancy [3].

However, there is limited data about the role of FNAC in detecting malignancies in superficial lymph nodes with respect to India especially in rural areas. Hence, this study was an audit of the use of FNAC as a first line investigation in diagnosing malignancies in superficial lymph nodes in a medical college in a rural area.

MATERIALS AND METHODS

The present study is a retrospective review of malignant lymph node aspirates in superficial lymph nodes over a period of two years from June 2014 to May 2016. FNAC was performed following strict aseptic precautions. Inadequate aspirates were excluded from the study. Relevant clinical details and investigations were noted in all cases.

Procedure

The site and size of the lymph nodes being aspirated was noted before performing the procedure. A 22/23 gauge needle attached to 20ml syringe mounted on Cameco handle was used for obtaining the material. The needle was inserted into the swelling and full suction pressure was applied. The needle was moved briskly in different directions in the swelling till sufficient material was visualized in the stem of the needle. The negative pressure of the syringe was released and the needle was taken out. The aspirated material was blown out

on clean glass slides. At least 4 good aspirate smears were prepared. Two smears were air dried and stained with Giemsa stain. Another two smears were alcohol fixed and stained with Hematoxylin and Eosin (H and E) stain and Papanicolaou Stain (PAP stain) each. All cytological smears were evaluated for adequacy, cellularity, type of cells, arrangement of cells and nuclear as well as cytoplasmic features. Background was evaluated in all smears for any specific findings like necrosis or presence of mucin.

Statistical analysis

The results were collected and analyzed on a Microsoft Excel 2010 sheet and percentages were calculated.

RESULTS

Patient Characteristics

A total of 1026 lymph nodes were aspirated during this study period.

Out of all these cases, 188 cases (18%) were identified as malignant lymph node aspirates. The age of patients in malignant lymph node aspirates ranged from 12 years to 92 years. There were 145 males (77%) and 43 females (23%). The male to female ratio was 3.5:1. Four malignancies (2%) were identified in pediatric population (< 18 years), 97 cases (52%) in adults (18-65 years) and 87 cases (46%) in geriatric age group (> 65 years).

Metastatic lymph nodes

Cervical lymph nodes (140/188; 74%) were the main group of enlarged lymph nodes identified among malignant lymph node aspirates, followed by supraclavicular lymph nodes (33/188; 18%), axillary lymph nodes (09/188; 05%) and inguinal lymph nodes (06/188; 03%) respectively as shown in (Figure 1). Among all 188 cases, 158 cases (84%) showed metastatic deposits and 30 cases (16%) were identified as primary lymphomas. Among metastatic malignancies, SCC (96 cases; 60%) was the most common malignancy identified followed by adenocarcinoma (44 cases; 27.5%), duct cell



carcinoma (09 cases; 06%), small cell carcinoma (04 cases; 03%), papillary carcinoma (04 cases; 03%) and Transitional Cell Carcinoma (TCC) (01 case; 0.5%) as shown in (Table 1).

Cytological features

The characteristic cytological features seen in making a diagnosis of SCC consisted of clusters and scattered population of malignant cells with hyperchromatic nuclei and dense blue cytoplasm. Certain cells on PAP smear revealed orangeophilia. Background revealed necrosis and keratin debris. Forty four cases were identified as adenocarcinoma. These cases revealed clusters of malignant cells with coarse nuclear chromatin, prominent nucleoli and moderate cytoplasm with vacuolations in many. Many cells revealed acinar formation as shown in (Figure 2a). Metastatic deposits from duct cell carcinoma were mainly identified in axillary lymph nodes (08 cases) and one case in cervical lymph node. Cytological features in these cases revealed many single and clusters of malignant cells. Cells revealed moderate to severe nuclear atypia, enlargement, pleomorphism and irregular nuclear chromatin. At places, tubule formation was noted. Four cases were identified as metastasis from small cell carcinoma lung. These cases revealed dispersed cell population and few clusters of tumor cells. The cells had high nuclear cytoplasmic ratio and salt and pepper nuclear chromatin. The cells in clusters revealed nuclear moulding. Many cells revealed streaking artefacts. Another four cases revealed metastatic deposits from papillary carcinoma thyroid. On cytology, these cases revealed papillae with and without fibrovascular cores and sheets of tumor cells. The cells had minimal pleomorphism, powdery nuclear chromatin, nuclear grooves and intranuclear inclusions as shown in (Figure 2b). One case identified as TCC revealed clusters and dispersed tumor cell population with prominent

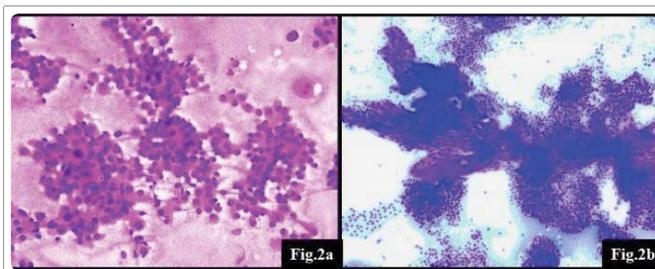


Figure 2: a) Adenocarcinoma deposits in lymph node showing clusters of malignant cells with acinar formation. b) Papillary carcinoma thyroid metastasis showing papillary fragments of tumor cells with fibrovascular cores.

nuclei and scanty blue cytoplasm. Background showed necrosis. This patient was a known case of TCC, urinary bladder.

Thirty cases of NHL were identified in the study. Majority of NHL cases revealed monotonous population of atypical lymphoid cells. Ten cases of Hodgkin's lymphoma were reported during this study period. These cases revealed Reed- Sternberg cells in a background of pleomorphic cells consisting of mature lymphocytes, eosinophils and plasma cells.

Primary malignancies

Lung was the most common primary tumor site seen in 51 out of 158 metastatic malignancies (32%). Out of 51 cases, 44 cases were seen in males and 07 cases in females. These 51 lung malignancies were classified as adenocarcinoma (30 cases), SCC (17 cases) and small cell carcinoma (04 cases). Oral cavity was identified as the second primary malignant tumor site seen in 29/158 cases (18%). There were 28 cases in males and 01 case in female. All cases were classified as SCC. Larynx was the third common primary malignancy site seen in 26/158 cases (16%). Twenty five cases were seen in males and 01 case was seen in females. In 06/158 cases each (04%), oesophagus and stomach were the primary tumor site. Metastasis in all oesophageal malignancies was seen in females. Out of 06 oesophageal metastatic malignancies, 02 cases were identified as SCC and 04 cases were identified as adenocarcinoma. Out of 06 cases of metastasis from stomach, 03 cases each were seen in males and females. All cases were identified as adenocarcinoma. In 03/158 cases (2%), nasopharynx was the primary site. All 03 cases were identified in males. In 02/158 cases (1%), penis was the primary malignant tumor site. Nine cases (6%) were metastatic spread from duct cell carcinoma breast. In another four cases (3%), the primary malignancy site was thyroid. Two cases each were identified in males and females. All 04 cases were identified as papillary carcinoma thyroid. Two female cases of metastasis were from mucinous cystadenoma ovary (01 case, 0.5%) and adenocarcinoma gall bladder (01 case; 0.5%) each. One male patient revealed metastatic deposit of transitional cell carcinoma urinary bladder (1%). In 19/158 cases (12%), the primary tumor site was unknown and the initial diagnosis of malignancy was made by FNAC as shown in (Table 2 and 3).

Thirty cases of primary lymphomas were identified on FNAC. These cases were classified as NHL (20 cases) and Hodgkin's lymphoma (10 cases). Fourteen cases of NHL were identified in males and 06 cases were identified in females. Nine cases of Hodgkin's lymphoma were identified in males and one case in females. All lymphoma cases were advised excision biopsy for confirmation and

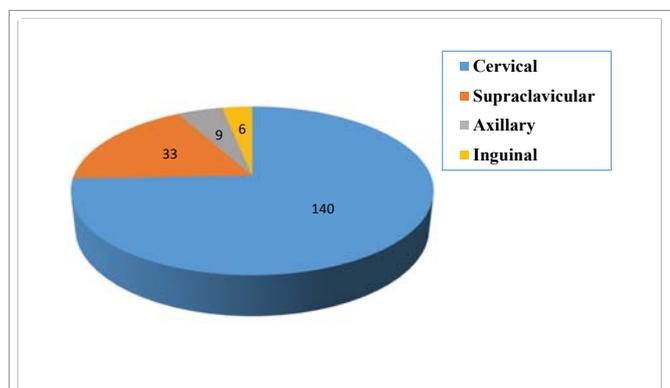


Figure 1: Distribution of lymph nodes involved in malignancy.

Table 1: Cytological types of malignancy in lymph nodes

Type of Malignancy	Number of cases
Squamous cell carcinoma	96
Adenocarcinoma	44
Non Hodgkins Lymphoma	20
Hodgkins Lymphoma	10
Duct cell carcinoma	09
Small cell carcinoma	04
Papillary carcinoma	04
Transitional cell carcinoma	01

**Table 2:** Distribution of malignancies in lymph nodes.

	Cervical	Supraclavicular	Axillary	Inguinal
Squamous cell carcinoma (96)	82	12	00	02
Adenocarcinoma (44)	31	12	00	01
Duct cell carcinoma (09)	01	00	08	00
Papillary carcinoma (04)	04	00	00	00
Small cell carcinoma (04)	02	02	00	00
Transitional cell carcinoma (01)	00	01	00	00
Primary				
Non Hodgkin Lymphoma (20)	14	03	01	02
Hodgkin Lymphoma (10)	06	03	00	01

Table 3: Distribution of primary sites in malignant lymph node aspirates.

Squamous cell ca (96)	Cervical (82)	Larynx (25), Oral Cavity (28), Lungs (11), Oesophagus (02), Nasopharynx (02), Unknown (14)
	Supraclavicular (12)	Lungs (06), Larynx (01), Nasopharynx (01), Oral Cavity (01), Unknown (03)
	Inguinal (02)	Penis (02)
Adenocarcinoma (44)	Cervical (31)	Lungs (23), Oesophagus (04), Stomach (02), Gall Bladder (01), Unknown (01)
	Supraclavicular (12)	Lungs (07), Stomach (04), Ovary (01)
	Inguinal (01)	Unknown
Duct cell ca (09)	Axillary (08) Cervical (01)	Breast Breast
Small cell ca (04)	Cervical (02) Supraclavicular (02)	Lungs Lungs
Papillary ca (04)	Cervical (04)	Thyroid
Transitional cell ca (01)	Supraclavicular (01)	Urinary bladder

immunohistochemistry for further characterization of lymphoma cases.

DISCUSSION

In many cases, LAP may be the first presenting sign of an underlying malignancy [4]. FNAC plays a pivotal role in making diagnosis in the superficial, easily accessible lymph nodes. It is an easy, cost-effective and rapid diagnostic procedure. The main importance of FNAC is that this simple diagnostic procedure can be easily performed in any peripheral center with minimal resources [5]. The set up does not require any sophisticated machinery and can be performed in day care settings. This way majority of cases can be easily diagnosed and managed on FNAC. Appropriate cases which need further evaluation can be easily identified by this procedure. This is important in advanced stage patients where exposure to anaesthesia or excision biopsy cannot be performed due to health constraints. Secondly, the procedure helps in identifying an occult malignancy which was not clinically suspected in a patient [6].

In our study, 1026 lymph nodes were aspirated during 2 year period. Similar to previous studies, majority of cases were reported as a benign pathology (838/1026; 82%) [3,7]. The reactive cases (562/1026; 55%) were kept under close follow up and granulomatous lymphadenitis (276/1026; 27%) were managed by appropriate treatment. It also helped to triage the malignant pathologies

(188/1026; 18%) which needed further work up for characterization of malignancies or work up to identify the primary malignancy site. Previous studies report incidence of malignancies in lymph nodes varying from 5.8% to 25.03% [2,3,8]. Among these 188 malignant lymph nodes, FNAC played a pivotal role in 12% of cases where there was no clinical suspicion of malignancy and the diagnosis was first made on FNAC. This finding has been supported by many other studies [8,9]. The cytological findings in these cases provide a clue towards the possible primary malignancy site. Presence of columnar malignant cells or mucin in the background in lymph node aspirate suggest colonic malignancy, prominent eosinophilic macro nucleoli suggest malignant melanoma, prominent nucleoli, intranuclear inclusions and bile pigment in tumor cells suggest hepatocellular carcinoma as the primary malignancy and the further evaluation can be based on these findings. The key point in all cases is to recognize foreign population of cells amidst a reactive population of lymphocytes.

In our audit, we recorded more cases of metastatic carcinoma (158/188; 84%) than primary lymphomas (30/188; 16%). The results are in agreement with the previous studies [10,11]. The age range was wide from 12 years to 92 years. Only 04 malignancies were identified in pediatric population and that too above 10 years. These cases were Hodgkin's lymphoma (12 years), NHL (14 years and 16 years) and papillary carcinoma thyroid metastasis (16 years). Surprisingly, malignant lymph node aspirate identified in males (145/188; 77%) were significantly higher than in females (43 cases; 23%). This may be attributed to higher incidence of head and neck carcinomas in males due to higher consumption of tobacco products and more smoking in male population. Secondly, it may also be explained by relatively lesser female patients reporting to hospitals in a rural set up.

Similar to other studies, SCC (96/158; 60%) was the most common carcinoma metastasizing to lymph nodes in our study [5,12]. Cervical lymph nodes (140/188; 74%) were the main group of lymph node involved by malignant pathology. This finding is also in agreement with other studies [10-12]. The most common primary site was lungs (51/158; 32%), followed by oral cavity (29/158; 18%) and larynx (26/158; 16%). This may be due to higher smoking rates and use of tobacco products. Adenocarcinoma was the next common metastasizing tumor. The primary malignancy was mainly identified in lungs, followed by oesophagus, stomach, oral cavity and gall bladder in these cases.

Primary lymphomas can be diagnosed on FNAC. In our study we identified 20 cases of NHL and 10 cases of Hodgkin's lymphoma. NHL revealed monotonous atypical lymphoid cells population. Hodgkin's lymphoma revealed characteristic Reed Sternberg cells in a background of pleomorphic cell population comprising of mature lymphocytes, eosinophils and plasma cells. The aim of FNAC in primary lymphomas is to identify these cases which can be advised further work up. It is important to subtype the lymphomas based on WHO classification as the treatment protocols may vary in different subtypes [13,14]. This can be achieved by excision biopsy of the involved lymph node along with immunohistochemistry for proper characterization of lymphomas. So the importance of FNAC in lymphomas is to triage such cases for further work up.

CONCLUSION

FNAC should be considered as an effective first line investigation in making a diagnosis in superficial lymph nodes. This is important in



a low resource rural setting where majority of cases can be managed by this cost effective simple investigation. It also helps to triage the appropriate malignancy cases which may be provided a rapid diagnosis and timely intervention. Further, it will be extremely useful in advanced stage patients especially in elderly age group as these cases may need only palliative care based on the FNAC diagnosis. It also proves itself as a first investigation in clinching diagnosis of an occult malignancy in many cases.

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