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FINE NEEDLE ASPIRATION CYTOLOGY IN DIAGNOSIS OF PAEDIATRIC LYMPHADEOPATHY: A SINGLE CENTRE EXPERIENCE.

Pathology

Subrat Kumar Samantara — Assistant Professor, Department of Surgical Oncology, Acharya Harihar Regional Cancer Centre, Cuttack, Odisha

Subhranshu Kumar Hota — Senior Resident, Department of Pathology, Acharya Harihar Regional Cancer Centre, Cuttack, Odisha.

Sashibhusan Dash* — Senior Research Fellow, Department of Pathology, Acharya Harihar Regional Cancer Centre, Cuttack, Odisha. *Corresponding Author

Pooja Mohanty — Research Trainee, Department of Pathology, Acharya Harihar Regional Cancer Centre, Cuttack, Odisha.

Madhusmita Rout — Research Trainee, Department of Pathology, Acharya Harihar Regional Cancer Centre, Cuttack, Odisha.

ABSTRACT

Background: In pediatric patients, lymphadenopathy is one of the commonest clinical presentations.
Objectives: To study the role of FNAC's in diagnosis of pediatric lymphadenopathy in our centre.
Material and Methods: The retrospective study was carried out for a period of two years from January 2017 to December 2018 on patients below 15 years of age with lymphadenopathy and subsequently suggested for FNAC of the lesion.
Results: In this study, males were predominated (67, 72.82%).The patients age between 6-10 years were most commonly observed. Out of total cases, (72, 78.26%) were non neoplastic and (20, 21.73%) were neoplastic lesions. The cervical lymphadenopathy was the most common in both neoplastic and non neoplastic cases (72, 78.26%). the sensitivity, specificity and diagnostic accuracy of the cytosmears were 95%, 100% and 97.87% respectively.
Conclusion: FNAC is not only a rapid, simple, accurate diagnostic procedure for paediatric lymphadeopathy but also useful in further studies like immunohistochemistry, electron microscopy, cytogenetic studies, flow cytometry, and microbiological culture on aspirated material. It is a safe, rappid and cost effective technique for screening and management.

KEYWORDS

Fine needle aspiration cytology; lymphadenopathy; malignancy.

INTRODUCTION:

Lymphadenopathy is one of the commonest clinical presentations among pediatric patients attending the outdoor department. [1] It posses diagnostic challenge to a pediatrician as it has several etiologies. [2]The main concern is to differentiate the association between malignancy and lymphadenopathy. [3]Sometimes to diagnose these tumors in the absence of clear and relevant clinical information is dangerous as it can lead to inaccurate diagnosis and further management. Although surgical biopsy is proved as a gold standard to diagnose malignancy but it has some own drawbacks and limitations. Therefore an presumptive,rapid,cost effective and well- structured pathology report by the help of any technique which speeds up the process of diagnosis limits the physical and the psychological trauma to the patient and saves the expenditure of hospitalization.[4]

In this regard FNAC as well established technique in adult oncology, is now being increasingly applied to childhood tumors as it permits a rapid diagnosis with minimal trauma, morbidity, and a low complication rate.[4] Although it is suggested that the frequently practice of FNAC as initial modalities in resource limited facility centre can be an important diagnostic tool for initial assessment and to plan the further course of management but paucity of study on pediatric lymphadenopathy in our region making health care strategy difficult. So we aimed to study the fine needle aspiration cytology in diagnosis of pediatrics lymphadenopathy.

MATERIALS AND METHODS

The retrospective study was carried out for a period of two years from January 2017 to December 2018 on patients up to 15 years of age, who were presented with palpable lymphadenopathy and subsequently suggested for FNAC. After aspiration; smears were immediately fixed in 95% alcohol, and stained with Pap. [2, 3] Special stains like Ziehl–Neelsen stain (ZN) for acid fast bacilli (AFB) were done whenever required. Patients' presentedwith deep seated nodes were excluded from the study.

Clinical parameters and cytological diagnosis were retrieved from pathology record and noted in excel sheet. Cytology diagnosis was correlated with histology findings, in available cases.

Statistical analysis for sensitivity, specificity, positive predictive value, negative predictive value and overall diagnostic accuracy was evaluated.

RESULT:

In this study, males were predominated 67(72.82%) with male to female ratio were 2.68:1.51.08%of cases were observed in the agebetween 6-10 years. Out of total cases, 72(78.26%) were non neoplastic and 20(21.73%) were neoplastic lesions. (Table 1) Among non neoplastic lesion non specific reactive node was most common while Non Hodgkin's lymphoma were the commonest neoplastic lesions. The cervical lymphadenopathy was the most common in both neoplastic and non neoplastic cases (72, 78.26%).Generalized lymphadenopathy was seen in 3(4.16%) cases. (Table 2)

In the present study, cytohistopathology correlation was availed only in 47 cases. We found the overall diagnostic accuracy of the cytosmears was 97.87%and the overall sensitivity and the specificity to be 95%and 100% respectively.

DISCUSSION:

The human body has approximately 600 lymph nodes and these are the part of reticuloendothelial system and serve as the termination point for lymphatic vessels draining lymph from most tissues of the body. Lymphadenopathy define as the nodes that are abnormal in either size (diameter >1cm for both cervical and axillary nodes and >1.5 cm for inguinal nodes), or number. It is usually caused by multiplication of cells normally residing within the node in response to foreign antigens or by either propagation of inflammatory or neoplastic cells into the node.[5-6]In children it is most common due to physiological changes or transient response to generalized infections. However, it may also due to tuberculosis, brucellosis and serious conditions like malignancies and auto immune disorders or other rare causes like atypical mycobacterial lymphadenitis, SLE, brucellosis or histiocytosis.[7]

It is most common in below 10 years old child, because normal peak lymphoid growth occurs in the age group of 4-8 yrs, nearly reaching pathological size. So with on-going antigenic stimulus, the lymphoid growth may exceed the normal limits. This could be the reason for maximum number of cases in this age group. [8]

According to the study ,if any pediatric lymphadenopathy not subsiding or remaining stable in size more than two weeks after administration of antibiotics, then its needs to be thoroughly investigated.[9]In this study 70% patients were presented lymphadeopathy after administration of antibiotics.

In this study, most of patients (47%) were between age 6 to10years and least no of cases (6.52%) were below 5 years. Atanda et al. [9] and Ponder et al.[10], observed thehighest numbers (46.4%) of cases in the age between 10-14 years and least number of cases (8.9%) were in the age ranged 0 – 4 years. [9]According to their result, they concluded that, the least no of cases in between 0-4, might be due to self limiting viral action which usually resolve at home without hospital visit.[9]

The males (72.82%) were predominated with male to female ratio (2.68:1) which was accordance with the earlier studies done by Bezabih et al and Mitra et al, who obtained (1.3:1).[11-12] According to their findings, they stated that, the male predominance could be due to the prevailing custom of paying more attention to male children in Indian society rather than the actual increased biological susceptibility in boys. In another study almost equal incidence in males and females were observed. [13] Where as Ahmad et al. [14] showed reverse ratio (0.47:1) with predominance of females in the study group.

The cervical lymph nodes are the first drainage stations for key points of contact with the outside world (mouth/ throat/nose /eyes/ears/ respiratory system)a critical aspect especially among children and can represent an early clinical sign in their exposed position on a child's slim neck.[15]In this study maximum number of aspirations(72,78.26%) were done from cervical lymph node which was similar with previous studies.[16][5]

The reason behind this predominance may be the easy accessibility of cervical lymph nodes for examination and evaluation or it could beattributed to low socio-economic group and high incidence of oropharyngeal, dental and scalp infections which results in enlargement of the cervical lymph nodes, draining the above regions and manifesting with reactive lymphadenitis.[16]

In earlier studies, non neoplastic lesions such as inflammatory lesions were maximum, among which reactive hyperplasias were predominated. Silas et al,[8] Locham et al.[17], Dhingra et al. [18-19]. In our study, we also found the similar result but 21.73% of the lymph node FNAC yielded malignant diagnosis which was higher than the above earlier studies, as this study was conducted in a referral cancer centre, where all suspected malignant cases were referred for FNAC.

In India it has been observed that, lymphadenopathy is the common presentation of extra pulmonary tuberculosis with massive economical implication on the health care system. In this present study tuberculosis lesion was observed in 17(18.47%) cases which were consistent with the earlier study. [20][17] Maximum numbers of tuberculosis was diagnosed in cervical lymphadenopathy followed by axillary group which was consistent with other workers.[21-23][8][10]

Unlike other studies, commonest malignant lesions were Non Hodgkin's lymphoma and we did not find metastatic leukemic infiltration.

Sengupta et al. [24] shown that the children with Non-Hodgkin lymphoma mostly had painful neck lymphadenopathy while the children with Hodgkin's lymphoma had painless neck mass. Constitutional symptoms like fever, night sweats, and weight loss. Our findings were also similar with the above study findings[14].

As it is suggested that ,persistent adenopathy raises more concerns, especially enlarged lymph nodes within the posterior triangle or supraclavicular space, nodes that are painless, firm, and not mobile, or a single dominant node that persists for more than 6 weeks should all heighten concern for malignancy.[22-24][8] We found the positive correlation.Lymphadenopathy in the supraclavicular region is highly significant as up to 60% are caused by malignant tumors.[25][7] where as localized lymphadenopathy occurs mainly cervical, axillary, inguinal or other (e.g. supratrochlear,occipital etc) areas. Most of time it is caused by viral infection. Others could be caused by bacterias e.g. tuberculosis etc.[8] Lymphadenopathy in pediatric population is always a diagnostic challenge. So the need for the initial presumptive pathological diagnostic technique is very much important.

FNAC is a safe, less invasive, cost effective and quick outpatient method to diagnose pediatric lymphadenopathy. Its therapeutic implications in cystic swellings were also reported.[17-19].In 1904, Grieg and Gray done the first lymph node FNAC in the diagnosis of Trypanosomiasis.[26]From that day it has been using frequently as a initial diagnostic technique in adult but less frequently on pediatric lesion.

In India, the incidence of pediatric lymphadenopathy is 2nd most common which indicates that the frequently practice of FNAC as initial modalities in resource limited facility centre can be an important diagnostic tool available for initial assessment and to plan the further course of management. [5] Along with a reassurance of benignity, confirmation of malignancy can be achieved and treatment initiated since the results are comparable to histopathological diagnosis.[6]

Most often especially in advance malignant lesion, the diagnosis is based on cytology because no further correlation is possible with histopathology. [6] In some cases, cytology not only gives the diagnostic evidence but also surprise to the clinician for unexpected result .[3] In this study, 47 cases were underwent surgical biopsy. In one case, cytological diagnosis of inflammatory lesion was turned out NHL in histopathology report.

In this study overall diagnostic accuracy, sensitivity and specificity of cytodiagnosis were, 97.87% ,95.00%and 100%, respectively where Reddy et al.[16]showed sensitivity 94%and specificity 100% and Dhingra V et al.[18] showed sensitivity 91.3%, specificity 99.1 % and over all diagnostic accuracy of 98.89%.

CONCLUSION:

FNAC is not only a rapid, simple, accurate diagnostic procedure for pediatric lymphadeopathy but also useful in further studies like immunohistochemistry, electron microscopy, cytogenetic studies, flow cytometry, and microbiological culture on aspirated material. It can be used as an initial diagnostic technique for management.

Table.1 Age-sex distribution of paediatrics lymphadenopathy.

Age Group	Benign		Malignant		Sub total		Total (%)
	Male	Female	Male	Female	Male	Female	
<5	3	-	1	2	4	2	6(6.52)
6-10	31	8	6	2	37	10	47(51.08)
11-15	20	10	6	3	26	13	39(42.39)
Sub Total	**54**	**18**	**13**	**7**	**67**	**25**	**92(100)**
Total (%)	**72 (78.26)**		**20 (21.73)**		**92**		

Table.2 Site wise distribution of paediatrics lymphadenopathy.

Sl.No	Disease	Total	CV	SC	AX	ING	Multiple Lymphadenopathy
1.	Inflammatory	72(78.26)	64	4	2	2	
a)	Non specific reactive node	37(51.38)	33	2	2	-	
b)	Acute suppurative	9(12.5)	9	-	-	-	
c)	Tuberculosis	17(23.61)	15	2	-	-	

d)	Granulomatous lymphadenitis	9(12.5)	7	-	-	2	
2.	Malignant	20(21.73)	8	4	4	1	3
a)	NHL	13(65)	4	4	3	-	2
b)	HL	4(20)	2	-	1	-	1
c)	Metastatic	3(15)	2	-	-	1	

CV: Cervical lymphadenopathy,
SC: Supraclavicular lymphadenopathy
AX: Axillary lymphadenopathy,
ING: Inguinal lymphadenopathy.