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Original Article

Spectrum of Cytological Findings in Paediatric Non-Thyroidal Neck Swelling – Experience in a Tertiary Care Children Hospital

Arijit Majumdar[1], Angshuman Jana[2], Soumali Biswas[3], Swagata Bhattacharyya[1], Anirban Jana[4]

1. Dept. Of Pathology, West Bengal University of Health Sciences, Kolkata, India
2. Dept. Of Microbiology, West Bengal University of Health Sciences, Kolkata, India
3. Dept. Of Anatomy, West Bengal University of Health Sciences, Kolkata, India
4. Dept. Of Medicine, West Bengal University of Health Sciences, Kolkata, India

ABSTRACT

Background and Objective: **Fine needle aspiration cytology (FNAC) is well accepted as a useful diagnostic technique in the management of adult patients with head and neck lumps. But, until recently, very few reports have been obtained regarding the role of FNAC in nonthyroidal neck masses in children. Hence, the objective of our study was to determine the diagnostic value of fine needle aspiration cytology in the diagnosis of paediatric nonthyroidalneck masses.**

Methods: **This descriptive study was conducted at the Department of Pathology,Dr. BCRoyPGIPSKolkata from January2012 to December 2012. Hundred patients with non-thyroidal neck masses fulfilling theinclusion criteria were included in the study. Fine needle aspirations were performed by Leishman-Giemsa staining.**

Results: **The most common nonneoplastic neck swelling seen in children were an enlarged lymph node due to inflammation 38(42.2%),i.e., reactive lymphadenitis. Others were TB lymphadenitis25(27.8%), nonTB granulomatous lymphadenitis 2(2.22%), chronic sialadenitis 2(2.22%), branchial cyst 4(4.44%) and epidermal cyst 3(3.33%) cases.**

Overall sensitivity, specificity, positive predictive value and negative predictive value of FNAC in our cases are 93.06%, 72.22%, 93.06% and 72.22%.

Conclusion: **FNA is a valuable diagnostic tool in the management of children with the clinical presentation of a suspicious neck mass. The technique reduces the need for more invasive and costly procedures like open biopsy.**

Keywords: **Fine Needle Aspiration, Cytology, Neck, Tumor**

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Address Communications to: Dr. Arijit Majumdar, Vill.-Duilya, Charaktala P.O.- Andul Dist.-Howrah 711302; West Bengal; India
Email: arijitmajumdar23@gmail.com

Introduction

The superficial lumps in the head neck region are very common findings in our daily clinical practice.The pathological nature of these clinically palpable lumps ranges from simply benign to highly malignant.Fine needle aspiration cytology (FNAC) has already established its significant role in the management of the head-neck lesions of the adults(1).But the pediatric population has been ignored for a long time. Taylor and Nunez reported 62 cases in 1984 which is thought to be the earliest work reported in this regard(2).Moreover those earlier studies limited their focus on the malignant lesions only(3-5).There are certain differences between the headneck masses of the adults and those of the children.Unlike the adults the children are less commonly affected by the malignancy, particularly metastasis. Reactive lymphadenopathy is the commonest presenting feature of the children with neck swelling.

The current study evaluated the role of FNAC as a diagnostic tool in investigation of nonthyroidalhead and neck lesions in children. With increasing cost of medical facilities any technique which speeds up the process of diagnosis, limits the physical and psychological trauma to the patient and saves the expenditure of hospitalization, will be of tremendous value.

Materials and Methods

This study was undertaken in the Department of Pathology, Dr.BCRoy PGIPS, Kolkata, over a period of one year from January 2012 to December 2012. FNAC was done on patientswho presented with non-thyroidal neck swelling.

Informed consent was taken from each and every patient party before including the patients in our study.

Prior to FNAC, clinical detailsregarding age ofthe patient at the onset of the swelling, its duration, change in size,and associated systemic symptoms were noted. The patients presented with traumatic, acute inflammatory swelling and /or abscess was excluded from the study.

FNAC was done using a 22-24 gauge needle fitted to a 10 mldisposable syringe. After immobilizing the target swelling multiplepasses are given to get sufficient material. Smears were preparedand stained with May- GrunwaldGiemsa stain (MGG) and Papanicolaou stain. The Zeihl-Neelsen's stainfor AFB was done in those cases, where the clinical suspiciousor diagnosis was tuberculosis and in those cases where purulentor cheesy material was aspirated. A repeat FNAC was done incases where the yield was inadequate in the first aspiration.The cytological features evaluated included cellularity (scanty,moderate and high), cell arrangement, nuclear and cytoplasmiccharacteristics, and background elements. Surgically excisedspecimens were routinely processed and stained with Haematoxylin and Eosin stain.

Histopathological findings were compared with cytological reports and sensitivity, specificity; predictive values and accuracy of FNACwere calculated taking histopathological diagnosis as gold standard.

Results

The study included 100 patients with nonthyroidal neck swellings. Ten samples were excludedfrom the study as the smears were unsatisfactory. There were 55(55%) male patients and 45 (45%) female patients with male to female ratio of 1.22:1. Age range varied from 2 months to 12 years with the mean age of 5.5 years. The distribution of the various non-thyroidalneckmasses was such that the reactive lymphadenopathy formed the main bulk followed by the TB lymphadenitis(Table1).

Table 1- Distribution of diseases in non –thyroidal neck masses on FNAC* (n=90)

Diagnosis of the case	No. of the case	Percentage
Reactive lymphadenitis	38	42.22
Tubercular lymphadenitis	25	27.78
Benign neoplasm	10	11.11
Malignant lymphoma	06	6.67
Branchial cyst	04	4.44
Epidermal cyst	03	3.33
Chronic sialadenitis	02	2.22
Non TB granuloma	02	2.22

* Fine Needle Aspiration Cytology

The benign neoplasms (10 cases) include lipoma(06), cystic hygroma(03) and paraganglioma(01). The malignant neoplasm(06 cases) was composed of Hodgkin'slymphoma (HL)(04) and Non Hodgkin's lymphoma(NHL)(02).
Others were nonTB granulomatous lymphadenetis2(2.22%), chr.sialadenitis 2(2.22%), branchial cyst 4(4.44%) and epidermal cyst 3(3.33%) cases. The correlation of the cytological and histopathological diagnosis was given in Table 2. The diagnostic yield of FNAC for various diseases in our study was given in Table 3.

Table 2- Correlation of FNAC* with biopsy in non-thyroidal neck disease (n=90)

Diseases	True positive	True negative	False positive	False negative	Total
Reactive lymphadenitis	31	05	01	01	38
Tubercular lymphadenitis	19	03	02	01	25
Benign neoplasm	06	02	01	01	10
Malignant lymphoma	03	01	0	02	06
Branchial cyst	02	01	01	0	04
Epidermal cyst	02	01	0	0	03
Chronic sialadenitis	02	0	0	0	02
Non TB granuloma	02	0	0	0	02

* Fine Needle Aspiration Cytology

Table 3- Table of frequency of diseases

FNAC* test result	Biopsy- disease	Biopsy- no disease	Total
Positive	67	05	72
Negative	05	13	18
Total	72	18	90

* Fine Needle Aspiration Cytology

The statistical analysis was done following the conventional methods.Overall sensitivity, specificity; positive predictive value and negative predictive value of FNAC in our cases are 93.06%, 72.22%, 93.06% and 72.22%(Table4).

Table 4- The Diagnosticvalue of FNAC*

Disease	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value
Reactive lymphadenitis	96.88	83.33	96.88	83.33
Tubercular lymphadenitis	95	60	90.48	75
Benign neoplasm	85.71	66.67	85.71	66.67
Malignant lymphoma	60	100	100	33.33
Branchial cyst	100	50	66.67	100
Epidermal cyst	100	100	100	100
Chronic sialadenitis	100	0	100	0
Non TB granuloma	100	0	100	0
	93.06	72.22	93.06	72.22

* Fine Needle Aspiration Cytology

Discussion

Though FNAC is popular in diagnosing superficial as well as deep masses in adults, there are very few reports regarding its use in children, particularly in head-neck masses.Howell reported in his work the increasing application of fine needle aspiration cytology in superficial palpable lesions in the children (6).

The unsatisfactory aspirates have been reported in various studies in the range of 9.3-15% (7) which is close to that observed in our study (11.11%).

The global literature delineates the common paediatric head and neck tumours as lymphomas (59%), rhabdomyosarcomas (13%), thyroid tumours (10%), nasopharyngeal carcinomas (5%), neuroblastomas (5%), non-rhabdomyosarcoma soft-tissue sarcomas (4.5%), salivary gland malignancies (2.5%), and malignant teratoma (1%). The lymph node lesions outnumbered the lesions of the other sites like the results obtained in the previous studies (8). The reactive lymphadenopathy was diagnosed by the presence of mixed population of lymphoid cells along with scattered histiocytes with intracytoplasmic nuclear debris(tangible body macrophages).

We observed a predominance of benign lesions in our study which is similar to the earlier reports(2). Earlier work(9) has shown the predictive value of cytologically malignant FNAC to be only 89.4% whereas in the present series it was 100%. This can be attributed to the type of lesion aspirated and operator technique of sampling from multiple sites, thus improving the chances of aspiratingmalignant cells.

There was one false negative case of TB lymphadenitis. This was due to the fact that sometimes the histiocytes may not have the typical appearance of the epithelioid cells and the case was diagnosed as reactive lymphadenitis with prominent histiocytes. The two false positive TB lymphadenitis cases found in our study were due to non TB granulomaousreaction (one foreign body type and the other fungal infection). We did misinterpretation of one low grade NHLas reactive lymphadenopathy and one HL with reactive histiocytes as granulomatous lymphadenitis.

Avoiding false-positive diagnosis is of obvious importance since therapeutic and surgical decisions are often based exclusively on cytology results.

The overall diagnostic yield of Fine needle aspiration cytology in diagnosis of non-thyroidal neck masses in our study in terms of accuracy, sensitivity, specificity,positive predictive value and negative predictive value are 90%, 90%, 77.42%, 90.41% and 88.89% respectively. This result is comparable to that of the previous studies(10-14).The statistical analysis shows *P* value of >0.05 in all these caseswhich suggests that both Fine needle aspirationcytology and open biopsy have comparable results as the difference between the two methods is not statistically significant.

Limitations of our study included the fact that evaluation of grading of mycobacterial infection on acid-fast bacilli smears was not performed. Because mycobacterial gradingdoes not provide a true guide to treatment, it is infrequently advised by clinicians.

Flow cytometry was not performed in any case, as this modality was unavailable at both the institutions and referral to other centers for cytometric evaluation would have addedto diagnostic delay with more financial burden on patients without any added diagnostic yield.

A sample size of 60 cases with cytologic diagnosis of malignancy is still too small to confirm an important role for FNA in diagnosing pediatric malignancies.

Conclusion

FNAC may be the primary diagnostic tool for the paediatric nonthyroidal neck masses like that of the adults. FNAC, being noninvasive technique, is particularly suitable in this sensitive area where an incisional biopsy may cause problems. FNAC can obviate the need for surgery if the lesion is shown to be non neoplasic. The reactive lymphadenopathy is a very common clinical presentation in paediatric population where surgical excision is not at all indicated as it resolves spontaneously in due course. A preoperative cytological diagnosis of a primary neoplasm may allow more rational planning of surgery. In addition to rapid diagnosis, he tissue samples retrieved from FNAC can be processed for other techniques, such as flow cytometry, cytogenetics,and electron microscopy.

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