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Original Research Article

Cytopathological Evaluation of Paediatric Non-Thyroidal Neck Swelling–Experience in a Tertiary Care Children Hospital

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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. However, until recently, few reports have been obtained regarding the role of FNAC in non-thyroidal neck masses in children. Therefore, the objective of our study was to determine the diagnostic value of fine needle aspiration cytology in the diagnosis of pediatric non-thyroidal neck masses. ***Methods:*** This descriptive study was conducted at the Department of Pathology of Bangladesh Shishu (Children) Hospital & Institute January 2019 to December 2021. Hundred patients with non-thyroidal neck masses fulfilling the inclusion criteria were included in the study. Fine needle aspirations were performed, smears prepared and stained by Hematoxylin and Eosin stain. ***Results:*** The most common non-neoplastic neck swelling seen in children were an enlarged lymph node due to inflammation 38(42.2%), i.e., reactive lymphadenitis. Others were TB lymphadenitis 25 (27.8%), non-TB 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 an important diagnostic tool in the management of childhood neck lesion with the clinical presentation. The procedure decreases the requirement for more invasive and costly procedures like surgical biopsy.

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

INTRODUCTION

The superficial lumps in the head neck region are very common findings in our daily clinical practice. The nature of clinically palpable lumps ranges from 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 head neck

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 non-thyroidal head and neck lesions in children. With increasing cost of medical facilities any technique which reduces the time of the process of diagnosis, limits the physical and psychological trauma to the patient and saves the cost of hospitalization, will be of tremendous value.

MATERIALS AND METHODS

This study was done in the Department of Pathology of Bangladesh Shishu (Children) Hospital & Institute, Dhaka, over a period of three years from January 2019 to December 2021. FNAC was done on children who presented with non-thyroidal neck swelling. Informed consent was taken from every patient before including the cases in our study.

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

FNAC was done using a 23-gauge needle fitted to a 10-cc disposable syringe. The target swelling multiple passes are given to obtain adequate material. Smears were prepared and stained with Hematoxylin and Eosin stain (H & E) and Papanicolaou stain. The Zeihl-Neelsen's stain for AFB was done in those cases, where the clinical suspicious was tuberculosis and, in those cases, where purulent or cheesy material was aspirated. A repeat FNAC was done in cases where the yield was inadequate in the first aspiration. The cytological features evaluated included cellularity (scanty, moderate and high), cell arrangement, nuclear and cytoplasmic characteristics, and background elements. Surgically excised specimens were routinely processed and stained with Hematoxylin and Eosin stain.

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

RESULTS

The study included 100 patients with non-thyroidal neck swellings. Ten (10) samples were excluded from the study as the smears were inadequate. There were 55(55%) male patients and 45 (45%) female patients with male to female ratio of 1.22:1. The age range varied from 2 months to 12 years with the mean age of 5.5 years. The distribution of the various non-thyroidal neck masses 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 non-TB granulomatous lymphadenitis 2 (2.22%), chronic 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 different 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 (n=90)

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%.

DISCUSSION

Though FNAC is popular in diagnosing superficial as well as deep masses in adults, there are 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 (10.0%). The global literature delineates the common pediatric head and neck tumors as lymphomas (59%), rhabdomyosarcomas (13%), thyroid tumors (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 93.06%. This can be attributed to the type of lesion aspirated and operator technique of sampling from multiple sites, thus improving the chances of aspirating malignant cells.

There was one false negative case of TB lymphadenitis. This was due to the histiocytes may not have the typical appearance of the epithelioid cells and the case was diagnosed as reactive lymphadenitis. The two false positive TB lymphadenitis cases found in our study were due to non-TB granulomatous reaction (one foreign body type and the other fungal infection). We did misinterpretation of one low grade NHL as 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 sensitivity, specificity, positive predictive value and negative predictive value are 93.06%, 72.22%, 93.06% and 72.22% 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 cases which suggests that both fine needle aspiration cytology and open biopsy have comparable results as the difference between the two methods is not statistically significant. A sample size of cytological 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 non-thyroidal neck masses like that of the adults. FNAC is a noninvasive technique, is particularly suitable in this sensitive area where an incisional biopsy may cause problems as well as complications. FNAC can obviate the need for surgery if the lesion is shown to be non-neoplastic. The reactive lymphadenopathy is a very common clinical presentation in paediatric population where surgical excision is not at all indicated. A preoperative cytological diagnosis of a primary neoplasm may allow rational planning of surgery.

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