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Original Article

Pathology Section

Role of Fine Needle Aspiration Cytology in Head and Neck Lesions of Paediatric Age Group

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ABSTRACT

Context: Fine Needle Aspiration Cytology [FNAC] of the head and neck region is well accepted as a diagnostic procedure. Various studies in the context of FNAC in the head and neck region are available for the adult population, but only few studies are available for the paediatric age group.

Aims: To study the role of fine needle aspiration cytology and its utility in paediatric head and neck lesions.

Settings and Design: This was a hospital based, prospective study.

Methods and Materials: Hundred cases of head and neck lesions of the paediatric age group [0-15 years] were studied for cytomorphology through fine needle aspiration cytology and the results were correlated with the histomorphology.

Results: There was a male predominance in the case distribution among both the sexes in children [55%]. The head and neck lesions were most frequent in the age group of 10-15 years, followed by the age group of 5-10 years than the age group of 0-5 years. Lesions in the cervical lymph nodes constituted 81% of the head and neck lesions and 87% of the adequate smears, followed by those in the skin and subcutaneous tissues [3 cases (3.2%)], the thyroid [4 cases (4.3%)] and the salivary gland [1 case (1%)]. 88.17% cases of head and neck lesions in children were diagnosed as benign on their smears and 11.83% cases were diagnosed as malignant, of which 8 cases of malignant lesions were located in the cervical lymph nodes, 1 case was located in the thyroid and 2 cases of malignant lesions were located in the orbits.

Conclusions: FNAC is an important and a non-invasive, investigational tool in children for identifying and planning the medical management of inflammatory and infectious conditions. It helped us in indicating the diagnosis of the lesions in congenital or aquired malformations, cystic lesions and benign neoplastic lesions, in which surgical management were needed and we got confirmations on histological examinations. For the malignant lesions, FNAC was a more important investigation tool than an accurate investigation tool, which suggested about the lesions and guided us to do more advanced specific investigations for obtaining the diagnosis.

Key Words: Fine Needle Aspiration Cytology [FNAC], Head and neck lesion, Paediatric

INTRODUCTION

Fine Needle Aspiration Cytology (FNAC) is a simple and a rapid diagnostic technique. It is now being considered as a valuable diagnostic aid because of the early availability of results, its simplicity, minimal trauma and the absence of complications. The cytomorphological features collaborate with the histopathology and it has the qualities of a micro-biopsy [1] Ancillary techniques such as flow cytometry, cytogenetics, electron microscopy and cell block preparations with immunocytochemistry can be applied for the characterization of tumours. In addition, their benefits include the lack of sedation or general anaesthesia [2]. For a long time, the application of FNAC was ignored in the Indian and American paediatric literatures. Previous reports have suggested its utility in only a small series of paediatric populations [3-5]. Only few studies which were done on paediatric FNAC have focused exclusively on both the benign and malignant lesions that occur in the regions of the head and neck [6-8]. FNAC of the head and neck region is a generally well-accepted technique that has high specificity [9]. By providing few false-negative diagnosis, the categorization of the lesions into inflammatory/benign and malignant is possible, with a high degree of certainity [10].

Adequacy	Category	Age distribution	Sex distribution	Nature of lesion
Adequate [93%]	Positive [100%]	0-5 years [27%]	Male [55%]	Benign [88.17%]
Inadequate [07%]	Negative [0%]	5-10 years [36%]	Female [45%]	Malignant [11.83%]
		10- 15 years [37%]		

[Table/Fig-1]: Results of FNAC of head and neck lesion of children

S. no	Site	Adequate Cases	Benign	%	Malignant	%
1.	Lymph node	81	73	91	8	9
2.	Thyroid gland	4	3	75	1	25
3.	Salivary Gland	1	1	100	0	0
4.	Eyelid and orbit	2	0	0	2	100
5	Misc.	5	5	100	0	0
	Total	**93**	**82**		**11**	

[Table/Fig-2]: Distribution of benign and malignant lesions in different organs

With the increasing costs of medical facilities, any technique which speeds up the process of the diagnosis and limits the physical/psychological trauma to the patients, will be of tremendous value. FNAC helps the surgeons in selecting, guiding and modifying the surgical planning in patients who require surgeries or a general clinical management such as the need of an antibiotic treatment and or a neoadjuvent chemotherapy. The present study was designed to study the role of fine needle aspiration cytology and its utility in paediatric head and neck lesions. It also specifies the spectra of the head and neck lesions in the paediatric age group and correlates the cytomorphological features with the histomorphological findings, whenever they are available.

SUBJECTS AND METHODS

The present study was performed in the Department of Pathology, in a tertiary care centre of northern India, on 100 children who were in the age group of 0-15 years, who presented with head and neck lesions, after getting the approval of the ethical committee of the institution, between 01/2/2009 to 30/11/2010 and also with the consent of their parents. A brief clinical history of the patients was taken and examinations of the lesions were done. The patients were placed in comfortable and the most suitable positions. The swellings were made prominent, they were cleaned with 70% isopropyl alcohol and they were aspirated aseptically. Smears were prepared from the materials which were aspirated in the syringes and they were spread over clean glass slides and fixed for staining.

The following staining methods were used

1. May-Grunwald-Giemsa Staining [11].
2. Papanicolaou Staining [11].
3. Ziehl-Neelson Staining [11].

Lymph node	No. 81	Thyroid	No. 04	Salivary Gland	No.01	Eyelid and Orbit	No. 02	Miscellaneous 05	No
Reactive hyperplasia	31	Hashimoto's thyroiditis	01	Pleomorphic Adenoma	01	Embryonal RMS	01	Epidermal inclusion cyst	02
Granulomatous lymphadenitis [with or without caseation]	23	Lingual thyroid	01			Small blue round cell tumor	01	Muscle fibromatosis coli	01
Necrosis and pus	17	Thyroglossal duct cyst	01					Hemangioma	01
Purulent aspirate with coccal aggregates	02	Papillary carcinoma of thyroid	01					Lymphangioma	01
Langerhans cell histiocytosis	01								
Hodgkin's lymphoma	03								
Non-Hodgkin's lymphoma	02								
Leukemic infiltrate	01								
Metastatic tumor in lymph node [RMS]	01								

[Table/Fig-3]: Cytomorphological diagnosis of lesion

S. No.	Diagnosis	No. of cases	Percentage
Benign lymph node lesions			
1.	Reactive follicular hyperplasia	31	42%
2.	Tubercular lymphadenitis	40	55%
3.	Suppurative bacterial lymphadenitis	02	03%
Total		**73**	**100%**
Malignant lymph node lesions			
1.	Hodgkin's lymphoma	3	37.5%
2.	Non –Hodgkin's lymphoma	2	25%
3	Acute leukemic infilterate	1	12.5%
4.	Metastasis from distant organs	1	12.5%
5.	Langerhans cell histiocytosis	1	12.5%
Total		**8**	**100%**

[Table/Fig-4]: Cytomorphological type in lymph node

S. No.	Organ	Diagnosis	No. of cases	%age
1	Lymph node	Hodgkin's lymphoma	3	28%
2	Lymph node	Non-Hodgkins lymphoma	2	18%
3.	Lymph node	Acute leukemic infiltrate	1	9%
4.	Lymph node	Metastasis from distant organ	1	9%
5.	Lymph node	Langerhans cell histiocytosis	1	9%
6.	Thyroid	Papillary carcinoma	1	9%
7.	Orbit	Embryonal rhabdomyo-sarcoma	1	9%
8.	Orbit	Small round blue cell tumor	1	9%
Total			**11**	**100%**

[Table/Fig-5]: Site and cytomorphological type in malignant lesions

	Amy Rapackwiz et al., [2]	M Jain et al., [12]	H.Mohan et al., [13]	Present study
Study Topics	Spectrum of head and neck lesions diagnosed by fine-needle aspiration cytology in the pediatric population	FNAC as diagnostic tool in pediatric head and neck lesions	Role of FNAC in paediatric lymphadenopathy	Role of FNAC in head & neck lesions of pediatric age group
Total no.of cases	85 cases	748 cases	692 cases [584 cervical lymph nodes]	100
Age group	0-18 years	0-12 years	0-14 years	0-15
Adequacy of material		94%	93.4%	93%
Age predominance			6-10 years	10-15 years
Sex predominance	Male [69.4%]		Male :female ratio 1.5: 1	Male 55%
Most common site of lesion	Lymph node cervical 69.4%	Lymph node cervical 81%	Lymph node cervical 84.3%	Lymph node cervical 87%
Other sites of lesions				
Skin & subcut. tissue				2.1%
Miscellaneous [cystic & soft tissue]	16 Case [Also in Bone]	7.6%		03.2%
Thyroid		3.2%		04.3%
Salivary gland	2cases	2.1%		01%%
Orbital nd eye lid		0.2%		02.1%
Nature of Lesion Benign	83%	98.5%	98.46%	88.17%
Malignant	17%	1.5%	1.54%	11.83%

[Table/Fig-6]: Comparative Study of FNAC From Similar Previous Studies

Studies By	Amy Rapackwiz et al., [2]	M Jain et al., [12]	H.Mohan et al., [13]	Present study
Lymph node lesions	91% of total lesion	81% of total	84.3% cervical	87%
Reactive Lymphoid hyperplasia	66%	60.6%	63%	42%
Granulomatous/tubercular lymphadenitis	15%	30.5%	25%	55%
Acute lymphadenitis	10.1%	7.1%	6%	02%
Hodgkin's lymphoma	2case	[2case]	4case	03%
Non Hodgkin's lymphoma	3case	0.8% [5case]	2case	02% [2case]
Langerhans cell histiocytosis	5cases [in bone also]		1case	1.2%[1case]
Leukemic infiltrates		0.6%[4case]	1case[ALL]	1 case
Metastatic lesions	02cases[SRBT & PTC]		02Case	1case[RMS]

[Table/Fig-7]: Comparison of Studies of Lymph Nodes of Head & Neck Lesions of Children

Study	Amy Rapackwiz et al., [2]	M Jain et al., [12]	Present study
Skin & subcut. tissue	*lymphangioma*haemangioma *lipoblastoma	*Epidermal inclusion cyst *dermoid cyst *infected sebaceous cyst *chronic inflammations	2.1% *Epidermal inclusion cyst
Miscellaneous [cystic & soft tissue]	16 Case [Also In Bone] *langrhans cell histiocytosis *benign myxoid lesion *Spindle cell proliferation *osteosarcoma *Benign cystic teretoma	7.6% *Muscle fibromatosis coli *vascular hammartoma *lymphangioma *fibroma *neurofibroma	03.2% * Muscle fibromatosis coli *Hemangioma *lymphangioma
Thyroid	1case of Papillary Carcinoma of Thyroid metastasis	3.2% total *Euthyroid colloid goiter [12case] *Thyroglossal duct cyst[11case] *Thyroid cyst [1case]	04.3% Total *Hashimoto's Thyroiditis [01case] *Lingual thyroid [01 case] * Thyroglossal duct cyst [01case] * Papillary carcinoma of thyroid [01case]
Salivary gland	2cases *Pleomorphic adenoma [1case] *Mucoepidermoid carcinoma[1case]	2.1%[total 15 cases] *Chronic sialadenitis [4 cases] * Mucus retention cyst [6 cases] *Pleomorphicadenoma [3cases] * Acute abscess[1case] *Normal [1 case]	01% of total *Pleomorphic adenoma [1case]
Orbital and eyelid	--	0.2%* Tubercular abcess [2case]	02.1% *Embryonal RMS[1case] * Small blue round cell tumor[1case]

[Table/Fig-8]: Comparative of Previous Studies in Head & Neck Lesions of Children

RESULTS

A total of 100 cases of head and neck lesions from patients who were in the age group of 0-15 years were studied through fine needle aspiration cytology smear examinations. The results have been described in [Table/Fig-1,2,3,4,5,6,7 & 8].

DISCUSSION

The head and neck lesions in children are mostly benign in nature, with a small percentage of malignant lesions which usually present as head and neck masses. A majority of the head and neck masses in children are inflammatory in nature, but other aetiologies include congenital, inflammatory, and euplastic lesions. A persistent adenopathy raises more concerns; especially the enlarged lymph nodes within the posterior triangle or the 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 a concern for malignancy [14]. Neoplasms of the head and neck region account for approximately 5% of all the childhood neoplasms of the head and neck [7]. 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%)[15].

The most common sites for the occurrence of head and neck masses in the paediatric age group in our study were the lymph nodes, which were mostly inflammatory in nature [reactive hyperplasia and tubercular lymphadenitis]. The other sites of the lesions were the thyroid, the soft tissues and subcutaneous tissues , the eyelids and the orbits and the salivary gland . Our study yielded results which were similiar to those of previous studies which were done on role of FNAC in the diagnoses of head and neck lesions of children.

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