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Original Research Article

Diagnostic utility of fine needle aspiration cytology in pediatric age group in a tertiary care centre

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ABSTRACT

Background: Fine Needle Aspiration Cytology (FNAC) is a simple, cost effective, minimal invasive and a rapid diagnostic technique. The present study was designed to study the role of fine needle aspiration cytology and its utility in paediatric lesions. It also specifies the spectra of different lesions in the paediatric age group.
Methods: The present study was performed in the Department of Pathology, in a tertiary care centre of Jammu, Jammu and Kashmir, India. All pediatric patients aged 0-17 years with palpable or deep-seated lesions were included in the study over a period extending from January 2017 to December 2018. The aim was to study the utility of FNAC in paediatric age group.
Results: A total of 200 cases of FNAC in pediatric age group were studied. Out of total 200 cases maximum number of patients i.e. 59% were between 11-17 years. Male to female ratio was 1.7:1. A preponderance of lymph nodes over other sites i.e. 129/200 (64.5%) was noted.
Conclusions: FNAC is a safe, rapid, accurate and cost-effective procedure with good patient acceptance with no essential morbidity and can be used as an initial screening tool in superficial and deep-seated lesions in pediatric age group.

Keywords: Benign, Cytology, Inflammatory, Lymph node, Malignant, Pediatric

INTRODUCTION

Fine Needle Aspiration Cytology (FNAC) is a simple, cost effective, minimal invasive 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.[1]

In view of increasing costs of medical facilities, FNAC is a technique which reduces the time of diagnosis and limits the finacial and psychological trauma to the patients. It has tremendous value. FNAC helps the clinicians to select right plan of treatment whether the patients require surgery or a general clinical management such as the need of an antibiotic treatment and or a neo-adjuvent chemotherapy.

The present study was designed to study the role of fine needle aspiration cytology, spectra of different lesions and its utility in paediatric lesions as it was ignored in the Indian and American paediatric literatures over a long

period of time. Previous reports have suggested its utility in only a small series of paediatric populations.[2-4]

METHODS

This prospective study was performed in the Department of Pathology, in a tertiary care centre of Jammu, Jammu and Kashmir, India. All pediatric patients aged 0-17 years with palpable or deep-seated lesions were included in the study over a period extending from January 2017 to December 2018. The cases included both inpatients and outpatients referred to the cytology section at our hospital. After obtaining consent from parent or guardian, routine FNAC procedure was done using 21-24-gauge needle attached to 10 ml syringe by a cyto-pathologist. Wet fixed smears in absolute alcohol were stained by Papanicolau stain and air-dried smears were stained with May Grunwald-Geimsa stain. Special stains were done wherever necessary. Uncooperative children and very deep-seated lesions near major vessels were excluded from the study.

For data analysis, author used Statistical Package for the Social Sciences (SPSS) version 10. Age, gender, site of FNAC and cytomorphological patterns were expressed as frequency and percentage.

RESULTS

A total of 200 cases of FNAC in pediatric age group were studied. The age range we have included was 0-17 years and we have subdivided this age range into two groups 0-10 years and 11-17 years. Out of total 200 cases maximum number of patients i.e. 59% were between 11-17 years. Male to female ratio was 1.7:1 (Table 1).

Table 1: Age group of patients.

Age in years	No. of cases	Percentage
0-10	82	41%
11-17	118	59%
Total	200	100%

A subdivision of FNA according to anatomic site revealed a preponderance of lymph nodes over other sites i.e. 129/200 (64.5%). Table 2 demonstrate distribution of cases according to site of FNAC.

Table 2: Site of FNAC.

Site	No. of cases	Percentage
Lymph node	129	64.5%
Salivary gland	13	6.5%
Breast	09	4.5%
Thyroid	07	3.5%
Bone and soft tissues	02	1%
*Miscellaneous	40	20%

Miscellaneous lesions included ganglion, epidermal inclusion cyst, thyroglossal cyst, lipoma, benign cyst and hemangioma as they all were in different sites.

Table 3: FNAC diagnosis in lymph node.

Diagnosis	No. of cases
Nonspecific reactive lymphadenitis	78
Granulomatous lymphadenitis	20
Suppuartive lymphadenitis	18
Tuberculous lymphadenitis	11
Hodgkin lymphoma	01
Non-Hodgkin lymphoma	01

Table 3 depicts the various lesions diagnosed in lymph node. Most common diagnosis was nonspecific reactive lymphadenitis 78 cases followed by granulomatous lymphadenitis 20 cases, suppurative lymphadenitis 18 cases, tuberculous lymphadenitis 11 cases, Hodgkin lymphoma and non-Hodgkin lymphoma 1 case each.

Table 4: FNAC diagnosis in salivary gland, breast and thyroid.

Site	Diagnosis	No. of cases
Salivary gland	Sialadenitis	09
	Parotiditis	02
	Pilomatricoma	02
Breast	Fibroadenoma	09
Thyroid	Thyroglossal cyst	03
	Autoimmune thyroiditis	02
	Lymphocytic thyroiditis	01
	Colloid goitre	01

Table 4 demonstrates various diagnosis made in salivary gland, breast and thyroid. Most common was sialadenitis 09 cases, followed by parotiditis and pilomatricoma 02 cases each in salivary gland. In breast only diagnosis made was fibroadenoma comprising of 9 cases only. Most common diagnosis in thyroid was thyroglossal cyst 03 cases, followed by 02 cases of autoimmune thyroiditis, Lymphocytic thyroiditis and colloid goitre 01 case each.

Table 5 depicts the categorization of cases into inflammatory and neoplastic lesions at different sites.

An aspirate of a 7-year-old male child from lymph node showing a well-formed epithelioid cell granuloma in a hemorrhagic background (Figure 1) (MGG, 40X).

An aspirate of a 14-year-old male child from lymph node having monomorphous lymphoid population diagnosed as Non-Hodgkin lymphoma (Figure 2) (MGG, 40X).

An aspirate of a 15-year-old male child from soft tissue overlying bone having bimodal population of cells in Figure 3 diagnosed as Ewings Sarcoma (MGG, 40X).

Table 5: Categorization of cases into inflammatory and neoplastic lesions.

Site		Inflammatory		Neoplastic		Total
		Specific	Non-specific	Benign	Malignant	
Head and neck	Lymph node	37	75		1	113
	Salivary gland	10		3		13
	Thyroid	3		4		7
	Eye lid	1				1
	Scalp	2				2
	Preauricular	4				4
	Occipital	2		1		3
	Gabella	1				1
	Cheek	4		1		5
	Nape of neck	2				2
	Scapula			3		3
Thorax and chest wall	Chest wall	1		3		4
	Breast			9		9
Bone and soft tissue	Soft tissue				1	1
	Bone			1		1
Lymph Node	Ingunial	1	2		1	4
	Axillary	10	1	1		12
Extremities	Upper limb	5		2		7
	Lower limb	5		3		8
Total		88	78	31	3	200

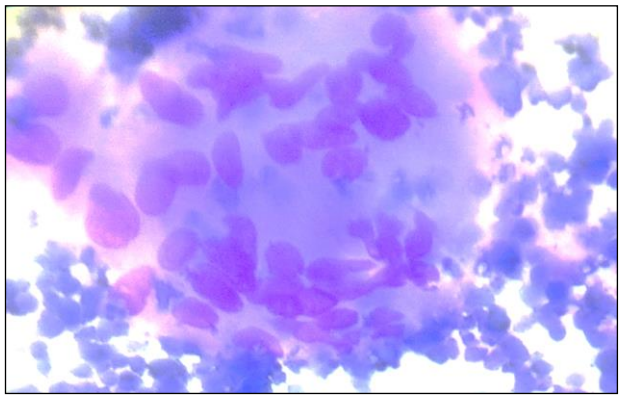

Figure 1: Epithelioid cell granuloma (MGG, 40X).

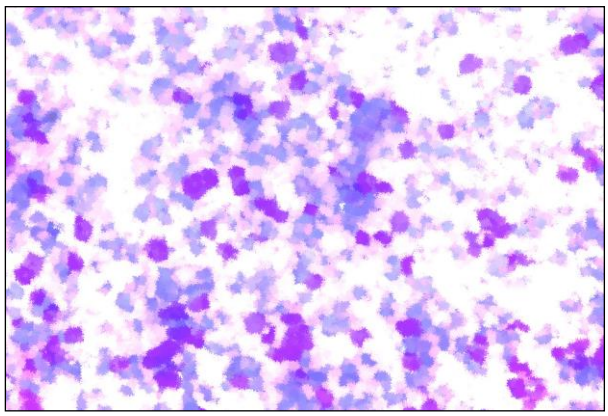

Figure 2: Non-Hodgkin lymphoma (MGG, 40X).

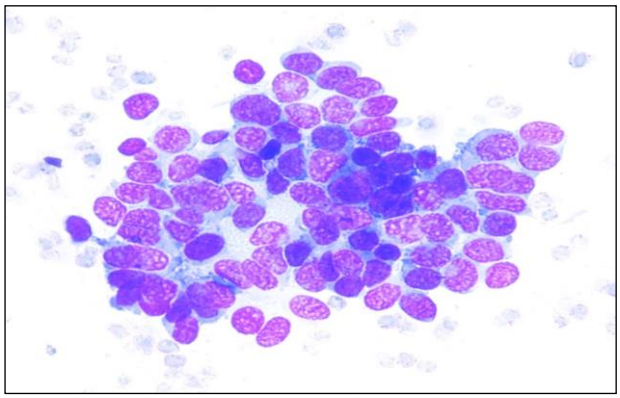

Figure 3: Ewings sarcoma (MGG, 40X).

DISCUSSION

Fine needle aspiration cytology began to flourish in the 1950s and 1960s in Europe.[5-7] FNAC is used as an initial diagnostic tool in evaluating different lesions in adult patients. However, FNAC was used in few pediatric cases possibly due to diagnostic technique of low morbidity and mortality but high accuracy and rapidity.[2] The FNAC specimen in present study was from various sites and includes a wide range of cytological diagnosis. The clinical value of FNAC is not only limited to neoplastic conditions, it is also valuable in the diagnosis of inflammatory, infectious and degenerative lesions.[8] In the last few years, FNAC has emerged as a reliable diagnostic procedure in the paediatric age group, thus

obviating the need for excision biopsy.[9,10] In this study maximum number of patients 59% were in the age group of 11-17 years, male preponderance was observed with a male to female ratio of 1.7:1. In study by Maheshwari et al, majority of cases 40.82% were in the age group of 11-14 years, male dominated the study population (66.7%) with M:F being 2:1.[11]

The commonest site for FNAC was lymph node accounting for 64.5% cases. Out of all the lymph nodes cervical group of nodes were most commonly involved. These results were comparable with the studies by Prathima S et al, (48.3%) cases and Shonubi et al, (70%) cases.[12,13] The commonest cytopathological diagnosis among the lymph node was nonspecific reactive lymphadenitis 60%, followed by granulomatous lymphadenitis 15.5%, suppurative lymphadenitis 14% and tuberculous lymphadenitis 8.5%.

In study by Sawaimul KD et al, the commonest finding among cervical lymph node lesions was reactive lymphadenitis in 44.39% (95/214), followed by tubercular lymphadenitis 6.07% (13/214), granulomatous lymphadenitis 5.60% (12/214), acute suppurative lymphadenitis 4.67% (10/214), and necrotizing lymphadenitis in 4.2% (09/214) and in a study by Prathima S et al, among cervical lymph node lesions, maximum cases were of reactive lymphadenitis 65.2% (103/158), followed by acute suppurative lymphadenitis 12.6% (20/158), granulomatous lymphadenitis 10.7% (17/158), and tubercular lymphadenitis 10.1% (16/158).[12,14] Present study results were also comparable with study by Annam et al.[15]

Tuberculosis is still one of the leading causes of cervical lymphadenopathy in India. Diagnosis of tuberculosis in lymph nodes can be established by demonstrating acid fast bacilli in FNA smears with Ziehl-Neelsen stain or Auramine-rhodamine stain, mycobacterial culture or by amplification of bacterial DNA by polymerase chain reaction. But, the cost, time required, and frequent negative results are important limitations.[16]

In thyroid, out of total 7 cases, there were 43% (3/7) cases of thyroglossal cyst, 28.6% (2/7) cases of autoimmune thyroiditis and 14.3% (1/7) cases each of lymphocytic thyroiditis and colloid goitre. These results were in accordance with findings by Prathima S et al, in which 38.7% (19/49) cases were diagnosed as colloid goitre, followed by 22.4% (11/49) cases of lymphocytic thyroiditis and 14.2% (7/49) cases of thyroglossal duct cyst.[12]

Fibroadenoma formed the majority among benign tumors in this study a total of 9 cases. Similar results observed in studies by Sawaimul KD et al, and Prathima et al.[12,14]

The malignant group was formed by lymphomas and round cell tumor. There was one case each of Hodgkin lymphoma, non-Hodgkin lymphoma and Ewing's sarcoma. This result was in concordance with study by Prathima S et al, in which there were two cases each of Hodgkin lymphoma and non-Hodgkin lymphoma.[12] FNAC is a safe, rapid, accurate and cost-effective procedure with good patient acceptance with no essential morbidity and can be used as an initial screening tool in superficial and deep-seated lesions in pediatric age group. From our study it was evident that there was widespread use of FNAC in children with enlarged lymph nodes. Most of them were reactive lymph nodes which does not need further investigation. It is also useful and best screening method in the diagnosis of tubercular lymph nodes. FNAC has helped to avoid unnecessary excision biopsy and its complications.

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