

The Role of Fine Needle Aspiration Cytology in the Diagnosis of Tissue Masses in Children

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Summary

Thomas J, Adeyi AO, Olu-Eddo AO, Nwachokor N. The role of fine Needle Aspiration Cytology in the Diagnosis of Tissue Masses in Children. *Nigerian Journal of Paediatrics* 2000; 27:6. Our experience with the use of fine needle aspiration (FNA) cytology in the diagnosis of various solid tissue masses in 87 children aged 15 months to 14 years at the University College Hospital, Ibadan, over a period of three years, is reviewed. Most aspirates were obtained from lymph nodes and jaw masses, constituting 51.8 percent and 16.5 percent, respectively. Tuberculous adenitis accounted for 24.7 percent of the aspirated lesions while Burkitt's lymphoma was the commonest malignancy diagnosed, accounting for 20 percent of cases. Other malignancies diagnosed by the method included retinoblastoma (8.3 percent) and rhabdomyosarcoma (4.7 percent). The procedure provided definitive diagnosis in 70 percent of cases, thereby obviating the need for subsequent incisional biopsies.

Introduction

FINE needle aspiration (FNA) cytology has been shown to be a minimally invasive and cheap technique for accurate diagnosis of both neoplastic and non-neoplastic lesions worldwide.^{1,2} In children, this technique has proved especially valuable in the assessment and management of tumours.^{3,4} In our centre, cancer accounts for 8.7 percent of childhood deaths, Burkitt's lymphoma (BL), retinoblastoma and rhabdomyosarcoma are the commonest childhood tumours.⁵ The overwhelming majority of these childhood cancers are composed of relatively undifferentiated round cells which are often difficult to characterize precisely on the basis

of histomorphology. However, the cytomorphology of BL, which is the commonest childhood tumour in Ibadan has been well described.¹ Prompt and accurate diagnosis are often required to distinguish these tumours so that appropriate therapy can be effected with minimal delay. Importantly, tuberculosis is the commonest infective cause of biopsied enlarged lymph node in childhood in University College Hospital (UCH),⁶ therefore this treatable infective condition must also be differentiated from these neoplastic conditions.

In most developing countries, the cost and availability of health care services which are largely borne by the patients, and long operation lists, often constitute major constraints in the investigation and management of patients. Consequently, the long wait for, and relatively high cost of surgical biopsy often delay diagnosis and appropriate management. Fine needle aspiration has therefore, become a useful adjunct to clinical assessment in patient manage-

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ment in our centre. This report reviews our experience with FNA in the diagnosis of palpable masses in childhood since the inception of the FNA at the UCH, Ibadan.

Materials and Methods

All aspirates taken from palpable tissue masses in patients aged 0-14 years, between May 1995 and December, 1997 in the Department of Pathology were reviewed. The patients were seen at the FNA clinic or in the wards and aspirates were carried out by consultant pathologist or pathology residents. Aspirations were carried out, using 21 or 22 gauge needles with 5 or 10ml disposable plastic syringes. The skin was cleaned with spirit and the mass stabilized with the free hand. Holding the syringe by the barrel, the needle was pushed into the mass until the needle tip was at the centre, whilst the plunger was partially withdrawn to create a negative pressure. The needle was moved in

and out within the lump, without withdrawing it from the node. The negative pressure sucked cells into the needle bore. Whilst still in the node the pull on the syringe plunger was released, the syringe and needle were withdrawn from the mass through the skin. The needle was then removed from the barrel; the syringe filled with air and the needle replaced. The content of the needle bore was blown on to the glass slide by pressing the plunger. Aspirated materials placed on standard microscope slides, were thinly smeared, air-dried or fixed in 95% alcohol for Giemsa and Papanicolaou stains respectively. The age, sex, clinical assessment and nature of the mass, quality or content of aspirates were noted.

The smears were cytologically classified, depending on the site and nature of mass, into benign, inflammatory or malignant. Attempts were made to subclassify the malignant cases into lymphoma, sarcoma, carcinoma or undifferen-

Table I
Age Distribution and FNA Cytological Diagnosis in 85 Children

Diagnoses	Age (Yrs)					Total	Percent
	0-1	2-4	5-9	10-11	12-14		
Tuberculous adenitis	2	6	6	3	4	21	24.8
Reactive adenitis	-	5	5	2	5	17	20.0
Burkitt's lymphoma	-	1	11	2	3	17	20.0
Retinoblastoma	-	6	1	-	-	7	8.2
Non-Hodgkin's (non-Burkitt's) Lymphoma	-	-	3	-	3	6	7.1
Rhabdomyosarcoma	-	1	-	2	1	4	4.7
Benign soft tissue lesions	1	1	-	1	1	3	3.5
Undifferentiated small cell tumour	-	-	-	2	-	2	2.3
Benign breast lesion	-	-	-	1	1	2	2.3
Sialadenitis	-	-	2	-	-	2	2.3
Salivary gland adenoma	-	-	-	-	1	1	1.2
Thyroid follicular lesion	-	-	-	-	1	1	1.2
Inflammatory abdominal lesion	-	1	-	-	-	1	1.2
Unsatisfactory smear	1	-	-	-	-	1	1.2
Total	3	21	28	13	20	85	100.0

tiated tumour. These results were correlated with subsequent histology, clinical progression or therapeutic response.

Results

Aspirations were carried out in 85 children during the review period. Fifty four (63.5 percent) of the 85 children were male and 31 females with male female ratio of 1.7:1. The youngest patient was aged 15 months. Table I details the age-group distribution against the cytological diagnoses of tissues obtained from various sites.

Most aspirates were obtained from the lymph nodes and jaw swellings, constituting 51.9 per-

cent and 16.5 percent of cases respectively (Table II). The commonest diagnosis was tuberculous adenitis, accounting for 24.8 percent of all lesions (Tables I & II). The commonest malignancy was BL which accounted for 20 percent of cases (Table I). Of the 17 cases of BL, 13 were from the jaws, three from abdominal masses and one from the breast. All the six non-Hodgkin's (non-Burkitt's) lymphomas were from peripheral lymph nodes. Specific definitive diagnosis of two cases of soft tissue aspiration could not be made and both were considered undifferentiated small cell tumour of childhood.

Altogether, definitive diagnoses were made with FNA in 60 cases (70.5 percent). Further-

Table II
Tissues aspirated by Fine Needle and Cytological Diagnoses made in 85 Children

Tissues/Diagnoses	No of Cases	Percent of Total
Lymph node	44	51.9
Tuberculosis	21	24.8
Reactive	17	20.0
Non-Hodgkin's (non-Burkitt's) lymphoma	6	7.1
Jaw	14	16.5
Burkitt's lymphoma	13	15.3
Undifferentiated tumour	1	1.2
Orbit	9	10.5
Retinoblastoma	7	8.2
Rhabdomyosarcoma	2	2.3
Soft tissue	7	8.2
Benign lesion	3	3.5
Rhabdomyosarcoma	2	2.3
Undifferentiated small cell tumour	1	1.2
Unsatisfactory	1	1.2
Intra-abdominal lesion	4	4.7
Burkitt's lymphoma	3	3.5
Inflammatory	1	1.2
Salivary gland	3	3.5
Pleomorphic adenoma	1	1.2
Sialadenitis	2	2.3
Breast	3	3.5
Benign ductal lesion	2	2.3
Burkitt's lymphoma	1	1.2
Thyroid	1	1.2
Follicular lesion	1	1.2
Total	85	100.0

more, FNA obviated the need for subsequent incisional biopsy in six others (7.1 percent). In the remaining 19 cases (22.4 percent) which included 17 cases of reactive lymphadenitis, it was recommended that either repeat aspiration or biopsy be done depending on further clinical assessment and judgement.

In general, there was no significant complication though the children were often apprehensive or crying.

Discussion

Fine needle aspiration cytology has proved to be very useful in the diagnosis and therapeutic management of a variety of neoplastic and inflammatory conditions. It is extremely cost effective, relatively painless, cheap and associated with minimal morbidity. In addition, the procedure can be done and repeated as often as required even in the outpatient clinic. It obviates the need for anaesthesia and surgical procedures. These characteristics are very advantageous particularly in the paediatric age group in which a quick diagnosis is often essential and hospital admission for operative surgical biopsy often involves both mother and child. The minimal invasiveness and minor discomfort associated with the procedure are also unlikely to cause much emotional trauma or physical morbidity, unlike what may occur in children subjected to operative biopsies and hospitalisation. Furthermore, the possible complication of tumour dissemination along the needle track, often feared with trucut biopsy, is more theoretical than real as the needle bore is comparatively small.

The usefulness of FNA in the diagnosis of tumours has been reported previously.⁷ The common cytologically diagnosed tumours are BL, retinoblastoma and rhabdomyosarcoma which are the commonest childhood tumours in Ibadan.⁵ These tumours often occur in sites accessible for FNA. In most instances, patients with malignant lesions present in very late stages and FNA has proven useful in the confirmation

of clinical impression, by providing tissue diagnosis with minimal trauma and no surgical incision of the main tumour mass. What is more, FNA can distinguish BL in the retro-orbital or jaw areas from the common tumours that also affect similar sites, by their considerably variable cellular and nuclear sizes and shapes. Rhabdomyosarcoma cells are often in singles with spindle or carrot-shaped forms present, while retinoblastoma cells in smears, often display the rosette arrangement, and oval to carrot-shaped nuclei which differentiate them from the more uniform round lymphoblasts of BL.

Tuberculosis was the commonest diagnosis made in this series, particularly from lymph node aspirates. Since early treatment of this potentially serious infection can prevent its further dissemination, it is crucial that it should be distinguished from lymphoma which also causes lymphadenopathy in children.⁶ Surgical incision of tuberculous nodes is not usually advocated because it is liable to be complicated by delayed wound healing and persistent discharging sinuses; these do not occur with FNA. No specific lymphadenitis as a cause of lymphadenopathy can be excluded by FNAC. Since it is possible that some cases of reactive lymphoid hyperplasia can be misdiagnosed as lymphoma or vice-versa,⁸ repeat aspirates or lymph node biopsy can be done only in those in which it is clinically indicated, thus reducing unnecessary biopsies. The use of the FNA involved various sites in this study, including palpable abdominal masses, soft tissue, salivary gland and thyroid masses. Importantly, inflammatory conditions of any site can be differentiated in these children and appropriate therapeutic agents given.

The practice of examining the lesions and masses personally by the pathologist at aspiration, has greatly enhanced the diagnostic accuracy of FNA in childhood. With increasing experience, it has been possible to make confident diagnosis of many of these lesions. Despite this however, ancillary investigations or tissue biopsy are recommended in equivocal or difficult cases.

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