A preliminary report of fine-needle aspiration biopsy in superficially accessible lesions in children

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Summary

Background: **Fine-Needle Aspiration Biopsy (FNAB) is a diagnostic technique which has achieved widespread use and acceptance. Its clinical use has continued to widen with the availability of more sophisticated methods of imaging. Its minimal invasiveness, cheap cost and easy application make it a technique of choice in investigating swellings even in children.**

Aims and objectives: **To investigate the reliability, safety and diagnostic value of FNAB in superficial masses including lymph nodes in children.**

Patients and methods: **Superficial masses and lymph nodes of twenty consecutive children aged 2-13years were subjected to FNAB. Open biopsies were also performed on them to validate the FNAB. All specimens were subjected to examination by a cytopathologist and a histopathologist.**

Results: **Nine of the patients (45%) had malignant diseases (lymphoma and osteosarcoma); seven had tuberculous lymphadenopathy while four had reactive lymphadenitis. Open biopsies corroborated these findings. There were no false-negative or false-positive cytology results from aspirates. There were no complications related to the procedures.**

Conclusion: **Fine-needle aspiration biopsy is a reliable, safe, less invasive and relatively cheaper alternative method of establishing a pathologic diagnosis, compared to open biopsy, in children.**

Key words: ***Cytology, Children, Fine needle aspiration biopsy.***

Résumé

Introduction:- La Biopsie d'aspiration d l'aiguille fine 'Fine-Needle aspiration Biopsy' (FNAB) est une technique diagnostique l'utisation et acceptabilité de laquelle est largement repandue. Son utilization clinique continue à s'elargir avec la disponibilité de la méthode d'imagerie médicale plus sophistiquée. Sa nature invasive minimale, du bon marché et application facile donnent à cette technique de choix dans le diagnostic de la tumefaction même chez des enfants.

Buts et Objectifs:- Etudier la fiabilité, le sans danger et la valeur diagnostique de FNAB dans des masses superficielle y compris ganglion lymphatique chez des enfants.

Patients et Méthodes:- Des masses superficielles et des ganglions lymphatiques de vignt enfants consécutifs âgés 2 - 13 ans ant subi la FNAB. On avait également opéré les biopsies couvertes chez des patients afin de confirmer la FNAB. Tous les spécimens ont été exposés a l'examen par un cytopathologiste et un histopathologiste.

Résultats:- Neuf d'entre les patients soit 45% étaient atteints des maladies malignes (lymphoma et ostéosarcome); sept atteints de la lymphadenopathie réactive tandis que quatre atteints de la tuberculose lymphadenite. Des biopsies ouvertes ont confirmé ces résultats. Il n'y avait pas de résultats cytologique fausse positive ou fausse négative à partir des aspirers. Il n' y avait aucune complication liée aux protocols.

Conclusion:- La biopsie de l'aspiration d'aiguille fine est fiable, sans danger, moins invasive et relativement du tres bon marché un autre méthode de confirmer un diagnostic pathologique par rapport a la biopsie ouverte chez des enfants.

Introduction

The report in 1904 by Greig and Gray[1] on the use of needle aspiration biopsy of a lymph node to diagnose trypanosomiasis opened the frontier in the application and evaluation of Fine-Needle Aspiration Biopsy (FNAB) as a diagnostic technique. Consequent on this, in 1921 Guthrie[2] emerged as the first to correlate aspiration cytology of lymph nodes with both benign and malignant disease states. However, the first reported clinical application of needle aspiration biopsy in the surgical literature was by Martin and Ellis[3,4]. The early attempts were mostly performed with large bore needles (12 to 18 gauge, OD 1.2 to 2.6mm) and thus had many complications[5,6].

The introduction of fine needle (22 to 25 gauge, OD 0.4 to 0.7mm) for aspiration, the widespread use of more sophisticated and accurate methods of imaging (such as ultrasound, fluoroscopy, CT Scan, arteriography, lymphangiography and ERCP) as well as the increasing experience of cytopathologists, have widened the clinical use of fine needle aspiration biopsy[6]. It is now possible to precisely locate and aspirate lesions deep within body cavities with ease, safety and cytologic accuracy in excess of 90%[5]. Tumour cells tend to be less cohesive than normal cells, thus it is often easy to harvest enough diagnostic droplets from most neoplastic lesions[7]. In benign lesions, however it is sometimes difficult to obtain enough material for diagnosis[6].

In adults, the diagnostic value of cytology specimen from FNAB of suspected malignant disease has been increasingly recognized[8,9,10]. Furthermore, with an experienced cytopathologist, the technique can be used to accurately diagnose abnormal lymph nodes;[9,10] primary and metastatic malignancies;[11,12] mediastinal and pulmonary malignancies and inflammatory diseases;[13,14] lytic bone lesions;[15] and benign and malignant extremity lesions[6] .

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Though FNAB has not been frequently applied in the clinical diagnosis of disease in children, the few reports in the literature have been very encouraging[5,16,17].

This study was motivated by a desire to assess the reliability, safety and diagnostic value of a less invasive technique as a diagnostic tool in children at the Queen Elizabeth II Hospital, Maseru, Kingdom of Lesotho with inadequate financial resources.

Materials and methods

Twenty children aged between 2 and 13 years had percutaneous FNAB of superficially accessible lesions during a one-year period; November, 2001 to October, 2002. The mean age was 8.4 years. There were twelve females and eight males. All the children were admitted to the Queen Elizabeth II Hospital, Maseru, Kingdom of Lesotho.

The lesions were aspirated directly using a 22-gauge needle under adequate sedation with intravenous papaveretum 0.5 mg/kg body weight and promazine 1mg/kg body weight or trimeprazine 2-4mg/kg body weight. Once the tip of the needle was within the lesion, it was gently moved in and out and rotated slightly while continuous suction was applied to the attached syringe. When aspiration into the needle was completed and the needle withdrawn, the syringe was filled with air and a small droplet of specimen was expelled onto a glass slide. Another glass slide was gently pressed against this droplet and the slides were immediately separated and sprayed with 95% alcohol. After fixation for 15 minutes, the smears were stained by the Papanicoloau technique[6] and the cytopathologist examined individual cells. Where a lymph node was involved, a second set of the specimen was prepared and air-dried. These were stained by the Giemsa stain[18] and examined by the cytopathologist.

Excisional or incisional tissue biopsy specimen of each lesion as appropriate was also taken and fixed in 10% formalin. After fixation, the tissues were processed by paraffin wax technique. The slides were stained with haematoxylin and eosin and were examined by the histopathologist. The cytology and histology results were compared in each patient.

Results

The age, sex, site of lesion and various diagnoses in the twenty patients are as shown in Table 1.

The diagnosis from the cytology of FNAB as presented in Table 2 shows that nine patients (45%) had malignant disease (lymphoma and osteosarcoma), seven (35%) had tuberculous lymphadenopathy while four (20%) had reactive lymphadenitis.

The tissue biopsy obtained at operation confirmed the accuracy of the diagnosis in all the patients. Thus, there were no false-negative or false-positive needle aspirates. No complication was associated with the FNAB. The skill, experience and enthusiasm of the cytopathologist was essential to the success of the technique in this series.

Table 1 Age, Sex, Site distribution and diagnosis

Serial number	Age (year)	Sex	Pre-FNAB diagnosis	Cytology diagnosis	Histology diagnosis
1	2	M	Lt cervical tuberculous lymphadenopathy	Reactive lymphadenopathy	Reactive lymphadenopathy
2	7	M	Rt cervical lymphadenopathy	Tuberculous lymphadenitis	Tuberculous lymphadenitis
3	12	F	Rt neck mass	Hodgkin's lymphoma	Hodgkin's lymphoma
4	7	F	Osteosarcoma Lt femur	Osteosarcoma	Osteosarcoma
5	4	F	Lt cervical tuberculous lymphadenopathy	Tuberculous lymphadenitis	Tuberculous lymphadenitis
6	6	M	Lt cervical lymphadenopathy	Tuberculous lymphadenitis	Tuberculous lymphadenitis
7	5	F	Rt submandibular mass	Non-Hodgkin's lymphoma	Non-Hodgkin's lymphoma
8	10	F	Bilateral cervical lymphadenopathy	Hodgkin's lymphoma	Hodgkin's lymphoma
9	11	M	Osteosarcoma Lt femur	Osteosarcoma	Osteosarcoma
10	6	F	Lt cervical lymphadenopathy	Reactive lymphadenopathy	Reactive lymphadenopathy
11	11	F	Lt cervical lymphadenopathy	Tuberculous lymphadenitis	Tuberculous lymphadenitis
12	11	M	Rt cervical mass	Non-Hodgkin's lymphoma	Non-Hodgkin's lymphoma
13	9	F	Lt cervical mass	Reactive lymphadenopathy	Reactive lymphadenopathy
14	2	F	Lt Submandibular mass	Tuberculous Lymphadenitis	Tuberculous lymphadenitis
15	13	M	Rt cervical mass	Non-Hodgkin's lymphoma	Non-Hodgkin's lymphoma
16	13	F	Rt cervical lymphadenopathy	Non-Hodgkin's lymphoma	Non-Hodgkin's lymphoma
17	6	M	Rt cervical lymphadenopathy	Reactive lymphadenopathy	Reactive lymphadenopathy
18	11	F	Osteosarcoma Lt femur	Osteosarcoma	Osteosarcoma
19	13	F	Lt submandibular mass	Tuberculous lymphadenitis	Tuberculous lymphadenitis
20	9	M	Rt cervical lymphadenopathy	Tuberculous lymphadenitis	Tuberculous lymphadenitis

Table 2 Cytology diagnosis from FNAB

Disease	No of patients	%
Lymphoma	6	30
Osteosarcoma	3	15
Tuberculous lymphadenitis	7	35
Reactive lymphadenopathy	4	20
Total	20	100

Discussion

The diagnostic value of cytology obtained by percutaneous fine-needle aspiration biopsy of lesions in patients with suspected malignant disease has been increasingly

recognized[5,7-10]. All our patients (45%) in the present series with malignant disease were accurately diagnosed. Schaller et al[6] reported a similar experience on the accuracy of FNAB in a wide range of malignancies both superficial and deep seated in body cavities. They further found FNAB useful in the diagnosis of local recurrence and metastatic malignancies.

In spite of the fact that this study was limited to a small series of superficial and readily accessible lesions, we are of the opinion that FNAB has considerable advantages in the rapid assessment of lesions in children. The procedure was successfully carried out in all the children under adequate sedation thus obviating the morbidity and possible mortality associated with general anaesthesia. Though our patients were all admitted to the hospital because of the need to proceed to open biopsy (excisional or incisional) under general anaesthesia, FNAB can be safely performed as an outpatient procedure with considerable savings to the patient and hospital[6].

We did not encounter any complications directly related to the procedure probably because it was performed only on a few superficial and readily accessible lesions. Reports from large series however confirm that generally, there is an insignificant risk associated with fine-needle technique and especially in deep seated lesions[5,7]. In adults, the incidence of pneumothorax following FNAB of chest lesions is about 30%, majority of the pneumothorax are small, and only 5% of such patients needed chest tube drainage[5]. The risk of tumour seeding of the needle-tract is also very negligible. Whilst one centre reported no evidence of tumour seeding in over 2500 transthoracic and transabdominal FNABs[5], a multicentre review of several thousands percutaneous FNABs documented only a single actual report of needle-tract seeding[19].

In patients with previous surgery for a malignant lesion, who subsequently develop "a mass", FNAB rather than an open exploratory operation can be used to confirm whether the lesion is a recurrence or a metastatic lesion where the previous histology result is available for comparison[6].

It would appear that FNAB is accurate enough to be employed as a diagnostic aid in childhood lesions. It is safe, has minimal direct complications and can be performed under adequate sedation as an outpatient procedure, and thus consumes minimal resources. However, it requires a lot of skill, experience and commitment by a trained cytopathologist for it to be widely used, routinely, as a diagnostic modality.

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