Fine needle aspiration cytology versus histopathology in diagnosing lymph node lesions

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الرشف بالإبر الدقيقة مقابل التشريح المرضي النسيجي في تشخيص آفات العقد اللمفية
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خلاصة : تم رشف عينات بالإبر الدقيقة من العقد اللمفية السطحية في 150 مصاباً باعتلال العقد اللمفية . وقورنت نتائج الفحص الخلوي لتلك العينات بالتشخيص النسيجي بعد استئصال نفس العقد . وقد وجد أن أكثر من نصف المرضى (55,3%) كانوا مصابين بآفات حميدة حيث شكل فرط التنسج التفاعلي اللمفي معظم تلك الحالات وتبعه التهاب العقد اللمفية التدرني . أما الآفات الخبيثة فشملت اللسوفومات (26,0%) والأورام النقيلية (16,7%) وبيضاض الدم (2,0%) . وكانت نتائج التشخيص بالرشف بالإبر الدقيقة مماثلة لنتائج فحص الخزعات النسيجية بمعدل دقة وصل إلى 89,6% في حالات اعتلال العقد اللمفية الخبيث . وهكذا فإن الاستعمال المناسب للفحص الخلوي عن طريق الرشف بالإبر الدقيقة يمكن أن يغني عن أخذ الخزعات بطرق جراحية .

ABSTRACT Fine needle aspirates (FNA) of superficial lymph nodes were obtained from 150 patients complaining of lymphadenopathy. Cytological findings were analysed in correlation with the corresponding histopathological diagnosis of the same excised nodes. Benign lesions were found in more than half of the patients (55.3%), the majority of which were nonspecific reactive hyperplasia followed by tuberculous lymphadenitis. Lymphomas constituted the main pathology in malignant involvement (26.0%), while metastatic lesions formed 16.7% and leukaemia 2.0%. The results of FNA compared favourably with those of tissue biopsies, with an accuracy rate of 89.6% for malignant lymphadenopathy. The appropriate use of FNA may obviate the need for an open biopsy.

La cytologie après ponction-biopsie comparée à l'histopathologie dans le diagnostic des lésions des ganglions lymphatiques

RESUME Des prélèvements par ponction-biopsie sur des ganglions lymphatiques superficiels ont été effectués chez 150 patients présentant une lymphadénopathie. Les résultats de l'examen cytologique ont été analysés en parallèle au diagnostic histopathologique correspondant qui a été réalisé sur les mêmes ganglions après excision. Des lésions bénignes ont été observées chez plus de la moitié des patients (55,3%); dans la majorité de ces cas, il s'agissait d'une hyperplasie réactionnelle non spécifique, suivie par l'adénopathie tuberculeuse. Les lymphomes représentaient la pathologie principale dans la malignité (26,0%) tandis que les lésions métastatiques constituaient 16,7% des cas et la leucémie 2,0%. Cette étude prospective a montré que les résultats de la ponction-biopsie supportaient favorablement la comparaison avec ceux de la biopsie tissulaire avec un taux de précision de 89,6% pour la lymphadénopathie maligne. L'utilisation appropriée de la ponction-biopsie pourrait éviter de devoir recourir à la biopsie-excision.

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Introduction

FNA cytology has become an integral part of the initial diagnosis and management of patients presenting with lymphadenopathy. This simple technique has recently gained wide acceptance since it offers a high degree of accuracy, lending itself to outpatient diagnosis, and thus making considerable savings in the cost of hospitalization [1,2].

In Iraq, primary tumours of lymphatic tissue are often encountered and account for 8% of total cancer cases (it is the fifth most common cancer) [3]. Moreover, lymph nodes are a common site of metastasis for different cancers. Thus, clinical recognition and urgent diagnosis of palpable lymphadenopathy by FNA is of great importance.

The present work reports the results of our experience with this quick and safe diagnostic tool. Our findings are compared with the corresponding histopathology, in an attempt to highlight the accuracy of the method, its diagnostic reliability and future potential.

Materials and methods

This prospective study was based on a sample of 150 patients, admitted to the surgical wards and outpatient clinics of the Medical City Teaching Hospital, Baghdad, from August 1992 to August 1993. Their chief complaint was enlarged superficial lymphadenopathy which had lasted for at least two weeks.

FNA was performed using a 10–20 cm³ disposable syringe attached to a 22-gauge needle. The needle was allowed to move back and forth into different parts of the tumour site several times before withdrawal. Aspirates were smeared on six slides, four

of which were fixed by absolute alcohol to be stained with Papanicolaou stain, while the remaining two were kept dry for special stains when indicated (e.g. Leishman, PAS, Ziehl Neelsen) [1].

Surgical excision of the same lymph node was carried out immediately after aspiration, and finally the results of cytological and histological diagnosis were tabulated and compared.

Results

In Table 1, the histopathological distribution of lesions among 150 patients is illustrated. Benign lymphadenopathy was recorded in 55.3%, while malignant involvement was observed in the remaining 44.7%.

Table 2 shows the corresponding results of FNA cytology in the 83 histopathologically diagnosed benign lesions. The majority were nonspecific reactive hyperplasia with a polymorphic, high cell density pattern and without malignant features, followed by pyogenic tuberculous lymphadenitis. Cytologically, changes sug-

Table 1 Histopathologic distribution of lesions among 150 patients

Histopathologic diagnosis	No.	%
Benign lymphadenopathy	83	55.3
Malignant lymphadenopathy		
Lymphoma		
Hodgkin	13	8.7
Non-Hodgkin	26	17.3
Metastatic	25	16.7
Leukaemia	3	2.0
Total	67	44.7
TOTAL	150	100

gestive of tuberculous lymphadenitis were in the form of granulomatous reactions, and included eosinophilic caseous necrosis, epithelioid and multinucleated giant cells. Examination by FNA showed the above-mentioned criteria in only 21 patients, while histologically such diagnosis was obtained in 34 patients. Aspirates of

the remaining 13 revealed nothing more than pyogenic infection [4], nonspecific reactive hyperplasia [5], or else they were inconclusive. However, retrospective staining of the latter 13 cases by Ziehl Neelsen searching for acid-fast bacilli proved positive in six patients, hence raising the number of cases which were cyto-

Table 2 Cytology-histopathology correlation in benign lymphadenopathy

Histologic diagnosis	FNA cytology				Total
	Suggestive of tuberculous lymphadenitis	Pyogenic lymphadenitis	Nonspecific reactive hyperlasia	Inconclusive	
Tuberculous lymphadenitis	21	0	5	2	34
Pyogenic lymphadenitis		4			4
Nonspecific reactive hyperplasia			43	2	45
Inconclusive				0	0
Total	21	10	48	4	83

Table 3 Tumour types in metastatic lymphadenopathy in relation to the site of primary and involved lymph nodes

Tumour diagnosis	Site of primary	Lymph nodes involved	Number of cases	%
Adenocarcinoma	Respiratory, gastrointestinal tract, breast	Cervical, inguinal, axillary, supraclavicular	9	36
Squamous cell carcinoma	Respiratory, nasopharynx, skin	Cervical, inguinal	7	28
Undifferentiated (anaplastic)	Respiratory, nasopharynx, pancreas	Cervical	5	20
Papillary cell carcinoma	Thyroid	Cervical	2	8
Melanoma	Skin	Inguinal	1	4
Neuroblastoma	Abdomen	Cervical	1	4
Total	—	—	25	100

logically diagnosed as tuberculous lymphadenitis to 27. The diagnostic accuracy thus recorded was 79.4%.

Out of 67 patients with malignant lymphadenopathy, FNA of 60 were confirmed histologically, showing an overall accuracy of 89.6% (Table 3). Identical correlation between both diagnoses was obtained in 10 out of 13 patients with Hodgkin disease (76.9% accuracy). The two false-negatively diagnosed cases were of the lymphocytic predominant type where no Reed-Sternberg cells were detected, making the diagnosis by cytology impossible [1]. In non-Hodgkin lymphoma, 23 out of 26 cases were confirmed histologically (88.5% accuracy). Aspirate of one patient false-negatively interpreted as atypical reactive hyperplasia, had a corresponding biopsy showing low-grade lymphoma. In contrast, for the only patient with a false-positive diagnosis considered in this study, a cytology report stated: "atypical changes highly suggestive of lymphoma". Tissue section of the same lymph node revealed evidence of toxoplasmosis with atypical reactive hyperplasia.

Accuracy of FNA in diagnosing metastatic tumours was 96.0%. Adenocarcinoma was the most common pathologic type followed by squamous and oat cell carcinomas. Discrepancy between the two diagnoses occurred in only one case with metastatic papillary thyroid carcinoma which showed just a few atypical cellular clusters on cytologic examination (Table 3).

A similar diagnosis of acute lymphoblastic leukaemia was arrived at in both studies, i.e. 100% accuracy. Sensitivity of FNA results was therefore 90.5%, while specificity was 98.8% (Table 4).

Discussion

The results of this work indicate that benign lymphadenopathy constitutes a significant proportion of findings in aspirates of enlarged lymph nodes. It is also proved that cytological examination may not only help to distinguish between benign and malignant types, but may also suggest the nature of the benign process. Hence, this study

Table 4 Quality and accuracy of FNA cytology (cyto-histopathological correlation) in malignant lymphadenopathy

Histopathologic diagnosis	Results of FNA cytology					Accuracy (%)
	Total	Confirmed histologically	Suspect*	False (-)	False (+)	
Hodgkin lymphoma	13	10	1	2	—	76.9
Non-Hodgkin lymphoma	26	23	2	1	1	88.5
Metastatic lesions	25	24	1	—	—	96.0
Leukaemia	3	3	—	—	—	100
Total	67	60	4	3	1	89.5

* Suspect cases are conservatively considered false negatives

$$\text{Sensitivity: } \frac{\text{True (+)}}{\text{True (+) + False (-)}} \times 100 = \frac{6700}{74} = 90.5\%$$

$$\text{Specificity: } \frac{\text{True (-)}}{\text{True (-) + False (+)}} \times 100 = \frac{8300}{84} = 98.8\%$$

showed benign lesions in 55.3%, of which reactive hyperplasia constituted more than half (54.2%). These figures are in line with reports in the literature [5,6].

In Iraq, mycobacterial infections are relatively common. It is, therefore, considered of interest to evaluate the use of FNA to diagnose tuberculous lymphadenitis in histologically confirmed cases. In places where mycobacterial infections are prevalent, and other granulomatous diseases uncommon, a diagnosis of tuberculous lymphadenitis can be made with some confidence when granulomatous changes are present cytologically [7]. However, patients with pyogenic tuberculous lymphadenitis may not necessarily exhibit such a picture. Moreover, FNA of advanced tuberculous lymphadenitis may frequently display changes that are incompatible with nonspecific reactive hyperplasia [1,7]. That is why it is always stressed that in a clinically suspected case, especially if the aspirate contains pus, a bacteriological examination should be tested for acid-fast bacilli and a culture made to improve the diagnostic accuracy [7,8]. Indeed, the latter was raised to 79% by using the Ziehl Neelsen stain. That figure compares favourably with other studies, specifically those conducted in developing countries [8-10].

For the diagnosis of lymphoma, FNA provides excellent cytomorphologic material if adequately sampled. The evaluation of FNA in patients with no previously diagnosed malignancy, or in those with suspected lymphoma, should be performed with extreme caution, taking care to obtain a clinical correlation and a confirmatory tissue biopsy, especially in cytologically suspicious cases. However, if malignancy has been previously diagnosed, the legitimate clinical utilization of FNA does not always require follow-up by open biopsy. False-positive results should therefore be reduced

to a minimum, since a positive cytologic diagnosis often supports important management decisions [11,12]. On the other hand, false-negative cases tend to be more common, and are generally based on sampling rather than diagnostic errors, such as the absence of Reed-Sternberg cells, which are important in the diagnosis of Hodgkin disease [12,13]. However, low-grade (well differentiated) lymphomas with minimal cytomorphologic atypia remains very difficult to evaluate cytologically [11,13]. Some authors still find it difficult to resolve with certainty the differential diagnosis of lymphoma from reactive hyperplasia or even granulomatous lymphadenitis [13]. Therefore, consultation between cytopathologists and clinicians is mandatory and may result in repeating aspiration or recommending a surgical biopsy.

In diagnosing metastatic lymphadenopathies by FNA, a high accuracy was achieved, with the cervical lymph node being the most commonly involved group, of which adenocarcinomas and squamous carcinomas comprised the commonest pathology. Similar findings have been documented by other researchers [4,6,8,10]. In many of those cases, a cytologic diagnosis was adequate to indicate the choice of treatment.

In conclusion, FNA cytology appears well established as another adjunctive method of diagnosis, since its results compare favourably in many respects with those obtained from traditional surgical biopsy. This fact is illustrated by the high sensitivity and specificity encountered in this study and others [14,15]. In malignant lymphadenopathies, this inexpensive, relatively painless and rapid technique may not only help in the primary diagnosis of tumours, but remains a useful method of following up patients with known malignancies, and even guiding therapy.

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Correction

First report of cryptosporidiosis among Iraqi children, EMHJ Vol. 2 No. 1, 1996, page 115

We wish to correct two editorial errors in the abstract of this article by Nadham K. Mahdi, Imad A. Al-Sadoon and Adel T. Mohamed. The study population of 240 Iraqi children under five years old were not schoolchildren. The number excreting cryptosporidium oocysts in their stools was 21, not 22.