FNAB THYROID GLAND:
COMPARISON STUDY BETWEEN PRE- AND POST-OPERATIVE HISTOLOGICAL DIAGNOSIS

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RESUME
La biopsie par aspiration à l’aide d’aiguille fine (FNAB) est recommandée en tant que première étape dans la prise en charge de maladie thyroïdienne nodulaire. Une étude rétrospective réalisée sur 520 patients présentant une thyroïde nodulaire, a été entreprise dans le Nord de la Jordanie, entre janvier 1998 et août 2001. Nous avons ainsi comparé les résultats obtenus suite à des biopsies par aspiration à ceux obtenus par analyses histologiques post opératoires. Les résultats ont été classés en 3 groupes : A) bénigne, B) maladie et C) suspect, comme le montre le tableau II. Les résultats des biopsies par aspiration étaient bénignes dans 94% des cas et incluaient les nodules colloïdiens bénignes (325 cas), le goître multinodulaire (70 cas), le goître diffus (40 cas), la thyroïdite (23 cas) et les kystes thyroïdiens (43 cas). Un total de 52 patients a subi l’opération chirurgicale, 49 d’entre eux présentaient des résultats similaires à ceux obtenus par aspiration. La précision de la biopsie par aspiration a été de 94% (49/52 patients), avec une spécificité de 99% et une sensibilité de 93%. Les résultats des ultrasons ont montré que 65% (338 patients) présentaient des nodules solides, 15% (78 patients) des kystes et 20% (104 patients) des lésions d’échogénicité. La confirmation de la malignité par la technique histologique a été montrée chez 10 parmi les 11 patients testés, avec une précision de 91%. La biopsie par aspiration est recommandée dans les cas suspects. La biopsie par aspiration, associée à l’ultrason, augmente la sensibilité qui peut atteindre 100%. La précision de la biopsie par aspiration (FNAB) donne des résultats similaires aussi bien dans les cas de goitres froids ou chauds. Cliniquement, la plupart des patients avec des nodules colloïdiens bénignes présentaient des goitres, suggérant le rôle que peut jouer la déficience en iode dans ces régions de la Jordanie.

ABSTRACT
Fine-needle aspiration biopsy is recommended as the first and most important step in the management of nodular thyroid disease. A retrospective study of 520 patients with nodular thyroid disease was done in the north of Jordan, between January 1998 and August 2001. We compared the results of fine-needle aspiration biopsy (FNAB) of thyroid gland with postoperative histological findings. The results are classified into three groups A) benign, B) malignant, and C) suspicious as shown in table II. The results of the FNAB were benign in 96.4% of the cases which include benign colloid nodules (325 cases), multi-nodular goitre (70 cases), diffuse goitre (40 cases), thyroiditis (23 cases) and thyroid cysts (43 cases). A total of 52 patients underwent surgical management, 49 patients found to be accurate with the FNAB. The accuracy of FNAB was 94% (49 patients out of 52), with a specificity of 99% and a sensitivity of 93%. Ultrasound findings showed that 65% (338 patients) had solid nodules, 15% (78 patients) had cystic lesions and 20% (104 patients) had mixed echogenicity lesions. Histological confirmation of malignancy was 10 out of 11 patients with a 91% accuracy rate. FNAB was found to be a highly effective procedure, which can obviate a lot of unnecessary surgery in case of thyroid lesions, and avoid over treatment of benign disease. Surgery was recommended in all suspicious cases. FNAB under ultrasound guidance increases the sensitivity rate which can reach 100%. FNAB accuracy seems to be similar in cold and in hot nodules. Clinically, most of the patients with benign colloid nodules were having goitres suggesting the role played by iodine deficiency which is a prominent feature in that area in Jordan.
INTRODUCTION
Fine needle aspiration biopsy (FNAB) of the thyroid was described in 1948. Currently, thyroid FNAB is worldwide widely used and considered as an essential step in the work up of thyroid nodules.

Two main considerations are taken into account, in the use of FNAB in the pre operative selection of thyroid nodules.

First, the decision to remove all thyroid nodules seems impractical when considering their high frequency occurrence in a population (approximately 5% of screened population). Because most thyroid nodules are benign, the morbidity and the mortality following surgery in patients with benign nodules, would outweigh the advantage of immediately excising all thyroid malignancies. The advantage of using FNAB is higher when the complication rate of surgery is higher or the mortality from late discovery of cancer is lower.

A second consideration is the rising costs of medical care which have stimulated interest in cost-effective diagnostic and therapeutic procedures. The use of ultrasound guided FNAB has several advantages; it allows the aspiration of nodules smaller than 5 mm and is useful in difficult-to-palpate nodules. Sometimes, after evacuation of a cystic nodule, the aspiration can be guided into a residual solid area.

RESULTS
The results of the fine needle aspiration biopsy (FNAB) were benign in 96.4% of which 62.5% benign colloid nodules (325 cases), 13.5% multinodular goitre (70 cases), 7.7% diffuse goitre (40 cases), 4.4% thyroiditis (23 cases) and 8.3% thyroid cysts (43 cases) (Table I).

The results were then classified into three groups: A)-benign, B)-malignant, and C)-suspicious, as shown in Table II.

MATERIAL AND METHODS
This study reviewed 520 patients who underwent fine needle aspiration and cytological examinations at Prince Rashid Ben Al-Hassan, Educational Hospital, in north of Jordan, during the period from January 1998 to August 2001; however, 52 patients underwent surgical management.

Single FNAB was done for 450 patients and multiple FNAB in 70 patients. 430 female (83%), with a mean age of 37 years and 90 males (17%) with a mean age of 42 years, were studied.

All cytological smears were evaluated by a cytopathologist and were carried out in an outpatient setting, with the use of local anaesthesia in some patients. FNAB was carried out with a fine needle (23-gauge); the goal was to yield enough cellular material without causing bleeding.

Ultrasound-guided FNAB has several advantages; it allows the aspiration of nodules smaller than 5 mm and is useful in difficult-to-palpate nodules. Sometimes, after evacuation of a cystic nodule, the aspiration can be guided into a residual solid area.

The results were then classified into three groups: A)-benign, B)-malignant, and C)-suspicious, as shown in Table II.

Table I- Results of fine-needle aspiration biopsy of thyroid nodules

<table>
<thead>
<tr>
<th>Total(%)</th>
<th>Benign colloid nodules (%)</th>
<th>Multinodular goitre (%)</th>
<th>Diffuse goitre (%)</th>
<th>Thyroiditis (%)</th>
<th>Malignancy (%)</th>
<th>Suspicious (%)</th>
<th>Thyroid cysts (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>520</td>
<td>325 (62.5)</td>
<td>70 (13.5)</td>
<td>40 (7.7)</td>
<td>23 (4.4)</td>
<td>11 (2.16)</td>
<td>8 (1.5)</td>
<td>43 (8.3)</td>
</tr>
</tbody>
</table>

The declining use of thyroid scintigraphy has led to the use of FNAB as the first step in the evaluation of all thyroid nodules.

The traditional diagnostic approach to thyroid nodules, including thyroid stimulating hormone (TSH) suppression trial with L-thyroxin and shrinkage of a nodule after L-thyroxin, was considered a criterion of benignity. This diagnostic procedure has low sensitivity and specificity and has largely been replaced by cytological nodule evaluation by FNAB.

Table II- Ways in management of thyroid nodules

<table>
<thead>
<tr>
<th>Number (%)</th>
<th>Benign (%)</th>
<th>Malignant (%)</th>
<th>Suspicious (%)</th>
<th>Total</th>
</tr>
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<tbody>
<tr>
<td>Conservative treatment</td>
<td>501 (96.3)</td>
<td>11 (2.2)</td>
<td>11 (1.5)</td>
<td>520</td>
</tr>
<tr>
<td>Surgical treatment</td>
<td>33 (63.5)</td>
<td>11 (21)</td>
<td>8 (15.5)</td>
<td>52</td>
</tr>
</tbody>
</table>

There was a female predominance with 83% of thyroid nodules detected (430 females) against 17% in male’s patients (90 males) (Table III).
Table III: Male to female ratio in case of thyroid nodules

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number (%)</th>
<th>Age (mean age)</th>
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<tbody>
<tr>
<td>Male</td>
<td>90 (17)</td>
<td>24-62 years (42)</td>
</tr>
<tr>
<td>Female</td>
<td>430 (83)</td>
<td>18-56 years (37)</td>
</tr>
<tr>
<td>Total</td>
<td>520</td>
<td>(39.5 years)</td>
</tr>
</tbody>
</table>

The histo-pathological surgical specimens showed benign lesions in 63.5%, malignant lesions in 21%, and suspicious lesions in 15.5% of the cases studied.

A total of 52 patients underwent surgical management, 49 patients were found to be accurate with the FNAB. This accuracy was about 94% (49 patients out of 52), with a specificity of 99% and a sensitivity of 93%. Histological confirmation of malignancy was in 10 out of 11 patients with a 91% accuracy rate. The accuracy of fine needle aspiration study (FNAB) depends on the expertise and experience of the cyto-pathologist, as well as the technical skill of the physician performing the biopsy. Poor needle technique leads to a higher proportion of unsatisfactory biopsy specimens and probably a higher rate of surgical procedures. In the case of more than one discrete nodule in a thyroid gland, the FNAB should be performed on all accessible nodules and not only on the largest nodule.

Amongst the 52 patients undergoing surgical management, 49 patients (94%) were found to be accurate with the FNAB, with a specificity of 99% and a sensitivity of 93%.

Single fine needle aspiration biopsy was done for 450 patients and multiple fine needle aspiration biopsy in 70 patients.

The histo-pathological surgical specimens showed benign lesions in 63.5%, malignant lesions in 21% and suspicious lesions in 15.5%. Histological confirmation of malignancy was in 10 out of 11 patients with a 91% accuracy rate. The accuracy of fine needle aspiration study (FNAB) depends on the expertise and experience of the cyto-pathologist, as well as the technical skill of the physician performing the biopsy. Poor needle technique leads to a higher proportion of unsatisfactory biopsy specimens and probably a higher rate of surgical procedures. In the case of more than one discrete nodule in a thyroid gland, the FNAB should be performed on all accessible nodules and not only on the largest nodule.

In an attempt to reduce false-negative results, many clinicians repeat FNAB one or more times during the follow up of benign nodules, although a second biopsy rarely changes the initial benign diagnosis. However, it is valuable to correct occasional false-negatives; this view is shared by others.

There was female predominance (83%) as compared to male patients studied (17%). Clinically, most of the patients with benign colloid nodules were having goitres which is an indication of the role played by iodine deficiency which is a prominent feature in that area of Jordan.

Ultrasound findings showed 65% (338 patients) were having solid nodules, 15% (78 patients) having cystic lesions and 15% (104 patients) were showing mixed echogenicity lesions (Table IV).

Table IV: Ultrasound findings of thyroid nodules

<table>
<thead>
<tr>
<th>Nodule type</th>
<th>Number (ceses)</th>
<th>Percent (%)</th>
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<tbody>
<tr>
<td>Solid</td>
<td>338</td>
<td>65</td>
</tr>
<tr>
<td>Cystic</td>
<td>78</td>
<td>15</td>
</tr>
<tr>
<td>Mixed</td>
<td>104</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td>520</td>
<td>100</td>
</tr>
</tbody>
</table>

DISCUSSION

We compare the results of fine-needle aspiration biopsy of thyroid gland with post-operative findings in 520 patients with thyroid nodules, done between January 1998 and August 2001, in the north of Jordan, to the outcome of 52 patients that underwent surgical management.

The main indication for FNAB is the pre-operative selection of thyroid nodules. The malignancy risk of palpable nodules ranges from 4% to 8%, in patients living in iodine- sufficient areas and from 2% to 3%, in patients coming from iodine-deficient areas.

Patients with a multi-nodular goitre or with cystic nodules, once believed to have a low cancer risk, have recently been shown to have a cancer risk similar to those with a solid solitary nodule.

The results of the fine-needle aspiration biopsy (FNAB) were benign in 96.4% of the cases, with 62.5% being benign colloid nodules, 13.5% multi-nodular goitre, 7.7% diffuse goitre, 4.4% thyroiditis and 8.3% thyroid cysts. In general, roughly 5% of thyroid nodules are malignant, whereas the remainder represents a variety of benign diagnoses. The main weakness of FNAB lies in hypo-cellular aspirates and in aspirates with high follicular cellularity; hypo cellular aspirates may be observed in cystic nodules or related to biopsy technique.

In general, thyroid nodules with suspicious FNAB results should be surgically removed if shown not to be autonomous in function. From 10 to 30% of follicular lesions on FNAB can prove malignant on surgical pathologic study. For non diagnosed specimens of...
cystic or solid nodules, the FNAB should be used, because 30 to 50% of nodules can subsequently be characterized cyto-pathologically. Carcinoma appeared to be uncommon in patients with solitary nodules. Some advice using frozen sections if pre-operative FNAB of the thyroid nodule suggests malignancy, but frozen sections, in general, are underreported nowadays.

FNAB has been found to be safer, cost-effective and reliable. It directs the appropriate selection of patients for surgery with the correct operation to be performed for each type of tumour and decreases thyroid operations for benign lesions; hence, reducing the operation costs and anaesthesia duration. FNAB is capable of providing critical information, which is unobtainable by any other investigations. It also makes the patients feel secure in the knowledge that their goitres are benign besides a substantial financial savings.

Thyroid ultrasound has revealed that thyroid nodules are much more commonly present than just palpable nodules. In addition, thyroid scintigraphy is no longer used as the first step in thyroid nodule evaluation because FNAB has replace it as a primary step in diagnosis. Thus, Thyroid ultrasound with the FNAB can provide high specificity and sensitivity in differentiating malignant lesions from benign ones.

FNAB is the most effective method for distinguishing between benign and malignant thyroid nodules. It is found to be a highly effective procedure which can obviate a lot of unnecessary surgery, avoiding over treatment of benign disease. Carcinoma appeared to be uncommon in patients with solitary nodules and FNAB gives an opportunity to be more conservative in selecting patients with solitary thyroid nodules for surgical treatment since its accuracy seems to be similar in cold and in hot nodules.

Références