Comparison of accuracy of fine needle aspiration biopsy in
differential diagnosis of solitary thyroid nodule during the
first year and subsequent 5 years.

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Sridama V, Pattanaungkul S, Suwanwalaikorn S. Comparison of accuracy of fine needle aspiration
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Accuracy of fine needle aspiration biopsy cytology of thyroid nodule had improved since the
initial usage of the technique. Improvement of the accuracy of interpretation in positive cytology was
observed in the second year after the introduction of the technique; improvement of the accuracy of
suspicious cytology was observed in the fourth year after the introduction of the technique. Therefore,
the result of fine needle aspiration when initially used might not be as precise as the experienced team’s.
Evaluation of the correlation of cytology and pathological results is essential in order to improve the
accuracy of the technique. Finally, to become an expert cytopathologist often requires a more extensive
training than to become an expert aspirator.

Key words: Thyroid nodule, Fine needle aspiration, Cytology.

Reprint request: Sridama V, Department of Medicine, Chulalongkorn University, Bangkok 10330.
Thailand.
Received for publication. May 6, 1994.

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วิทยา ศรีคามะ, สมชาย พัฒนาภูมิ, สมพรชัย ศุภรัตน์ลัยภัทร์. ความถูกต้องในการตรวจเซลล์จากการกินดอยโดยใช้เข็มขนาดเล็กในการวินิจฉัยแก้มโรคก่อนแล้ววิ่งไปต่ออัยการศึกในระยะ 5 ปี. จุฬาลงกรณ์เวชศาสตร 2537 (สิงหาคม; 38(4): 457–460

ความถูกต้องในการวินิจฉัยแก้มโรค Thyroid nodule โดยการใช้ fine needle aspiration biopsy cytology นั้น ต้องมีระดับ 2 หลังจากมีการใช้เทคนิคนี้ในการวินิจฉัยแก้มโรค ความถูกต้องในการอ่าน positive cytology ต้องน้อยแต่ไม่ต่ำกว่า 2 หลังจากใช้เทคนิคหนึ่งสามารถSuspicious cytology นั้น ความถูกต้องในการอ่าน ต้องไม่น้อยกว่า 4 หลังจากใช้เทคนิคนี้ ผลของ fine needle aspiration ในการใช้ในระยะแรกนั้น ไม่ดีเท่ากับในกลุ่มที่ใช้เทคนิคหนึ่งและนำไปที่การประเมินความถูกต้องระหว่าง cytology และแพทย์ พยาบาลที่มีความรู้ในการวินิจฉัยการอ่านกลุ่มที่มีความถูกต้องของการวินิจฉัย แต่ที่จะสืบทอดเป็นผู้ช่วยในการตัดสินใจจากต่อไปนี้ อนาคตแตกต่างกันกว่า การศึกษาที่จะเป็นผู้ช่วยในการอ่าน cytology.
Fine needle aspiration biopsy cytology is probably the best method available for differential diagnosis of malignancy from benign solitary thyroid nodule.\(^2\) Reported prevalence of malignancy found in operated cases varied widely. Positive cytology was found to be malignant in 50-97% of operated surgical specimens.\(^2\) Reported prevalence of malignancy in suspicious cytology varied from 15-40%.\(^3\) The objective of this study is to compare the accuracy of fine needle aspiration biopsy cytology for prediction of malignancy in the first year of the introduction of the technique and several years later.

**Material and Methods**

We used fine needle aspiration biopsy cytology to investigate patients with solitary thyroid nodule in thyroid clinic, Chulalongkorn University Hospital since 1984. Needle gauge 22 attached to disposable 20 ml syringe and Cameco pistol syringe was used to obtain specimens. The contents from aspiration were smeared on the slides and fixed in 95% alcohol or air dired. The slides were then stained by Papanicoulou and Wright-Giemsa dye, respectively.

The aspiration were performed by one of the authors in the first year (1984). After 1985-1986, six medical doctors operated the aspiration. In the last three years (1987-1989), the aspirations were performed by three of the authors and rotating medical residents in endocrinology (approximately sixty residents per year with rotating time of four to six weeks.) Technique of aspiration was demonstrated once for each rotating medical residents. Three of five aspirations by medical residents were performed under supervision by one of the authors. Subsequent aspirations by medical residents were performed independently.

Cytology was classified into three groups: positive, suspicious, and negative. Surgical treatments were recommended in patients with positive and suspicious cytology. Patients with negative cytology were placed on thyroid hormone suppressive therapy. Fine needle aspirations were repeated for at least two time in patients with partial or no response to thyroid hormone therapy. In the first year, patients in surgical department were include. These patients were operated despite negative cytology.

Cytology was evaluated by one of the authors throughout the entire study period. Evaluations of the correlation of cytology and pathological specimens were previously performed at the end of the first and third year. In this evaluation, we evaluated all operated patients in each year to find the percentage of malignancy in each cytological classification.

**Results**

As shown in Table 1, in cytology positive group, malignancy was found in 76.2% of operated cases during the first year. Percentage of malignancy in cytology positive group was significantly increased in the later years to 94.9% (100, 100, 75, 88.9 and 100% in 1985-1989, respectively) compared to the first year (P<0.01). In suspicious cytology groups, malignancy was found in 19.3, 16, 16, 32, 25.9 and 27.8% during 1984-1989, respectively. Percentage of malignancy in suspicious cytology in the first three years is 17.8, compared to 28.6% in the last three years.

Pathological results in a positive cytology group included papillary carcinoma (77.4%), mixed papillary & follicular carcinoma (9.4%), anaplastic (7.5%) and metastatis carcinoma (5.7%). Pathological finding in a suspicious cytology group included follicular carcinoma (54.3%), mixed follicular and papillary carcinoma (10.9%), anaplastic (2.1%), Hürthle cell (4.3%), papillary (21.7%), Lymphoma (4.3%) and medullary (2.1%).

**Discussion**

Our results indicated that accuracy of fine aspiration biopsy cytology of thyroid nodule had improved since the initial usage of the technique. This finding explained a wide range of percentage of malignancy reported in the literature in suspicious\(^3\) (15-40%) and positive cytology\(^2\) (50-97%). The technique gave the best result when it was performed by an experienced physician and interpreted by an experienced cytopathologist.\(^4\) In our study, improvement of the accuracy of positive cytology was

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<tr>
<td>Positive</td>
<td>76.2</td>
<td>100</td>
<td>100</td>
<td>75.6</td>
<td>88.9</td>
<td>100 %</td>
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<td></td>
<td>(16/21)</td>
<td>(10/10)</td>
<td>(10/10)</td>
<td>(3/4)</td>
<td>(8/9)</td>
<td>(6/6)</td>
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<td>Suspicious</td>
<td>19.3</td>
<td>16.0</td>
<td>16.0</td>
<td>32.0</td>
<td>25.9</td>
<td>27.8</td>
</tr>
<tr>
<td>Negative</td>
<td>1/49</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<td>(2.0%)</td>
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observed in the second year after the introduction of the technique. Improvement of the accuracy of suspicious cytology was observed in the fourth year after the introduction of the technique. Therefore, the result of fine needle aspiration when initially used might not be as good as the experienced team’s. The improvement of accuracy of the cytology was probably related to the time of evaluation of correlation of cytology and pathology results that was performed at the end of the first and third year. Criteria for diagnosis of positive cytology was clearer than suspicious cytology. Therefore, improvement was seen earlier with a small number of specimens. However, it required more experience to define suspicious cytology.

From our study, experienced cytopathologists were probably more important than experienced aspirators, because physicians who performed aspirations in the last three year were mainly rotating medical residents who were not experienced aspirators. Nevertheless, accuracy remained stable for positive cytology and improved for suspicious cytology despite being performed partly by inexperienced aspirators. Finally, when the technique is appropriately instructed, physicians may gain some experience within a short period of time. It takes an extensive training for physicians to be able to accurately interpret cytological results.

Reference