Ultrasound-guided Fine-Needle Aspiration Biopsy Is An Efficient Diagnostic Tool In Thyroid Nodules

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Introduction
- Thyroid nodules are commonly encountered in clinical practice:
  - Simple clinical examination reveals nodules 4-7% of subjects examined, the frequency increasing to 5-20% in areas of endemic goiter.
  - The actual frequency of thyroid nodules is significantly higher and increases with age -> autopsy studies record frequency of 40-50%.
  - The main diagnostic problem is the benign or malignant nature of the nodules.
- Fine-needle aspiration biopsy (FNAB) is a standard diagnostic test for evaluating thyroid nodules.
- Several studies have showed that the use of ultrasound guidance (US-FNAB) improves the diagnostic accuracy of aspiration biopsies in comparison with palpation guidance (P-FNAB) alone.

Patients and Methods
- We performed a retrospective study
  - to compare the efficacy of US-FNAB of thyroid nodules with that of P-FNAB.
- Study group:
  - patients referred to Endocrinology Department
  - for assessment of thyroid nodular disease who underwent:
    - P-FNAB between 2000-2001,
- In order to avoid differences due to nodules size
  - only palpable nodules in both groups were selected.
- Thyroid examinations, ultrasound imaging, and aspiration biopsies were performed by the same endocrinologist.
- Histopathologic and cytologic results were compared for patients who were operated.

Results
- Study sample consisted of 403 patients.
  - P-FNAB performed in 106 patients
    - of which 32 underwent thyroidectomy
  - US-FNAB in 297 patients
    - of which 58 underwent thyroidectomy
- Excepting for moderate local pain in some cases, no adverse effects were noticed.

- Chart 1. Patient distribution by sex
- Chart 2. FNAB Classification by Bethesda system
- Chart 3. Histology results of the patients who underwent surgery
- Chart 4. Patient distribution by age
- Chart 5. Patients who underwent surgery
- Chart 6. Time passed between FNAB and surgery

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<tbody>
<tr>
<td>MIN</td>
<td>MAX</td>
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<tr>
<td>The rate of true positive results (Sensitivity)</td>
<td>50%</td>
<td>85.71%</td>
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<tr>
<td>The rate of true negative results (Specificity)</td>
<td>88.88%</td>
<td>90.90%</td>
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<tr>
<td>The rate of false negative results</td>
<td>50%</td>
<td>14.28%</td>
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<tr>
<td>The rate of false positives results</td>
<td>11.11%</td>
<td>9.09%</td>
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<tr>
<td>The positive predictive value</td>
<td>40%</td>
<td>60%</td>
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<tr>
<td>The negative predictive value</td>
<td>92.30%</td>
<td>97.56%</td>
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<td>Prevalence</td>
<td>12.90%</td>
<td>13.72%</td>
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<td>Overall performance (Accuracy)</td>
<td>83.87%</td>
<td>90.19%</td>
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- Cytologic diagnostic accuracy rate was 83.87% for P-FNAB and 90.19% for US-FNAB.
- With use of ultrasound guidance:
  - sensitivity (85.71% for US-FNAB, 50% for P-FNAB),
  - positive predictive value (60% US-FNAB vs. 40% P-FNAB),
  - negative predictive value (97.56% US-FNAB vs. 92.3% P-FNAB)
  - were increased significantly;
  - the false-negative rate [14.28% US-FNAB vs. 50% P-FNAB] was significantly reduced.

Conclusions
- Fine-needle aspiration biopsy is an essential diagnostic tool in the management of thyroid nodules.
- US-FNAB improved the accuracy, sensitivity, and positive predictive value and reduced the false-negative rate of the cytologic diagnostic in comparison with P-FNAB.
- Therefore, practice guidelines should universally recommend US-FNAB in the management of thyroid nodules, permitting an accurate preoperative diagnostic and avoiding numerous unnecessary surgical interventions.

References: