Ultrasound Guided Fine-needle Aspiration of Thyroid Nodules

Does Size Matter?

Rickul Varshney MDCM, Veronique-Isabelle Forest MD, FRCSC, Faisal Zawawi MD, Louise Rochon MD, Michael P Hier MD, FRCSC, Alexander Mlynarek MDCM, FRCSC, Michael Tamilia MD, Richard J Payne MD, FRCSC

McGill University, Otolaryngology-Head and Neck Surgery, Montreal, Canada

ABSTRACT

Introduction: Authors have questioned the benefit of fine-needle aspiration (FNA) of thyroid nodules ≥4cm. They report that the results of the FNA are not as reliable when compared to nodules <4cm.

Objectives: The aim of this study is to evaluate the accuracy and predictive values of ultrasound guided FNA (USFNA) of thyroid nodules ≥4cm compared to nodules <4cm.

Methods: A retrospective study of 998 patients who underwent thyroid surgery between 2006-2012 at the McGill University Thyroid Cancer Center was performed. USFNA and post-operative pathology diagnoses of nodules ≥4cm versus those <4cm were compared. Pre-operative USFNA results were divided into three groups: benign, indeterminate, and malignant/suspicious for malignancy subgroups. Postoperative results were separated into benign and malignant groups.

Results: There were 225 patients with nodules ≥4cm and 773 patients with nodules <4cm. The sensitivity, specificity, positive predictive value and negative predictive value for USFNA of nodules ≥4cm were 94.62% (CI 71.91-93.10), 91.46% (CI 79.62-97.58), 91.67% (CI 80.0-97.63) and 84.31% (CI 71.4-92.95), respectively. The sensitivity, specificity, positive predictive value and negative predictive value for USFNA of nodules <4cm were 90.48% (CI 86.1-93.8), 85.92% (CI 75.6-93.02), 95.8% (CI 92.41-97.96) and 71.76% (CI 60.95-81.0), respectively. The difference in diagnostic accuracy of USFNA between both groups was not statistically significant (p>0.05).

Conclusion: This study shows that the sensitivity, specificity, positive predictive value and negative predictive value for USFNA of nodules ≥4cm are similar to that of smaller nodules. It is therefore suggested that these nodules undergo USFNA.

METHODS AND MATERIALS

This study is a retrospective review of 998 consecutive patients who underwent thyroid surgery between January 2006 and December 2012 at the McGill University Thyroid Cancer Center.

Patients were divided into two groups based on thyroid nodule size ≥4cm versus <4cm. Pre-operative USFNA results were noted and broadly classified into three groups: benign, indeterminate, and malignant/suspicious for malignancy subgroups. Indeterminate USFNA consisted of follicular lesions/neoplasms and Hurthle cell lesions/neoplasms. The groups were then divided postoperatively into benign and malignant groups.

USFNA results and postoperative diagnoses were compared. Sensitivity, specificity, positive predictive value (PPV) and negative predictive value (NPV) of USFNA of nodules ≥4cm versus <4cm were calculated.

SPSS 20.0 was used for statistical analysis using the Chi-square method. P<0.05 was considered statistically significant.

RESULTS

There were 773 patients with nodules <4cm and 225 patients with nodules ≥4cm. There was no statistical difference between both groups in terms of patients age and gender.

The distribution of the USFNA results and their counterpart postoperative diagnoses is presented in table 1 for nodules <4cm and nodules ≥4cm.

The sensitivity, specificity, positive predictive value and negative predictive value for USFNA of nodules <4cm and nodules ≥4cm are presented in figure 1.

The differences in diagnostic accuracy of USFNA between both groups were not statistically significant (p>0.05).

Table 1. USFNA results and post-operative pathology diagnoses comparing nodules <4cm and ≥4cm.

<table>
<thead>
<tr>
<th>NODULE SIZE</th>
<th>POST-OPERATIVE PATHOLOGY</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;4cm nodules</td>
<td>Benign</td>
</tr>
<tr>
<td>USFNA Benign</td>
<td>61</td>
</tr>
<tr>
<td>Indeterminate</td>
<td>292</td>
</tr>
<tr>
<td>Malignant/Suspicious for malignancy</td>
<td>10</td>
</tr>
</tbody>
</table>

Fig 1. Comparison of predictive values of USFNA of nodules <4cm and ≥4cm.

Sensitivity 90.48% (CI 86.1-93.8)
Specificity 85.92% (CI 75.6-93.02)
PPV 95.2% (CI 92.41-97.50)
NPV 71.76% (CI 60.95-81.0)

Sensitivity 84.62% (CI 71.91-93.10)
Specificity 91.46% (CI 79.6-97.58)
PPV 91.4% (CI 80.0-97.03)
NPV 94.31% (CI 71.4-92.95)

CONCLUSIONS

This study shows that the sensitivity, specificity, positive predictive value and negative predictive value for USFNA of nodules ≥4cm is the same as that of smaller nodules.

Based on these results, with regards to USFNA of thyroid nodules, size does not change its diagnostic accuracy. As a result, we recommend that patients with thyroid nodules ≥4cm should be managed similarly to patients with smaller thyroid nodules, and be offered an USFNA to help guide treatment.

REFERENCES