ABSTRACT

Background: While recently comparing our institution’s experience with thyroid FNAB to published reports, we found large discrepancies in how descriptive statistics of thyroid FNAB were tabulated in the literature. Methods: Published series of thyroid FNAB with ≥180 cases and available histological data with sufficient raw data to re-calculate descriptive statistics were examined. Uniformly considering indeterminate and malignant results to be positive FNAB results, both in clinical management, sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), false negative (FN) and false positive (FP) rates were re-calculated. Differences reported between re-calculated statistics were then evaluated for significance.

Results: Nineteen studies and 20 series were identified. The following are reported and re-calculated means, respectively: sensitivity, 88% and 86%; specificity, 84% and 62%; accuracy, 77% and 75%; PPV, 65% and 50%; NPV, 44% and 39%; FN rates, 15% and 14%; FP rates, 38% and 38%. FP rates had a mean of 1.4% when re-calculated considering only malignant FNAB as positive tests. Specificity and PPV had statistically significant differences in means of reported and re-calculated values.

Conclusion: Thyroid FNAB remains the screening tool of choice in the evaluation of thyroid nodules. However, the variability in the calculation of reported thyroid FNAB statistics highlights the need for uniformity in statistical reporting for accurate examination of thyroid FNAB efficacy.

INTRODUCTION

Thyroid nodules can be palpated in 4-7% of the adult population in the United States; fortunately, only 5% of palpable nodules harbor malignancy. This low rate of malignancy is a relative contraindication for cytological testing in most populations. Fine-needle aspiration biopsy (FNAB) has proven itself to be a reliable, safe, and cost-effective screening test. When compared other screening tools, management based on FNAB results reduced the rate of confirmed malignancy on histology while limiting the number of surgeries. In addition, many series report sensitivity and specificity to both be greater than 90%.

We recently evaluated our institutional experience with FNAB. In comparing our statistical results with those published for large series, we found a wide variability not only in reporting series publishing their results, but in statistical calculations as well. To further clarify the variability we observed in our FNAB and present a more accurate picture of its efficacy as a screening tool, we evaluated recently published series containing more than 180 cases of FNAB with histological corroboration.

METHODS

Published approaches to thyroid FNAB statistical analyses

• Indeterminate FNAB considered positive test results
• Indeterminate FNAB considered negative test results
• Indeterminate FNAB not considered for analysis
• Indeterminate FNAB considered positive test when calculating specificity

RESULTS

19 studies with 20 series met inclusion criteria

<table>
<thead>
<tr>
<th>Cytologic Category</th>
<th>Range (mean)</th>
<th>MEEG/MGH Range (mean)</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Benign</td>
<td>21-89% (76%)</td>
<td>66.9%</td>
<td>0.89</td>
<td>0.70</td>
<td>0.67</td>
<td>0.51</td>
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<tr>
<td>Indeterminate</td>
<td>65-11% (11%)</td>
<td>28.3%</td>
<td>0.69</td>
<td>0.92</td>
<td>0.59</td>
<td>0.78</td>
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<tr>
<td>Malignant</td>
<td>3-16% (6%)</td>
<td>7.5%</td>
<td>0.57</td>
<td>0.98</td>
<td>0.57</td>
<td>0.86</td>
</tr>
<tr>
<td>Non-diagnostic</td>
<td>23-24% (15%)</td>
<td>16.8%</td>
<td>0.46</td>
<td>0.98</td>
<td>0.46</td>
<td>0.85</td>
</tr>
</tbody>
</table>

CONCLUSIONS

- There is an emphasized need for standardized FNAB reporting among medical centers
- Melenova et al reported FNAB results with a clinical grade, indicating the likely need for surgical intervention
- There is a highlighted need for uniformity in thyroid FNAB statistical analysis for a more accurate understanding of its efficacy

REFERENCES

1. Cameron JL. Thyroid Fine Needle Biopsy: Variability in Reporting. Thyroid. 2007;17:743-749
8. studies with ≥180 cases and available histological data with sufficient raw data to re-calculate descriptive statistics were examined.