BRIEF REPORT

Reliability of FNAC in diagnosing thyroid malignancy

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Abstract

Introduction

Thyroid diseases are common disorders with a great geographical variation worldwide. Underlying pathology of a thyroid swelling can be variable, with thyroid cancer being the most sinister pathology of all. Fine Needle Aspiration Cytology (FNAC) is a widely accepted, simple and minimally invasive investigation in the assessment of nodular thyroid disease.

Objective

This study was conducted to evaluate the reliability of FNAC in diagnosing malignant thyroid conditions.

Material and methods

Retrospective analysis of patients who underwent thyroidectomies in a teaching hospital during a ten month period was considered in the study. Their preoperative FNAC diagnosis was compared with the post operative histopathological diagnosis.

Results and conclusion

Data from 94 patients who underwent FNAC and subsequent histological examination were collected. Eight patients were excluded due to inadequate information given for a conclusive diagnosis. Out of the remaining 86 patients 44 had colloid nodules 16 had thyroiditis 24 had papillary carcinomas and 2 had follicular neoplasms. The FNAC reliability in diagnosing thyroid malignancy was concluded as sensitivity 73%, specificity 85%, positive predictive value 67.8% and negative predictive value of 87.9%. This is consistent with the recent reports in the literature that suggest sensitivity, specificity, positive and negative predictive values of FNAC in detecting thyroid diseases ranging from 84-98%, 67-100%, 34-92%, and 65-94% respectively.

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Introduction

Thyroid diseases are common disorders with great geographical variation worldwide. The incidence of thyroid diseases are higher in endemic areas (1) affecting females more than males [2]. The underlying pathology of a thyroid swelling can be variable, and of these the most sinister is thyroid cancer. Global Incidence of thyroid cancers is approximately 122,000 new cases per year (3). In Sri Lanka, thyroid cancers are responsible for 4.6% of all cancers and account for 6.9% of cancers in females(4). Fine Needle Aspiration Cytology (FNAC) is a widely accepted, simple and minimally invasive investigation in the assessment of nodular thyroid disease. It has been shown to have a high sensitivity in diagnosing malignancies as well as in the evaluation of thyroid nodules(5). At present, in Sri Lanka, FNAC is used as a routine first line diagnostic method to assess thyroid diseases. As it is a simple technique which can be carried out in the out-patient department, it can be readily repeated if necessary, and has good patient compliance. FNAC is therefore used in combination with radiological investigations in many recognized centers to assess discrete thyroid swellings to diagnose or exclude a malignancy. FNAC has also reduced the need of isotope scans and the necessity for surgery.

This study was conducted to evaluate the reliability of FNAC in diagnosing malignant thyroid conditions.

Material and methods

The study was conducted on patients who underwent thyroidectomies in a teaching hospital during a period of ten months. Relevant histopathalogical and FNAC results were collected retrospectively. Patients who had undergone thyroidectomies but where the FNAC could not be traced, and those whose histopathological examination was not done at the same hospital were excluded from the study. Data analysis was carried out

manually according to standard analytical methods.

Results

Data from 94 patients who underwent FNAC and subsequent histological examination were collected. Eight were excluded due to inadequate information given for a conclusive diagnosis. Out of the remaining 86 patients FNAC showed 44 colloid nodules 14 thyroiditis and 28 neoplasms. In the subsequent histological examinations 44 had colloid nodules 16 had thyroiditis 24 had papillary carcinomas and 2 had follicular neoplasms (table 1)

According to the above data there were 19 true positives, 51 true negatives, 9 false positives and 7 false negatives. So sensitivity, specificity, positive predictive value and negative predictive value of FNAC in diagnosing thyroid malignancy are 73%, 85%, 67.8%, and 87.9%, respectively. (Table 2)

Discussion

FNAC contributes significantly to the pre operative investigation in patients with thyroid enlargement. The technique is safe simple and quick with a low complication rate. Several other tests such as high resolution ultrasonography, radioisotope scanning and FNA biopsy have been used for evaluation of thyroid swellings before proceeding to thyroid surgery. Studies have demonstrated that among all these diagnostic modalities, FNAC is the most accurate, cost effective screening test for rapid diagnosis of thyroid swellings (10-12). Despite its well documented value there are limitations to the technique.

A false negative FNAC results may occur because of sampling error or misinterpretation of cytology, and are of great concern because they indicate the potential to miss malignant lesions (13). However, it is difficult to calculate the true frequency of false negative results because only a small percentage (approx. 10%) of patients with benign cytological findings undergo surgery. Most authorities agree that the true false negative rate is below 5% if all patients with thyroid FNAC also have a histological examination (14). False negative FNA cytology results occurred in 7 (8.1%) of our patients. This is slightly higher than the recent reports in the literature that suggest a false negative rate of 2-7%(6-11) A false positive cytology result may in retrospect have resulted in surgical over treatment for an individual patient. False positive FNA cytology results are uncommon and were found in only 9(10.4%) patient in this series. This finding is slightly higher when compared with resent reports that cited an incidence of false positive FNA cytology results ranging from 0-9 % (15-20). In our study sensitivity, specificity, positive predictive value and negative predictive value were 73%, 85%, 67.8%, 87.9% respectively. This is consistent with the recent reports in the literature that suggest sensitivity, specificity, positive and negative predictive values of FNAC in detecting thyroid diseases ranging from 84-98%, 67-100%, 34-92%, and 65-94% respectively. The determinant factors for such a wide range could be the methodological differences, the technique of aspiration, preparation of smears, the nature of the nodule, and condition of the sample and experience of the reporting pathologist

Conclusion

In conclusion this study validates our unit's utilization of FNAC as a reliable diagnostic tool for evaluating thyroid nodules with a sensitivity, specificity, positive predictive value and negative predictive value of 73%, 85%, 67.8%, 87.9% respectively.

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Editorial comment:

The authors' presentation of an audit of their experience with FNAC in the evaluation of thyroid nodules from a provincial surgical unit is appreciated by the editorial team. While adding to the existing data on this well studied topic, it reinforces the principle of audit and research in improving surgical standards.