Research Article

Role of fine needle aspiration cytology in the diagnosis of papillary carcinoma thyroid: A retrospective study from north-east India

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ABSTRACT

Background: Thyroid cancer is the most common endocrine malignancy, and 85% of thyroid cancers are papillary thyroid carcinoma (PTC) making it the most common malignant tumor among all thyroid cancers. **Objectives:** To analyze the efficacy of fine needle aspiration cytology (FNAC) as the first-line diagnosis of PTC. **Materials and Methods:** A retrospective study was conducted over a period of 10 years 6 months from January 2007 to June 2017. All the cases of thyroid nodules, which are suspected to have thyroid malignancy from history and clinical examination, and morphologically proven cases of PTC either on FNAC or histopathology were included in the study. FNAC results were compared with the definitive histological diagnosis, which was considered the gold standard. The cytological evaluation and reporting of thyroid lesions were done in accordance with the Bethesda system of reporting thyroid cytopathology. **Results:** A total of 106 cases were included in the study. Out of the 106 cases, FNAC was inadequate in 8 cases (7.54%), benign in 18 cases (16.98%), atypia of undetermined significance/follicular lesion of undetermined significance in 2 cases (1.88%), follicular neoplasm (FN)/ suspicious for FN in 8 cases (7.54%), suspicious for malignancy in 27 cases (25.47%), and malignant in 43 cases (40.56%). Out of the 106 cases, 75 cases (70.75%) were PTC, which had histopathological correlation. The sensitivity and specificity of FNAC were 87.14% and 77.27%, respectively. **Conclusion:** FNAC is helpful in triaging the suspicious thyroid lesions for further management. FNAC is quite useful in diagnosis of PTC.

KEY WORDS: Fine Needle Aspiration Cytology; Thyroid; Papillary Carcinoma

INTRODUCTION

Thyroid cancer is the most common endocrine malignancy and represents 1% of all malignancies.[1,2] About 75-85% of thyroid cancers are papillary thyroid carcinoma (PTC) making it the most common malignant tumor among all thyroid cancers.[3,4] It is even more commonly seen in the North-East sub-Himalayan India. Most patients, if diagnosed early, respond to surgery and targeted therapy with radioactive iodine.[4] Fine needle aspiration cytology (FNAC) is a rapid, efficient, inexpensive, and safe diagnostic method in these cases.[5] With this background knowledge, the present study was conducted to reclassify all the clinically suspicious cases of thyroid nodules as per the Bethesda system for thyroid cytopathology and to establish the efficacy of FNAC as the first-line diagnosis, and surgical management of PTC.

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MATERIALS AND METHODS

A retrospective study was conducted over a period of 10 years 6 months from January 2007 to June 2017. All thyroid nodules, which were suspected to have thyroid malignancy from history and clinical examination, and morphologically proven cases of PTC either on FNAC or histopathology, were

included in the study. A total of 106 cases were included in the study. FNAC results were then compared with the definitive histological diagnosis, which was considered the gold standard. Cases with cytohistological disparity were reanalyzed for the detection of possible cause. Thyroid swellings were aspirated using 24 gauge disposable needles using standard procedures. The aspirated contents of the needle were expelled onto glass slides. 4-6 slide smears were made for each case. Half of the slides were immediately fixed in 95% ethyl alcohol. These slides were stained with Papanicolaou and May-Grunwald-Giemsa stains.

RESULTS

The cytological evaluation and reporting of thyroid lesions were done in accordance with the Bethesda system of reporting thyroid cytopathology. Out of the 106 cases, FNAC was inadequate in 8 cases (7.54%), benign in 18 cases (16.98%), atypia of undetermined significance/follicular lesion of undetermined significance (AUS/FLUS) in 2 cases (1.88%), FN/SFN in 8 cases (7.54%), suspicious for malignancy in 27 cases (25.47%), and malignant in 43 cases (40.56%).Out of the 106 cases with cytohistological correlation, 75 cases (70.75%) were PTC (Figures 1a and b).

In the 75 cases of PTC, the age of the patients ranged from 14 to 62 years. Sixty cases were females and 15 were males. The male:female ratio was 1:4 (Figure 2).

The distribution of cytological diagnoses of the biopsy-proven cases of PTC, according to the six categories of the Bethesda system of reporting thyroid cytopathology was done as follows: 6 cases were (8%) nondiagnostic, 3 (4%) benign, 0 (0%) AUS/FLUS, 2 (2.7%) FN/SFN, 27 (36%) suspicious for malignancy (SM), and 37 cases were (49.3%) malignant.

Statistical analysis of all the lesions included in the study showed sensitivity, specificity, accuracy, false positive rate, false negative rate, positive predictive value, and negative predictive value of FNAC to be 88.75%, 70.83 %, 83.01%, 29.16%, 13.41%, 91.03%, and 65.38%, respectively.

Statistical analysis of only the PTC cases showed sensitivity, specificity, accuracy, false positive rate, false negative rate, positive predictive value, and negative predictive value of FNAC to be 87.14%, 77.27%, 84.78%, 22.72%, 12.85%, 92.42%, and 65.38%, respectively.

DISCUSSION

In the present study, out of 75 cases of PTC, there were 6 (8%) nondiagnostic cases and 3 (4%) benign cases as per the Bethesda system of reporting thyroid cytopathology. All these cases had low cellularity leading to nondiagnostic material or an erroneous benign diagnosis. There were 2 cases (2.7%)

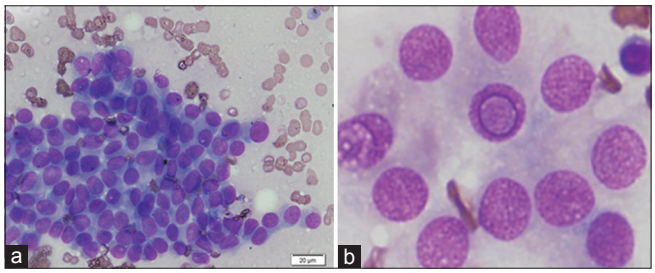

Figure 1: (a) Smears show papillary formations (×10, May-Grunwald-Giemsa [MGG]), (b) intranuclear inclusions seen in the cells (×40, MGG)

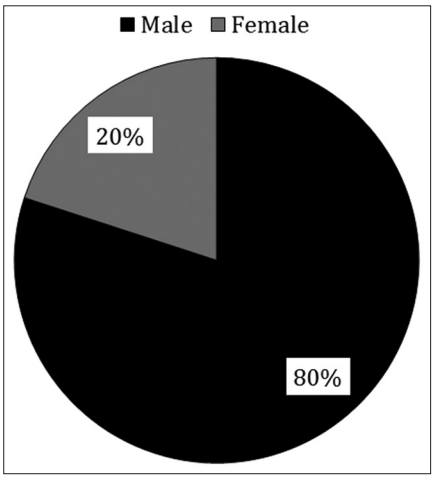

Figure 2: Sex distribution of the papillary thyroid carcinoma cases

of FN/SFN, which turned out to be PTC on histopathology. Both the cases were invasive follicular variant of PTC, which led to the diagnosis of FN/SFN on FNAC. Literature suggests that diagnosing papillary carcinoma is less of a problem. In the present study, the sensitivity, specificity, and accuracy of PTC cases on FNAC were 87.14%, 77.27%, and 84.78%. The false positive rate in the present study was 22.72%. This finding is comparable with that of Nyyef et al.[3] However, some studies show high false negative rates.[6] The authors attributed the poor results to a variety of reasons such as inexperienced operators, operator variability, and low numbers.[6]

Major criteria for the diagnosis of PTC on FNAC are high cellularity, papillary formations, cells with enlarged nuclei showing anisonucleosis and powdery chromatin, and definite nucleoli. Intranuclear pseudoinclusions and grooves are seen in most of the cases. Psammoma bodies, multinucleate giant cells, and ropy colloid are variably present.[6] In the present study, all the cases of PTC had papillary formations with definite nucleoli. Intranuclear pseudoinclusions and grooves were significant.

In spite of the already introduced major selection bias of preselecting only morphologically proven cases of thyroid malignancy, still, the Bethesda system of reporting thyroid cytopathology was seen to be very powerful method in

triaging the clinically suspicious patient for management. This is in concordance with various studies.[7,8]

FNAC of the thyroid gland is now a well-established, the first-line diagnostic test for the evaluation of diffuse thyroid lesions as well as of thyroid nodules.[9] Nevertheless, like any other test, FNAC has its limitations and diagnostic pitfalls.[5] These limitations include false negative and false positive results and a proportion of FNAC results that are not obviously benign or malignant and fall into the indeterminate or suspicious group.[10] The reported pitfalls are those related to specimen adequacy, sampling techniques, the skill of the physician performing the aspiration, the experience of the pathologist interpreting the aspirate, and the overlapping cytological features between some benign and malignant thyroid lesions.[11] A guided FNAC was certainly better in nonpalpable lesions, however, in palpable lesion even an unguided FNAC could yield equally comparable result.

Although the present study is a retrospective analysis, however attempted to assess the role of cytological diagnosis based on the Bethesda system of reporting thyroid cytopathology in the diagnosis of PTC in a high incidence region.

CONCLUSION

The present study proves the reliability of the Bethesda system of reporting thyroid cytopathology in successfully triaging the suspicious thyroid lesions for further management. FNAC is quite useful in the diagnosis of PTC with high sensitivity and specificity.

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