



USE OF CELL BLOCK STUDY ALONGSIDE FNAC IN DIAGNOSIS OF THYROID LESIONS

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ABSTRACT

This study was aimed at bringing forward the significance of cell-block study along with fine needle aspiration cytology in diagnosing various thyroid lesions. Patients with thyroid swellings were selected in the pathology department of SreeBalaji Medical College and hospital (SBMCH). A retrospective study was done for 30 patients in total. Comparison of cytological and histopathological results was done following the respective procedures. There were a total of 6 insufficient cases, which didn't fit into the standard criteria for diagnosis. The following FNAC reports were made: 15 (50%) colloid goiter, 5 (16.7%) Hashimoto thyroiditis, 2 (6.7%) follicular neoplasm (without atypia), 2 (6.7%) follicular neoplasm (with atypia), 2 (6.7%) suspicious of malignancy, 3 (10%) papillary thyroid carcinoma, and 1 (3.3%) undefined category of thyroid carcinoma. The sensitivity of FNAC against the histopathological results of cell-blocks was 92.6% and specificity was 97.4%. This study shows the importance of performing cell-block for each case of FNAC of thyroid lesions, thus making the diagnosis and management of thyroid lesions more effective

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INTRODUCTION

Thyroid lesions are one of the most common conditions all over the world presenting as a neck swelling [1]. Neck swellings mostly indicate a thyroid problem that carries profound morbidity and mortality, especially taking neoplastic lesions into account, which are a nightmare for clinicians if not managed properly with correct diagnosis. There are diffuse or nodular swellings which can be multiple or solitary. Possibility of the nodule being malignant in solitary nodular lesions becomes a menace for clinicians making it more worrisome [2]. Sometimes diffuse swelling of the neck may become immobile due to infiltration especially in anaplastic carcinoma [3]. Thyroid nodules may be found incidentally, occasionally when evaluating the neck by USG [4, 5]. Majority of thyroid lesions are non-neoplastic /benign, rest 5% only make up the malignant neoplasms [6]. The importance of distinguishing benign from malignant lesions becomes evident when it comes to surgical removal in patients, because it avoids misdiagnosis. In view of this aspect, there are several techniques used for diagnosis of such conditions, including, high-resolution USG, radionuclide imaging and FNAC. In spite of this, FNAC is considered as the cost-effective and accurate procedure [7], which is not say that FNAC doesn't have disadvantages, that includes false positive or false negative results. Sometimes findings that are not obviously either benign or malignant, unfortunately have to be placed under the "indeterminate" or "suspicious for malignancy" category [8].

Objectives

- The aim of the current study is to assess the importance of cell block in diagnosis of thyroid lesions
- To study cell-block with FNAC diagnosis correlation.

MATERIALS AND METHODS

A retrospective study was performed on 30 patients with thyroid swellings referred to cytopathology unit in SBMCH, during the period between January 2017 to December 2018. The case details were sought for and information about the age, sex, USG findings were reviewed. Aspiration of thyroid swellings was done using (23/24) gauge disposable needles using standard procedures [9]. The smears were processed for histopathological study. Four smears were made for each case, then fixed in 95% ethyl alcohol for approximately 30 min followed by staining with hematoxylin and eosin (H&E) stains. The residual material in the syringe was centrifuged, clotted and fixed in neutral buffered formalin and kept for 12 hours, then processed as cell-blocks. The cytological smears were grouped into insufficient/inadequate for diagnosis, benign, atypical follicular lesion of undetermined significance, follicular neoplasm, suspicious of malignancy and malignant [9]. Adequacy criteria was followed and cases were labelled insufficient if there were less than four groups of follicular cells in the smear and the if cell-blocks were follicular cell negative. The FNAC positive and negative results were assessed for diagnosis of malignancy in relation to the histopathology findings of cell-blocks. Along with this, the sensitivity, specificity, positive predictive value (PPV),

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negative predictive value (NPV) and diagnostic accuracy were determined [10].

RESULTS

The age of patients in the study varied from 15 to 60 years, with a median age of 45 years. Cases of papillary carcinoma of thyroid were mostly in the 20 age group, while anaplastic carcinoma was found at the age of 60 years. There was no definite age group for follicular adenoma or colloid goiter. Sex distribution of case numbers was 8 males and 22 females with ratio of 1:3. However, sex distribution of malignancy was shown to be insignificant. Table(1) shows findings of FNAC and results of histopathological diagnoses of cell block are shown in table(2). There were 15 cases (50%) diagnosed by FNAC as colloid goiters out of which 2 cases showed different findings on histopathological examination of cell blocks. The 2 cases diagnosed as follicular neoplasm with atypia actually showed findings of papillary carcinoma - follicular variant histopathologically. Out of the 2 cases diagnosed as suspicious of malignancy, one of them revealed colloid goiter and the other showed follicular adenoma. FNAC results showed that sensitivity was 92.6%, specificity was 97.4%, positive predictive value (PPV) was 85.6%, negative predictive value (NPV) was 98.3%, false positive rate (FPR) was 67.6%, and false negative rate was 33.3%. Total accuracy was 96.2%.

Table 1 Distribution of FNAC cases

Cytological diagnosis	Number	Percentage
Colloid goitre	15	50%
Hashimoto thyroiditis	5	16.7%
Follicular lesion without atypia	2	6.7%
Follicular lesion with atypia	2	6.7%
Papillary thyroid carcinoma	3	10%
Thyroid carcinoma - undefined category	1	3.3%

Table 2 Relation of FNAC Cytological Diagnosis with cell block histopathological Diagnosis

	No.		No.
Colloid goitre	15	Colloid goiter	13
		follicular adenoma	1
		Colloid cyst	1
Hashimoto thyroiditis	5	Hashimoto thyroiditis	5
Follicular lesion without atypia	2	Follicular adenoma	2
Follicular lesion with atypia	2	Papillary carcinoma follicular variant	2
Papillary thyroid carcinoma	3	Papillary carcinoma	3
Thyroid carcinoma - undefined category	1	Anaplastic carcinoma	1

DISCUSSION

Thyroid tumors arise from epithelial and even the non-epithelial stromal elements [11]. The most basic accepted classification of thyroid neoplasms are follicular, papillary, medullary and anaplastic types in general [12]. In this study, papillary carcinoma was detected in the 2nd decade, while anaplastic carcinoma was found at age of 60 years which is in accordance with the finding of a previous literature stating that malignancy risk is increased for thyroid swelling at extremes of age [13]. Thyroid cancer is the most common type of endocrine malignancy and it carries a favourable prognosis with early diagnosis and proper management [14]. It is therefore important to have a holistic and structured method to assess the risk of malignancy in thyroid lesions. The accuracy of FNAC for detection of neoplasm in the current study was 96.2%, whereas it varied from 68% to 96% in other studies [10, 18]. Even though FNAC is important in diagnosis of

thyroid FNAC, it still has demerits related not just only to inadequate sampling but also, more importantly, to its inability to diagnose malignant follicular neoplasms in the absence of nuclear features of papillary carcinoma [19]. Introduction of cell-block in our present study helped to improve the accuracy and the interpretation. With regards to sampling adequacy, it was found that some cases that were smear negative had been diagnosed positively with cell-block, which probably occurs due to inefficient smearing and processing or limitation in centrifuging cyst fluids.

The results that were obtained by FNAC were then compared with the definitive histopathological diagnosis. The difficulty in distinguishing benign from malignant cases in the FNAC, explain our findings of two cases diagnosed cytologically as suspicious of malignancy and revealed in histopathology as colloid goiter in one case and follicular adenoma the other. The indeterminate category of follicular lesions includes a number of thyroid lesions such as adenomatoid (cellular) nodule, follicular adenoma, and follicular carcinoma [20]. This was in support of our findings in the cases diagnosed as follicular neoplasm without atypia that was found to be that of follicular adenoma. Follicular variant of papillary carcinoma interpretation from our study in cytology may be tedious when prominent classic nuclear features of papillary thyroid carcinoma are not visualised. In the present study, we found 1 case diagnosed as follicular neoplasm with atypia to be that of papillary carcinoma of follicular variant. In this situation, a preoperative diagnosis of “follicular lesion suggestive of papillary carcinoma” may allow conservative surgical management until a definitive diagnosis can be made for better treatment options [21].

With regards to diagnosis of Hashimoto thyroiditis, cell-block was useful for finding degenerated follicular cells and plasma cells. Even more, cell-block was very helpful in the diagnosis of papillary thyroid carcinoma and carcinoma of undefined category since the papillary pattern and nuclear features were more obvious. The inadequacy of smears was 15% but cell block had reduced it to 5.8%.

In the present study 1 case with an FNAC diagnosis of colloid goiter was actually found to be follicular adenoma on cell block examination. Previous literature agreed with this finding with the caveat that the distinction between a cellular colloid goiter and a follicular neoplasm may be difficult - Hall *et al*; [22]. Cystic nodules were found in 4 cases (13.3%) of the study that were previously diagnosed as colloid goiter in cytology, making up to 10-25% of all thyroid nodules as confirmed with several other studies [23], which portrays further diagnostic challenges. Both benign and malignant thyroid nodules show cystic degeneration, the malignancy risk of which comes even upto 10% [24]. Conventional FNAC for cystic thyroid nodules has an increased rate of false negatives and non-diagnostic results [30]. So in effect, cell-block may solve this problem, as a quiet large amount of the fluid is aspirated and centrifuged. Cysts may have partially solid component, hence it must be aspirated for residual tumor in its entirety especially if not too viscous. USG FNAC can then be performed to sample the suspicious solid part. The merit of USG cannot be stressed enough as it allows direct sampling of the wall and the solid portion of the cystic thyroid nodule, thereby increasing chances of acquiring a representative sample [24, 25].

CONCLUSIONS

This study definitely shows the merits of performing cell block along with FNAC. Cell block showed a better final interpretation of morphology of the papillary structures or follicles along with nuclear features. Therefore it is advisable and helpful to perform cell-block for all cases of FNAC of thyroid lesions if adequate and sufficient material is acquired in order to reduce false negatives, false positive cases and shortcomings of FNAC procedure. A broad statistical study with larger sample size might probably assist us to gain better information and perspective with regard to the use of cell blocks. This combined effort will make a surgeon's decisions much easier when it comes to proper surgical management.

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