

Original Research Article

FNAC and Cell Block Study in Thyroid Lesions

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Abstract: The aim of the study is to highlight the importance of cell-block study in combination with FNAC in the diagnosis of different thyroid lesions. This study was a retrospective study of 30 patients with thyroid swellings who came to cytopathology unit in SreeBalaji Medical College. FNAC and cell-blocks performed for each case was reviewed. Cytological results of FNAC were compared to the cell-block histopathological picture. FNAC findings were diagnosed as follows: 16 (61%) as colloid goiter, 4 (5.8%) as Hashimoto thyroiditis, 2 (5.8%) follicular neoplasm without atypia, 2 (2.3%) as follicular neoplasm with atypia, 2 (2.3%) as suspicious of malignancy, 3 (11.7%) papillary thyroid carcinoma, and 1 (1.1%) thyroid carcinoma of undefined category. Insufficient cases were 5 in number. The sensitivity of FNAC in comparison with histopathological results of cell-blocks was 91.6% and specificity was 97.2%. It is advised to perform cell-block for each case of FNAC of thyroid lesions to decrease the pitfalls and to improve the diagnosis and management of thyroid lesions.

Keywords: Thyroid, Cytology, Histopathology, Lesions

INTRODUCTION:

Neck swelling is a common clinical presentation all over the world. Among which thyroid lesions are more common in many countries [1]. Clinicians look for neck swelling as it mostly indicates a thyroid problem that carries significant morbidity and even mortality if it is not managed. The swellings may be diffuse or nodular and solitary nodules are more cause of concern for the clinician due to the possibility of the nodule being malignant [2]. Sometimes the diffuse swelling of the neck may be due to cases of anaplastic carcinoma wherein the tumour because of infiltration becomes immobile [3]. Occasionally thyroid nodules may be an incidental finding during ultrasonographic evaluation of the neck [4, 5]. Only 5% of nodules are malignant and the vast majority is non-neoplastic lesions or benign neoplasms [6]. In order to avoid misdiagnosis and hence unnecessary surgery in patients with benign thyroid nodules, it is essential to distinguish between benign and malignant lesions. In this respect, there are many different techniques used for diagnosis of such conditions, including radionuclide scanning, high-resolution ultrasonography and FNAC. However, the FNAC is regarded as the single most accurate and cost-effective procedure [7]. FNAC has its limitations and

disadvantage. These limitations include false negative or positive results and a finding that is not obviously benign or malignant and falls into the indeterminate or suspicious group [8].

OBJECTIVES:

- The aim of the present study is to assess the usefulness of cell block study in the diagnosis of thyroid lesions
- To study the correlation of cell-block technique with FNAC diagnosis

MATERIALS AND METHODS:

A retrospective study was done on 30 thyroid swellings referred to cytology unit in pathology department in SBMCH, in the period between January 2015 to December 2016. The case notes were retrieved and information about the age, sex, ultrasound findings and cytological and histological diagnoses were reviewed. Thyroid swellings had been aspirated using (23/24) gauge disposable needles following the standard procedures [9]. The smears were prepared for histological study. Four slide smears were made for each case and immediately fixed in 95% ethyl alcohol for about 30 min and stained with hematoxylin and eosin (H&E). The remnants in the syringe were

centrifuged, clotted, fixed in neutral buffered formalin for 12 hours and processed as small cell-blocks. The cytological smears were categorized into insufficient for diagnosis, benign, atypical follicular lesion of undetermined significance, follicular neoplasm, suspicious for malignancy, and malignant sampling [9]. The case was considered insufficient if less than four groups of follicular cells could be seen in the smear and the cell-block were negative for follicular cells. The positive and negative FNAC results for diagnosis of malignancy in relation to the histopathology of cell-blocks were determined. Also, the sensitivity, specificity, diagnostic accuracy, positive predictive value (PPV) and negative predictive value (NPV) were calculated [10].

RESULTS:

All patients in this study ranged from 15 to 65 years, with a median age of 40 years. Cases of papillary carcinoma were in twenties while anaplastic carcinoma was found at the age of 65 years. No definite age for

follicular adenoma or colloid goiter was recognized. Sex distribution of case numbers was 10 males and 20 females with ratio of 1:2. However, sex distribution of malignancy was insignificant. Table 1 summarizes the findings of FNAC smears while results of histopathological diagnoses are shown in table 2. There were 16 cases (61%) diagnosed by FNAC as colloid goiters out of which 2 cases had different diagnosis on histopathological examination of cell blocks. The 2 cases diagnosed as follicular neoplasm with atypia were diagnosed histopathologically as papillary carcinoma of follicular variant. Out of the 2 cases diagnosed as suspicious of malignancy, one of them revealed colloid goiter and the other showed follicular carcinoma. FNAC results showed that sensitivity was 91.6%, specificity was 97.2%, positive predictive value (PPV) was 84.6%, negative predictive value (NPV) was 98.5%, false positive rate (FPR) was 66.6%, and false negative rate was 33.3%. Then, total accuracy was 95.2%.

Table 1: Distribution of Cases According To FNAC

CYTOLOGICAL DIAGNOSIS	NUMBER	PERCENTAGE
Colloid goitre	16	61%
Hashimoto thyroditis	4	21.6%
Follicular neoplasm without atypia	2	2.3%
Follicular neoplasm with atypia	2	2.3%
Papillary thyroid carcinoma	3	11.7%
Thyroid carcinoma of undefined category	1	1.1%

Table 2: Relation of Cytological Diagnosis with Histopathological Diagnosis

	No	Histopathological Diagnosis	No
Colloid goitre	16	Colloid goiter	14
		follicular adenoma	1
		Colloid cyst	1
Hashimoto thyroiditis	4	Hashimoto thyroiditis	4
Follicular neoplasm without atypia	2	Follicular adenoma	2
Follicular neoplasm with atypia	2	Papillary carcinoma follicular variant	2
Papillary thyroid carcinoma	3	Papillary carcinoma	3
Thyroid of undefined category	1	Anaplastic carcinoma	1

DISCUSSION:

Thyroid tumors arise from different kinds of cells including the non-epithelial stromal elements [11]. Classification into papillary, follicular, medullary and anaplastic types is generally accepted [12]. In this study, papillary carcinoma was detected in the twenties, while anaplastic carcinoma was found at age of 65 years. This finding is similar to the conclusion of previous literature stating that the risk of malignancy is increased for thyroid swelling at extremes of age [13]. Although thyroid cancer is the most common type of endocrine malignancy, it carries a favourable prognosis with the early and appropriate management [14]. It is therefore important to have a structured diagnostic method to ascertain the risk of malignancy in thyroid

lesions. The overall accuracy of FNAC for detection of neoplasm in the current study was 95.2%, whereas it varied from 69% to 96.2% in other studies [10, 18]. Despite the proved clinical importance of thyroid FNAC, it still has limitations related not only to inadequate sampling but also, most importantly, to its inability to define malignant follicular lesions in the absence of nuclear features of papillary carcinoma [19]. We introduced cell-block study in order to improve the accuracy and the interpretation. In regards to the adequacy of the samplings, we found some cases which were negative in the smear had been diagnosed in the cell-block. This finding may be attributed to inefficient smearing or failure to centrifuge cyst fluids.

FNAC results were then compared with the definitive histological 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 carcinoma the other. The indeterminate diagnosis of follicular neoplasm includes a number of heterogeneous thyroid lesions such as cellular adenomatoid nodule, follicular adenoma, and follicular carcinoma [20]. This agreed with our findings in the cases diagnosed as follicular neoplasm without atypia which was found to be follicular adenoma. The interpretation of follicular variant of papillary carcinoma (FVPC) in cytology may be difficult when prominent classic nuclear features of papillary thyroid carcinoma are absent. In our study, we found 1cases diagnosed as follicular neoplasm with atypia that was found to be papillary carcinoma of follicular variant at histopathological investigation. In such cases, a preoperative diagnosis of “follicular lesion suggestive of papillary carcinoma” results in conservative surgical assessment until a definitive diagnosis can determine the appropriate line of treatment [21].

In this study one case diagnosed as colloid goitre on FNAC was found to be follicular adenoma on cell block. Hall *et al.*;[22] agreed with this finding and accounted that the distinction between a cellular colloid goiter and a follicular neoplasm may be impossible. Cystic nodules were detected in 5 cases (5.8%) of our study which were previously diagnosed in cytology as colloid goiter, representing 10–25% of all thyroid nodules similar to other literature [23]. This represents additional diagnostic challenges. Cystic degeneration may be observed in both benign and malignant thyroid nodules. The malignancy rate within cystic thyroid nodules is 10% [24]. However, conventional FNAC for cystic thyroid nodules has a high rate of non-diagnostic and false negative results [30]. Cell-block may resolve this problem, as a large amount of the fluid are aspirated and centrifuged. The few follicular cells that may appear within a large number of degenerated cells might easily rule out malignancy thus preventing a misdiagnosis. Most cysts have a partially solid component, and these cysts should be aspirated for residual tumor. Initially the cystic fluid, if not excessively viscous, should be completely aspirated and sent for cytopathologic evaluation. Ultrasound-guided FNAC can then be performed to sample the suspicious solid component. Ultrasound (US) investigation permits direct sampling of the wall and/or the solid portion of the cystic thyroid nodule, thereby increasing the possibility of a representative sample [24, 25].

In regards to Hashimoto thyroiditis, cell-block was useful for finding the few degenerated follicular cells and in detection of plasma cells which were useful for the diagnosis of Hashimoto thyroiditis. Moreover, cell-block was very helpful in the diagnosis of papillary

thyroid carcinoma and the carcinoma of undefined category; as the papillary configuration and nuclear features were more obvious. The inadequacy of smears was 15% but cell block had reduced it to 5.8. %.

CONCLUSIONS:

This study clearly shows the added advantages of performing cell block in FNAC aspirations. A broader study with larger sample size will help us to gain a better perspective with regard to this. The cell block enabled a better interpretation of morphology of the papillae or follicles along with the study of nuclear features. Hence it is advisable to perform cell-block for all cases of FNAC of thyroid lesions if sufficient material is obtained in order to reduce pitfalls, false negatives and false positive cases. This helps the surgeon to plan a more appropriate management protocol for the patient.

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