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Cytological evaluation of thyroid swellings Govt. Medical College, Kathua: Two year study

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Abstract

Fine needle aspiration cytology plays an important role in avoiding unnecessary surgeries as benign and malignant lesions virtually cannot be accurately diagnosed by any non-invasive method. FNA has become the first line diagnostic test in the preoperative evaluation of thyroid lesions because of the simplicity, diagnostic accuracy and cost effectiveness. The Bethesda system of thyroid cytology reporting makes the reports clinically relevant and helps the clinicians to take appropriate therapeutic interventions. The study was conducted both retrospectively and prospectively over a period of 2 year. All fine needle aspirates of thyroid done in the Cytology laboratory of Department of Pathology of GMC Kathua were included in the study. A total of 76 patients were included in this study, Out of 76 patients, 69 cases were reported as benign (90.7%) lesions. Only 03 (3.9%) cases were reported as malignant lesions. 04 cases were reported as unsatisfactory aspirate due to scant cellularity. Among the benign cases, the most common diagnosis was benign follicular nodule in 50 cases (65.8%) followed by autoimmune thyroiditis in 17 cases (22.6%). 01 case (1.31%) each was reported as granulomatous thyroiditis and thyroglossal cyst. Benign follicular nodule cases comprised of 47 (61.8%) colloid nodule and 03 cases (3.9%) of adenomatous nodule. Among cases of autoimmune thyroiditis, 10 cases (13.1%) were reported as Hashimoto's thyroiditis and 7 cases (9.2%) were reported as lymphocytic thyroiditis. All the malignant cases were of papillary carcinoma, thyroid. Thyroid cytopathology can fairly distinguished between inflammatory, benign & malignant lesions. Therefore, thyroid fine needle aspirate is a cost effective, easy and time saving OPD procedure. It can reliably and effectively be used for preoperative diagnosis and accurate categorization of thyroid lesions.

Keywords: Thyroid swelling, colloid goiter, lymphocytic thyroiditis, hashimoto's thyroiditis, papillary carcinoma

Introduction

Thyroid swellings are an important concern in the general population. Non-Neoplastic swellings do not require surgery. Thus, FNAC plays an important role in avoiding unnecessary surgeries as benign and malignant lesions virtually cannot be accurately diagnosed by any non-invasive method. FNA has become the first line diagnostic test in the preoperative evaluation of thyroid lesions because of the simplicity, diagnostic accuracy and cost effectiveness. It is also useful in the diagnosis and monitoring of autoimmune thyroid lesions, especially in clinically equivocal cases and cases where biochemical and immunological parameters are normal or marginally abnormal. With increasing experience Thyroid cancer is the most common malignant tumor of the endocrine system, and accounts for 1.1% of all malignant tumors. FNA also has therapeutic role by relieving the compressing symptoms on aspiration of cystic swellings. It also stratifies cases requiring further investigations, surgical intervention or just clinical follow-up. It mainly rules out the unnecessary explorative surgical procedures^[1].

In fact, thyroid cancer is considered one of the most common malignant tumors it is the eighth most common malignant tumor in women. The incidence of thyroid cancer in nodules varies from approximately 0.1% in the general population to 20% in surgically biopsied nodule^[2].

The Bethesda System for Reporting Thyroid Cytopathology (TBSRTC) established a uniform, tiered reporting system for thyroid FNA specimens. The Bethesda system of thyroid cytology reporting makes the reports clinically relevant and helps the clinicians to take appropriate therapeutic interventions. We planned this study to evaluate spectrum of various thyroid lesions on FNAC and categorize them according to Bethesda System of Reporting

Thyroid Cytopathology & to correlate the cytological findings with clinical features.

Materials and Methods

The present study was conducted both retrospectively and prospectively over a period of 2 year starting from Aug 2019. All FNACs of thyroid lesions done in the Cytology laboratory of Deptt. Of Pathology of GMC Kathua were included in the study. The patients were enrolled in the study after taking the written informed consent. Study proforma included the demographic information, clinical features, radiological details, thyroid function tests as well as cytological features and diagnosis. The aspiration technique was essentially the same whether palpation or Ultrasonography is used for guidance. Depending on the circumstances and operator preference, the aspiration can be performed with or without suction applied by a syringe. No local anesthesia was used. After cleaning the skin with betadine swab followed by alcohol swab, FNA was done with 22-gauge needle attached to 20 cc disposable syringe fitted in a syringe holding Franzen handle. Samples were smeared onto glass slides and fixed in Isopropyl alcohol and stained with Papanicolaou stain. Air dried smears were stained with May-Grunwald Giemsa (MGG) stain. In cystic lesions, the aspirated fluids were processed through cytopspin and smears were made from the sediment. The cytological results were correlated with clinical features and thyroid function test. Stained smears were evaluated according to The Bethesda System of Thyroid Cytology Reporting (TBSRTC) which makes the reports clinically relevant and helps the clinicians to take appropriate therapeutic interventions. TBSRTC classify thyroid lesions into following main categories

- Nondiagnostic/unsatisfactory (ND/UNS)
- Benign
- Atypia of undetermined significance/follicular lesion of undetermined significance (AUS/FLUS)
- Follicular neoplasm/suspicious of a follicular neoplasm (FN/SFN)
- Suspicious for malignancy (SFM), and malignant.

Data was collected and analyzed by using appropriate statistical methods

Results

A total of 76 patients were included in this study, of which 89.4% were females and 10.5% were males with M:F ratio

of 1:8.5. The most common age group was 2-40 years with mean age of 29.3 years (46.0%) followed by 41-60 years age (38.1%) with mean age of 51.2 years. The youngest patient presented at the age of 13 years, diagnosed as lymphocytic thyroiditis.

The most common presenting symptom was solitary thyroid swelling seen in 53 cases (70.6%). Diffuse thyroid swelling was present in 19 cases (25.3%). 10 patients (13.1%) presented with complaint of pain. The thyroid function tests were available in 60 cases. Of them, 36 patients (60%) were found to be euthyroid, 22 (29.3%) hypothyroid and 02 (3.33%) hyperthyroid. USG findings were available only in 36 cases in which maximum cases (50%) were hyperechoic followed by 27.7% cases as hypoechoic and 22, 2% cases as isoechoic.

Among 76 patients, 69 patients reported as benign (90.7%). Only 03 patients (3.9%) were reported as malignant. 04 cases were reported as non- diagnostic due to scant cellularity. Among benign cases, the most common diagnosis was benign follicular nodule in 50 cases (65.8%) followed by autoimmune thyroiditis in 17 cases (22.6%). 01 case (1.31%) each was reported as granulomatous thyroiditis and thyroglossal cyst. Benign cases comprised of 47 cases (61.8%) of colloid nodule and 03 cases (3.9%) of adenomatous nodule. Among cases of autoimmune thyroiditis, 10 cases (13.1%) were reported as Hashimoto's thyroiditis and 7 cases (9.2%) were reported as lymphocytic thyroiditis. 01 case each was reported as granulomatous thyroiditis and thyroglossal cyst. All the malignant cases were reported as papillary carcinoma.

The aspirate was hemorrhagic in 58(76.3%) patients, colloid- like aspirate in 17(22.3%) patients and cystic fluid in 1 case (1.31%) of thyroglossal cyst. Colloid was aspirated only in patients diagnosed with colloid goiter.

The thyroid lesions were found to be hyperechoic in 18 cases (50%) followed by hypoechoic lesions 10 cases (27.7%)

Table 1: Presenting clinical features

Clinical features	No. of cases (n = 76)	% Age
Swelling	Solitary	53 69.7%
	Multinodular	04 5.2%
	Diffuse	19 25.0%
Pain	10	13.1%
Dysphagia	07	9.2%
Hoarseness	02	2.6%
Cough	05	6.6%

Table 2: The bethesda system of thyroid cytology reporting (TBSRTC)

Bethesda category	No. of cases (n = 76)	% Age
1. Nondiagnostic or unsatisfactory	04	5.3%
Cyst fluid only Virtually acellular specimen Other (obscuring blood, clotting artifact, etc.)		
2. Benign	50	65.8%
Consistent with a benign follicular nodule(includes adenomatoid nodule, colloid nodule, etc)		
Consistent with lymphocytic thyroiditis (Hashimoto's thyroiditis)		
Consistent with granulomatous (subacute thyroiditis)		
Others (Thyroglossal cyst)	01	1.31%
3. Atypia of undetermined significance or follicular lesion of undetermined significance	0	0
Follicular neoplasm or suspicious for a follicular neoplasm (Specify if Hurthle cell (Oncocytic) type	0	0
1. Suspicious for malignancy	0	0
Suspicious for papillary carcinoma, Suspicious for medullary carcinoma, Suspicious for metastatic carcinoma Suspicious for lymphoma, Other		
5. Malignant	03	3.9%
Papillary thyroid carcinoma, Poorly differentiated carcinoma, Medullary thyroid carcinoma, Undifferentiated carcinoma Squamous cell carcinoma, Carcinoma of mixed features, Metastatic carcinoma, Non- Hodgkin Lymphoma, Other		

Discussion

FNAC is an important diagnostic tool for thyroid lesions. Thyroid swellings are one of the common presentations in OPDs. A battery of investigations is usually done for detailed evaluation of thyroid lesions to rule out any possibility of a neoplasm. FNAC is usually the first line of investigations for such patients.

This study was done with the aim of classifying thyroid lesions according to the TBSRTC which provides reliable diagnostic categories thus helping in providing specific treatments.

In the present study, maximum cases (89.4%) were reported in females with M:F ratio of 1:8.5. the studies done by Jaiswal *et al.* 2020 [3], Nandedkar *et al.*, 2018 [2] and De *et al.*, 2020 [4] also showed female preponderance with M:F ratio of 1:6, 1:4 and 1:6.6 respectively.

The age distribution pattern of thyroid lesions showed the mean age of presentation of 51.2 years with most of the cases in the age group of 21-40 years. The findings were similar to the study conducted by De *et al.* 2020 [4] in which total 150 subjects were studied with mean age of 40.18±13.64 years (Age range of 21-40 years). Nandedkar *et al.*, 2018 [2] also showed similar findings with 75% cases in age group of 21- 50 years in study done on 606 patients. Sengupta *et al.*, 2011 [5] also observed maximum cases (75.84%) between 21- 40 years. Wahid *et al.*, 2011 [6] studied 82 cases which showed mean age of 42.56±11.60 years comparable to present study. 63.2% females presented in premenopausal age. This finding was similar to that of Tyagi *et al.* 2021 [7], in which maximum females (70%) presented in premenopausal age.

All 76 patients presented with swelling in front of neck, pain was present in 13.1% cases, and dysphagia was complained in 07 cases (9.2%), hoarseness in 02 cases (2.6%) and cough in 05 cases (6.6%). The similar findings were observed in the study conducted by Hamdani *et al.*, 2015 [8] in which 94.4% cases had swelling of thyroid as major presenting symptom and pain in 08 patients (4.44%). The study by Chavan *et al.* 2016 [9] also showed that swelling in front of neck was the most common symptom.

The swelling of thyroid was solitary in 53 cases (69.7%) followed by diffuse in 19 cases (25.0%) in concordance to the observation by Hamdani *et al.*, 2015 [8] (51.11% cases had nodular swelling followed by diffuse swelling in 48.88% cases). The study by Chavan US 2016 *et al.* [9] had a different observation with diffuse swelling present in 42% and solitary nodule in 32.6%.

The present study revealed that maximum patients (60%) were euthyroid followed by hypothyroidism in 36.6% patients. Studies done by Prasad *et al.*, 2020 [10] and Hamdani *et al.*, 2015 [8] observed similar findings with 70% and 85% euthyroid patients respectively.

According to the present study, benign lesions were found to be common than malignant lesions. Likar *et al.*, 2013 [11], Prasad *et al.*, 2020 [10] and Jaiswal *et al.*, 2020 [3] also observed similar findings as shown in the table.

	Benign	Malignant
Present study	90.7%	3.9%
Likhar LS <i>et al.</i> 2013 [14]	94.4%	6.0%
Jaiswal YP <i>et al.</i> 2020 [3]	71.74%	5.23%
Prasad PR <i>et al.</i> 2020 [10]	70.0%	7.0%

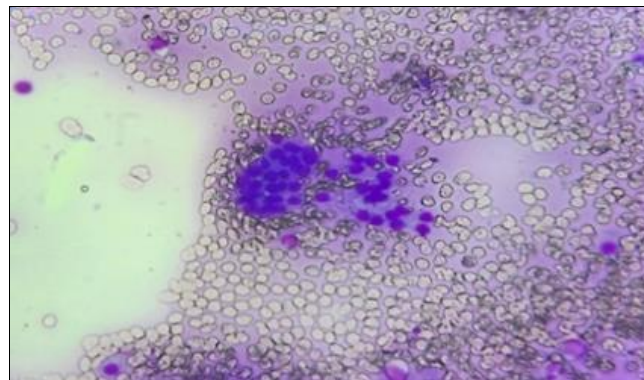


Fig 1: Benign follicular nodule showed abundant colloid, few clusters of benign thyroid follicular cells, many cytic macrophages alongwith few Hurthle cells.

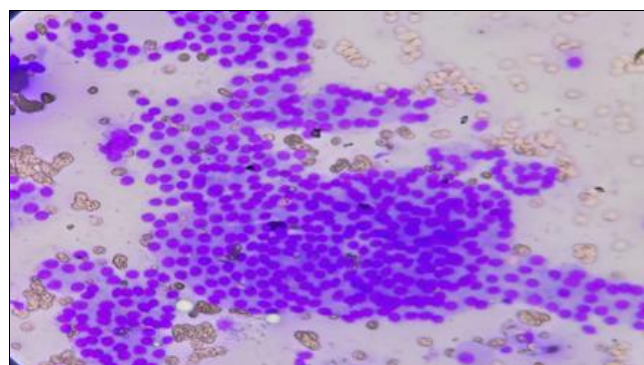


Fig 2: Adenomatoid nodule showing abundant thin and thick colloid with abundant cellularity comprising of sheets and clusters of benign thyroid follicular cells, macro follicles,

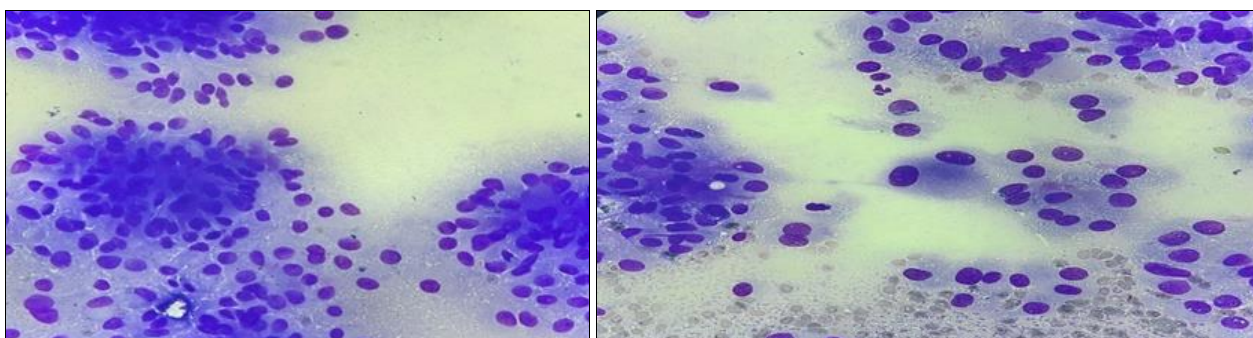


Fig 3: Papillary carcinoma thyroid showing cells in papillary clusters and groups, moderate pleomorphism and nuclear grooves and intranuclear inclusions.

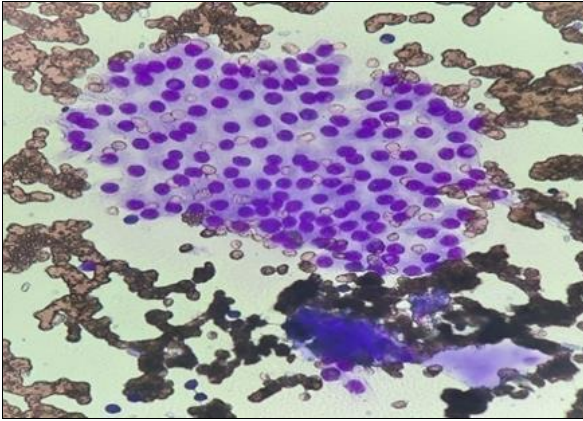


Fig 4: Hashimoto's thyroiditis showing sheets of cells with impinging of lymphocytes, Hurthle cells and colloid.

Colloid nodule was the most common benign disease diagnosed followed by autoimmune thyroiditis in our study. The previous studies by Gupta *et al.*, 2020^[14], Likhar *et al.*, 2013^[14] and Prasad *et al.*, 2020^[10] also showed comparable results. The study done by Gupta *et al.*, 2020^[14] done on 60 patients revealed that 66.67% patients were diagnosed with colloid goiter and 3.33% patients with thyroiditis as benign category. Colloid nodule comprised about 76.88% patients while only 10.41% cases were diagnosed as thyroiditis in a study done by Likhar *et al.*, 2013^[11], thus showing that benign follicular nodule was most common benign thyroid lesion. In a study done on 100 patients by Prasad *et al.*, 2020^[10] showed that colloid goiter comprised of 71% benign cases followed by lymphocytic thyroiditis (22% cases).

Among other benign lesions, granulomatous thyroiditis accounted for 1.3% which agrees with studies of Nandedkar *et al.*, 2018^[2] reported 1.21% cases and Chavan 2016^[9] 2.2% cases but variance from the study by Sengupta *et al.*, 2011^[5] having 8.53% cases of granulomatous thyroiditis, higher than present study.

The malignant diseases in the study were 3.9% which is comparable to the study by Jaiswal *et al.*, 2020^[3] and Gupta *et al.*, 2020^[14] having 5.23% and 5% malignant cases. However, Chavan *et al.*, 2016^[9] reported lower prevalence of malignant cases while Sengupta *et al.*, 2011^[5] revealed higher number of cases of 9.55%. Nandedkar *et al.*, 2018^[2] found in a 10 years study on 606 patients that majority of thyroid aspirates were hemorrhagic (37.9%) followed by colloid like aspirate (29.8%) and Cystic fluid (27.3%) in concordance to our study. The present study reported 5.3% cases as non-diagnostic similar to that observed in Jaiswal *et al.*, 2020^[3] (61.9%) and Hamdani *et al.*, 2015^[8] (6.11%). Thyroid FNAC is a cost effective, easy and time saving OPD procedure. It can reliably and effectively be used for preoperative diagnosis and accurate categorization of thyroid lesions.

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Conflict of interest: None

Ethical approval: The study was approved by the Institutional Ethics Committee.

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