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Utility of British Thy system of reporting Thyroid FNAC smears in a tertiary hospital

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Abstract

Introduction: Thyroid Fine Needle Aspiration (FNA) has been widely used as a first line investigation to assess thyroid nodules, as it is rapid, cost effective, safe and reliable. Thyroid cytology categories are required for coding, audit and comparison The RCPath system of thyroid cytopathology is a modification of the British Thyroid Association (BTA)/ RCP Thy1–5 systems. This study has been undertaken to evaluate the utility of Thy system while reporting thyroid FNACs in our hospital.

Materials and Method: A retrospective study was conducted from 2009 to 2015 in which 189 cases of thyroid aspirates were reclassified according to Thy in to five categories by cytologist.

Results: A total of 189 thyroid lesions were analysed. Category wise distribution of aspirates was Thy 1+ Thy 1c (Non-Diagnostic) 8 cases. Thy 2 + Thy 2c (Non Neoplastic) were 156 (86.19%). Thy 3a (Neoplasm possible – atypia/nondiagnostic) were 5 (2.77%), Thy 3f – (Neoplasm possible- Suggesting follicular neoplasm) were 9 (4.97%), Thy 4 (Suspicious for malignancy) were 2 (1.10%), Thy (Malignant) were 59 (4.97%) Age and sex wise distribution was interpreted. Thyroid diseases were more prevalent in women and most common age group affected was 3rd to 4th decade. Out of all cases 181 were satisfactory for evaluation. Among them 156 (86.19 %) were Non-neoplastic which included simple goitre, thyroiditis, toxic goitre and thyroid cysts. Malignant lesions were 9 which included papillary carcinoma, anaplastic carcinoma and medullary carcinoma.

Conclusions: It was observed that standardized nomenclature of the Thy System has brought much needed clarity in thyroid FNAC reporting in the UK .Hence this study was undertaken to know its utility in this region of country.

Keywords: Thy system; Thyroid; FNAC.

Introduction

Thyroid lesions are one of the common conditions encountered in clinical practice Thyroid nodule is a common clinical condition and about 85 to 90% of them are benign lesions.[1,2] There is a increased demand for thyroid cytology to triage the patients due to rising investigations for evaluation of thyroid nodules clinically and radiologically. It has also highlighted the need to ensure that only patients with a risk of significant disease are investigated and that under- and over-treatment is minimized if at all possible. Thyroid FNA has been widely used as a first line investigation to assess thyroid nodules, as it is rapid, cost effective, reliable and safe.[3] It is important that cytology report is unambiguous and clinically useful. It has been observed that thyroid FNAC smears terminologies vary significantly from one laboratory to other, sometimes from one cytopathologist to other in the same institute Hence, confusion is being created in some cases due to terminologies[4,5]

The RCPath system is a modification of the British Thyroid Association (BTA)/ RCP Thy1–5 system. The Thy categories allow for diagnostic classification and are not intended to mean or imply a progression from one category to another (i.e. Thy2–Thy3a–Thy3f–Thy4–Thy5).[6] This study has been undertaken to evaluate the Thy system while reporting thyroid FNACs as very few studies have been in India.

Materials and Method

Details of all the thyroid FNAC cases done from January 2009 to October 2015 in tertiary care hospital were retrieved from archives of cytology section. Experienced cytologist with experience in cytology reporting and self-learned the different aspects of Thy System reviewed the slides. All the clinical details and available radiological and thyroid function test results which were noted down in the original cytology request forms were provided to cytologist. The FNA smears were reclassified in a double blinded fashion into five categories as per Thy System.

The British Thy System has the following five Categories:[6]

Non Diagnostic: Thy 1/ Thy 1c: The reason for a non-diagnostic sample should be clearly stated in the cytology report. This category will include samples which are non-diagnostic.

a. Those that are most likely related to the operator/technique and those that are most likely related to the lesion.
b. Cyst lesion fluid specimens which do not reach the follicular epithelial cell adequacy criterion stated above and which contain mostly macrophages but without abundant colloid. Thy1c is used where 'c' means 'cystic lesion'. It is important for auditing results that any samples of insufficient epithelial cellularity that are cyst fluid can be separated from those which are non-diagnostic.

Non-neoplastic: Thy 2/Thy 2c**:** Samples in this category should have sufficient epithelial cellularity to allow diagnosis and are consistent with the clinical information. This includes colloid nodules, hyperplastic nodules, thyroiditis, cyst lesion specimens which consist predominantly of colloid and macrophages (Thy 2c)

Neoplasm possible: Thy 3

Thy 3a: samples that exhibit cytological/nuclear or architectural atypia, or other features that raise the possibility of neoplasia, but which are insufficient to enable confident placement into any other category. This group is classed as Thy 3a ('a' for 'atypia').

Thy 3f: samples suggesting follicular neoplasms. These are likely to form the majority of the Thy 3 category. The histological possibilities therefore include hyperplastic or other cellular but non-neoplastic nodules, as well as neoplasms, including follicular adenomas and follicular carcinomas. Follicular variants of papillary thyroid carcinoma without clear nuclear features of papillary thyroid cancer may fall into this category.

Suspicious of malignancy: Thy 4**:** This category includes those samples that are suspicious of malignancy but which do not allow confident diagnosis of malignancy. This will include specimens of low cellularity and mixed cell types (normal and abnormal).

Malignant: Thy 5

These are samples that can be confidently diagnosed as malignant. The spectrum of all the thyroid lesions was classified as per the above five classes.

Results

A total of 189 thyroid lesions were analysed and categorized as per Thy System. Category wise distribution of aspirates was as below. Thy 1+ Thy 1c (Non- Diagnostic) were 8 cases. Thy 2 + Thy 2c (Non Neoplastic) were 156 (86.19%). Thy 3a (Neoplasm possible – atypia/non-diagnostic) were 5 (2.77 %), Thy 3f – (Neoplasm possible- suggesting follicular neoplasm) were 9 (4.97%), Thy 4 (Suspicious for malignancy) were 2 (1.10%), Thy (Malignant) were 59 (4.97 %) as depicted in Table 1. The various thyroid lesions in all the categories are described in Table 2. The female to male ratio in our study was 4:1. The youngest patient was 11 year female child with simple colloid goitre. The oldest patient was 80 years male patient with papillary carcinoma. Most common age group affected with thyroid lesions was 3rd to 4th decade and most common thyroid lesion was simple colloid goitre which was most commonly seen in 3rd to 4th decade (Table 3). Least common age group affected was 71-80 years. Most common lesion in 7th to 8th decade was colloid goitre with cystic change as shown in Table 3. Most common thyroid malignancy was Papillary carcinoma (Fig. 2) seen most commonly in 6th to 7th decade. Most common inflammatory thyroiditis wa Hashimoto's thyroiditis. The most common thyroid lesion in Pediatric age group was simple colloid goitre.

Table 1: Distribution of the thyroid lesions as per British Thy Category

British Thy System	Lesion	Number (Cases)
Thy 1	Non-diagnostic for cytological diagnosis	8
Thy 1c	Non-diagnostic for cytological diagnosis – cystic lesion	
Thy 2	Non-neoplastic	156
Thy 2c	Non-neoplastic cystic lesion	
Thy 3a	Neoplasm possible – Atypia/nondiagnostic	5
Thy 3f	Neoplasm possible, suggesting Follicular neoplasm	9
Thy 4	Suspicious of Malignancy	2
Thy 5	Malignant	9
	Total	**189**

Table 2: The spectrum of thyroid lesions as per British Thy Category

Thy System category	Lesions	Number (Cases)
Thy 1 + Thy 1c	**Non Diagnostic**	**8**
Thy 2 + Thy 2c	**Non Neoplastic**	**156 (86.19%)**
	Simple Colloid goitre	85
	Colloid goitre with cystic change	30
	Thyroid cyst	4
	Toxic goitre	6
	Multinodular goitre	12
	Acute thyroiditis	2
	Granulomatous thyroiditis	2

	Lymphocytic thyroiditis	5
	Hashimoto's thyroiditis	10
Thy 3a	**Neoplasm possible – atypia/non-diagnostic**	**5(2.77 %)**
Thy 3f	**Neoplasm possible, suggesting follicular neoplasm**	**9 (4.97%)**
	Follicular neoplasm	8
	Hurthle cell neoplasm	1
Thy 4	**Suspicious for malignancy**	**2 (1.10%)**
Thy 5	**Malignant**	**9 (4.97 %)**
	Papillary Carcinoma	7
	Anaplastic carcinoma	1
	Medullary carcinoma	1
	Total	**189**

Table 3: Age wise distribution of the lesions as per Thy system

Lesion	Age (in years)								
	< 10	**11-20**	**21-30**	**31-40**	**41 - 50**	**51 - 60**	**61-70**	**71 - 80**	**Total**
Thy 1+Thy 1c			**1**	**2**	**3**	**1**	**1**	**-**	**8**
Thy 2 + Thy 2c									
Simple Colloid goitre	-	4	16	28	16	15	6	-	85
Colloid goite with cystic change	-	-	4	10	6	5	3	2	30
Thyroid cyst	-	-	1	1		-	1	1	4
Toxic Goitre	-	-	1	1	2	2	-	-	6
Multinodular goitre	-	-	2	1	4	4	1	-	12
Acute thyroiditis	-	-	-	1	-	-	1	-	2
Granulomatous thyroiditis	-	1	-	1	-	-	-	-	2
Lymphocytic thyroiditis	-	-	2	3	-	-	-	-	5
Hashimoto's thyroiditis	-	-	1	3	2	3	1	-	10
Thy 3a		-	-	-	1	2	1	1	5
Thy 3f									
Hurthle cell neoplasm	-	-	-	1		-	-	-	1
Follicular neoplasm	-	-	1	4	1	1	1	-	8
Thy 4		-	-	1	-	1	-	-	2
Thy 5									
Papillary Carcinoma	-	-	1	1	1	-	3	1	7
Anaplastic carcinoma	-	-	-	-	1	-	-	-	1
Medullary carcinoma	-	-	-	1	-	-	-	-	1
Total	0	5	30	59	38	35	18	4	189

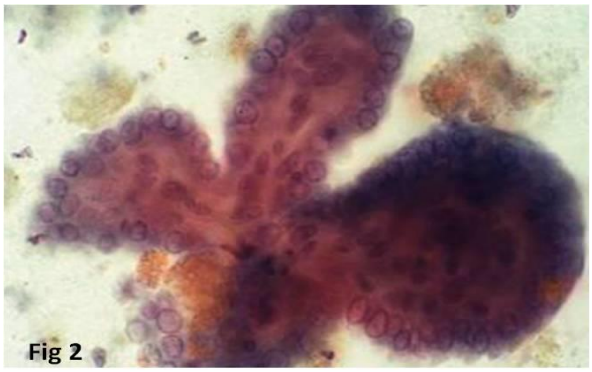

Fig. 2: Smears show Papillary carcinoma of thyroid showing typical papillary features and nuclear features.(X 400)

Discussion

Fine needle aspiration cytology is a cost effective procedure that provides specific diagnosis rapidly with minimum complications in thyroid lesions. There is a limitation in interpretation of the reports of thyroid FNA due to lack of uniformity in reporting terminologies.[7] Thy system was introduced by The Royal College of Pathologists(RCPath) which was developed by building on the existing British Thyroid Association (BTA) system and was originally issued in 2009.[8] These different categories help in predicting the prognosis by estimating the malignant potential of each category.[9] An attempt was made in the present study, to reclassify the 189 cases according to the Thy system in reporting thyroid FNA results were Thy 1+ Thy 1c (Non-Diagnostic) 8 cases. Thy 2 + Thy 2c (Non Neoplastic) were 156 cases (86.19%). Thy 3a (Neoplasm possible – atypia/nondiagnostic) were 5 cases (2.77 %), Thy 3f – (Neoplasm possible- Suggesting follicular neoplasm) were 9 cases (4.97%), Thy 4 (Suspicious for malignancy) were 2 cases (1.10%), Thy (Malignant) were 59 cases (4.97 %). This also assists in calculating the malignancy

risk for each category which is essential for treatment decision. Non-neoplastic category was maximum in our study similar to the other studies (Table 4). The various benign lesions (Thy 2+Thy 2c) found in our study were Simple colloid goitre, Colloid goitre with cystic change, Thyroid cyst, Toxic goitre, Multinodular goitre, Acute thyroiditis, Granulomatous thyroiditis, Lymphocytic thyroiditis (Fig. 1) and Hashimoto's thyroiditis. The Thy 3f included Follicular neoplasm and Hurthle cell neoplasm. The malignant class Thy 5 included Papillary carcinoma, Anaplastic carcinoma (Fig. 3) and Medullary carcinoma However, percentage of Thy 2 is much higher accounting for 86.19% in our study. Non neoplastic lesions were maximum in our set up. Percentage of Thy 3 category were less. Our study was compared with studies by Parikh et al,[10] Bhatta et al[11] and Uma et al.[12] It was found that most were benign lesions similar to all other studies. However our study had similar Non-diagnostic smears as study by Uma et al. The number of follicular neoplasms/ Suspicious for follicular neoplasms seen in our study is 4.97% which is higher as compared all other studies which reported around 3.2%. The malignant cases in our study is 4.97 % which varied widely from 2.5% to 11.1% in various other studies.

Thy System also recommends Multi-Disciplinary Meetings (MDM) in thyroid reporting team. According to guidelines it is expected that any thyroid cytology cases categorised as Thy 4 or Thy 5 will be reviewed by a cyto/histopathologist core member of the thyroid MDM and be discussed in the MDM setting. Other cases, such as Thy3a and Thy3f, and ones even classed as Thy1/1c or Thy2/2c categories, can benefit from Multi-disciplinary team (MDT) discussion, especially if there is any concern. Depending on local arrangements these may be reviewed/ discussed locally or as part of a network MDT approach.

The other widely used system for reporting is the Bethesda system which has 6 categories. The difference between the two systems is in assigning Class III and IV in Bethesda system which is equivalent to Thy 3 (Thy 3a +Thy 3f) in British Thy System of reporting. Thy system also proposes SNOMED coding and Thyroid Cytology Audit for better traceability and clinical care. SNOMED was designed as a comprehensive nomenclature of clinical medicine for the purpose of accurately storing and/or retrieving records of clinical care in human medicine.[6]

Table 4: Comparison to other studies

Lesions	Parikh et al	Uma et al	Bhatta et al	Our study
Non diagnostic (Thy 1+ Thy 1c)	19	22	-	8
Non neoplastic (Thy 2)	207	381	77	156
AUS/FLUS (Thy 3a)	-	-	-	5
FN / SFN (Thy 3f)	8	14	3	9
Suspicious for malignancy (Thy 4)	-	-	-	2
Malignancy (Thy 5)	6	17	10	9
Total	240	434	90	189

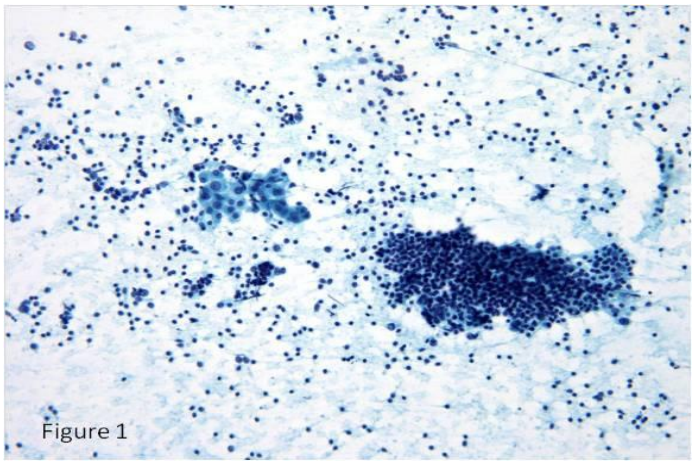

Fig. 1: Smears show lymphocytic thyroiditis (Giemsa stain X 100)

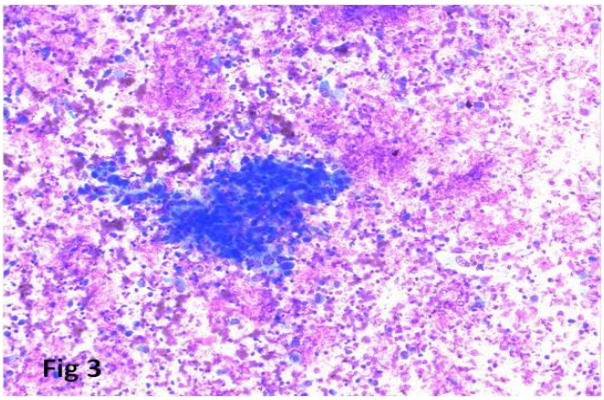

Fig. 3: Smears show pleomorphic, dyscohesive follicular epithelial cells against hemorrhagic and necrotic background (PAP stain –X 100)

Conclusion

Fine needle aspiration cytology is standard diagnostic test for the diagnosis of thyroid lesions with a high diagnostic yield, accuracy, sensitivity & specificity. Fine needle aspiration cytology is a cost effective procedure that provides specific diagnosis rapidly with minimum complications. It was observed that standardized nomenclature of the Thy system is more systematic and brought much needed clarity in thyroid FNAC reporting. Along with malignant category, the Thy 3 and Thy 4 categories carry higher malignancy risk. Close follow up of the patients and surgical intervention option has to be considered in these various categories.

References

1. Sakorafas GH. Thyroid nodules; interpretation and importance of fine needle aspiration (FNA) for the clinician – Practical considerations. Surg Oncol 2010;19:130-9.
2. Redman R, Yoder BJ, Massoll NA. Perceptions of diagnostic terminology and cytopathologic reporting of fineneedle aspiration biopsies of thyroid nodules: a survey of clinicians and pathologists. Thyroid. 2006;16:1003-8.
3. Baqqa PK, Mahajan NC. Fine needle aspiration cytology of thyroid swelling: how useful and accurate is it? Indian J Cancer 2010;47:437-42.
4. Cibas ES. Fineneedle aspiration in the workup of thyroid nodules. Otolaryngol Clin North Am 2010;43:257-71.
5. Park JH, Kim HK, Kang SW, Jeong JJ, Nam KH, Chung WY, et al. Second opinion in thyroid fine needle aspiration biopsy by the Bethesda System. Endocr J 2012;59:205-12.
6. Cross PCA, Giles T, Johnson S, Kocjan G, Poller D, Stephenson T. Guidance on the reporting of thyroid cytologyspecimens.http://www.rcpath.org/Resources/RCPath/Migrated%20Resources/Documents/G/g089guidanceonthereportingofthyroidcytologyfinal.pdf.June 4,2012.
7. Cibas ES, Ali SZ. The Bethesda system for reporting thyroid cytopathology. Am J Clin Pathol 2009;132:658-65.
8 British Thyroid Association. Guidelines for the management of thyroid cancer (3rd edition). Report of the Thyroid Cancer Guidelines Update Group. London: RCP,2014.
9 Layfield LJ, Morton MJ, Cramer HM, Hirschowitz S. Implications of the proposed thyroid fine needle aspiration category of "follicular lesion of undetermined significance": A five year multi institutional analysis. Diagn Cytopathol 2009;37:710-4.
10 Parikh U.R, Goswami H.M., Shah A.M., Mehta N.P. and Gonsai R.N. Fine Needle Aspiration Cytology (FNAC) Study of Thyroid Lesions (Study of 240 Cases) Gujarat medical journal;2012:6-7.
11 Bhatta S, Makaju R, Mohammad. Role of fine needle aspiration cytology in the diagnosis of thyroid lesions; Journal of Pathology of Nepal. 2012; (2):186-8.
12 Uma Handa, Sukant garg, Harsh Mohan, Nitin Nagarkar. Role of fine needle aspiration cytology in diagnosis and management of thyroid lesions: A study on 434 patients. Journal of Cytology. 2008.(25);1:13-8.