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Spectrum of thyroid lesions in FNAC - diagnostic implications and pitfalls

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Abstract
Thyroid nodule is one of the most common clinical presentations with annual incidence of 4% in general population. For clear communication between treating surgeon and cytopathologist the Bethesda System for Reporting Thyroid Cytopathology (TBSRTC) established a uniform, tiered reporting system for thyroid Fine needle aspiration (FNAC) specimens. Retrospective descriptive study was conducted for the duration of three years on all cases of thyroid FNAC.481 thyroid FNAC were performed, patients age ranged from 16 years to 78 years, with mean age of 39 years, majority of them in 4th decade 158 cases (32.8%).Male female ratio of 1: 8.6, with female predominance 443 cases (92%).Observation based on TBSRTC categories as follows category I - unsatisfactory – 36 cases (7.5%),Category II – Benign – 419 cases (87.1%),Category III - Atypia of Undetermined Significance or Follicular Lesion of Undetermined Significance 2 cases (0.4%), Category IV of Follicular Neoplasm or Suspicious for a Follicular Neoplasm 05 cases (1%), category V - suspicious of malignancy 5 cases (1%).The Bethesda system for reporting of thyroid cytology will give uniform categorization of thyroid smear globally among cytopathologist, and give clear communication to treating surgeon regarding decision on further treatment.

Keywords: Thyroid, FNAC, bethesda, triple assessment.

Introduction
Thyroid nodule is one of the most common clinical presentations with annual incidence of 4% in general population. Most of the thyroid lesions clinically present as either diffuse enlargement of the gland or a solitary thyroid nodule [1, 2]. Thyroid lesions can be non-neoplastic or Neoplastic causing various signs and symptoms like hoarseness of voice, dysphasia, neck pain and symptoms related to hypo functioning or hyper functioning of thyroid. There are various non-invasive methods used for diagnosis of thyroid lesions but are not able to make definitive diagnosis of malignant lesions. Therefore, most clinicians rely on Fine needle aspiration (FNAC) for making the preoperative diagnosis of benign thyroid lesions [3].For clear communication between treating surgeon and cytopathologist the Bethesda System for Reporting Thyroid Cytopathology (TBSRTC) established a uniform, tiered reporting system for thyroid FNA specimens [4].The aim of the present study was to study the clinco pathological character, cytomorphological pattern, classification of thyroid lesions based on TBSRTC and pitfalls in thyroid FNAC.

Material and Methods
Retrospective descriptive study was planned after obtaining Institutional review board and ethical committee approval. Clinical, pathological and imaging details have been retrieved from medical record department for the period of three year duration from January 2015 – December 2018. Thyroid nodules found on clinical examination were subjected for Ultrasonography and further fine needle aspiration cytology were performed after obtaining consent from the patient, Six passes were done for twice for each nodule palpated with 22-24 G needle attached with syringe without aspiration, Four smears were made and toluene blue stain was performed to know the cellularity. Final smears were stained with Geimsa and Papanicolaou's (PAP) stain, smears were reported by two pathologist asper TBSRTC systeminto six category I- Nondiagnostic or Unsatisfactory, category II –benign, category III - Atypia of Undetermined Significance or Follicular Lesion of Undetermined Significance, category IV -Follicular Neoplasm or Suspicious for a Follicular Neoplasm, Category v-Suspicious for Malignancy, category VI – malignancy [4].

Observations

The present study was conducted for the period of three years, total 481 thyroid FNAC were performed, patient age ranged from 16 years to 78 years, with mean age of 39 years, majority of them in 4th decade 158 cases (32.8%) followed by 3rddecade106 cases (22%). Male female ratio of 1: 8.6, with female predominance 443 cases (92%).Out of total 481 cases, 445 cases (92.5%) were satisfactory for reporting and 36 cases (7.5%) were reported as unsatisfactory,

Table 1: Clinico pathological characteristics of thyroid lesions

Age range (Yrs.)		No of cases	Percentage (%)
	0 – 10	00	00%
	11 – 20	39	8.2%
	21 – 30	106	22%
	31 – 40	158	32.8%
	41 – 50	98	20%
	51 – 60	43	09%
	61 – 70	28	06%
	71 – 80	09	02%
Gender			
	Male	38	08%
	Female	443	92%
Side – predominant nodule (clinical, radiological)			
	Right	327	68%
	Left	154	32%
Adequacy			
	Satisfactory	445	92.5%
	Not satisfactory	36	7.5%

Distribution of thyroid smears based on Bethesda system of reporting of thyroid cytology

Out of total 481 cases the distribution based on TBSRTC were as follows, category I - unsatisfactory – 36 cases (7.5%),with cystic only fluid with macrophages were seen in 25 cases (5.2%), 8 cases (1.7%) with smear obscuring with blood and drying artifact, and acellular smear observed in 03 cases (0.6%). Category II – Benign – 419 cases (87.1%) were observed with subcategorised as 371 cases (76.9%) of benign follicular nodule includes colloid cyst, colloid nodule, adenomatous nodule, 42 cases (8.7%) with chronic lymphocytic thyroiditis and 6 cases (1.5%) of granulomatous thyroiditis.

Table 2: Distribution of thyroid lesion according to Bethesda system of reporting.

Bethesda category	Lesions		No. of cases	Percentage
I	Non diagnostic / Unsatisfactory	Cyst fluid only	25	5.2%
		obscuring blood, clotting artifact, drying artifact,	08	1.7%
		Virtually acellular specimen	03	0.6%
II	Benign	Benign follicular nodule (includes adenomatoid nodule, colloid nodule, etc.)	371	76.9%
		Consistent with chronic lymphocytic (Hashimoto) thyroiditis in the proper clinical context	42	8.7%
		Consistent with granulomatous (subacute) thyroiditis	6	1.5%
III	Atypia of Undetermined Significance or Follicular Lesion of Undetermined Significance		02	0.4%
IV	Follicular Neoplasm or Suspicious for a Follicular Neoplasm	Follicular neoplasia	04	0.8%
		Hurthle cell type	01	0.2%
V	Suspicious for Malignancy	Suspicious for papillary thyroid carcinoma	4	0.8%
		Suspicious for medullary thyroid carcinoma	1	0.2%
VI	Malignant	Papillary thyroid carcinoma	12	2.6%
		Medullary thyroid carcinoma	02	0.4%
Total			481	100%

Category III - Atypia of Undetermined Significance or Follicular Lesion of Undetermined Significance 2 cases (0.4%), Category IV of Follicular Neoplasm or Suspicious for a Follicular Neoplasm 05 cases (1%), category V - suspicious of malignancy 5 cases (1%) were observed, subdivided into 4 cases (0.8%) of suspicious if papillary carcinoma of thyroid and 1 case (0.2%)of suspicious of medullary carcinoma of thyroid, and in the last category of TBSRTC category IV – malignancy 14 cases (3%) were observed in which 12 cases (2.6%) were of papillary carcinoma of thyroid all classical variant followed by 2 cases (0.4%) of medullary carcinoma of thyroid.

Discussion

The present study was conducted for the period of three years, total 481 thyroid FNAC were performed, with Six passes were done for twice for each nodule palpated, with 22- 24 G needle [6, 7, 10, 11, 12, 13, 14] attached with syringe without aspiration, Four smears were made and toluene blue stain was performed to know the cellularity [11]. Final smears were stained with Giemsa and Papanicolaou's (PAP) stain, smears were reported by two pathologist [6] asper TBSRTC system patient age ranged from 16 years to 78 years [1, 12, 14], with mean age of 39 years [6, 10, 12, 14], majority of them in 4th decade 158 cases (32.8%) [7, 8, 10, 11] followed by 3rd decade 106 cases (22%). Male female ratio of 1: 8.6 [1, 5, 6, 79, 10, 11, 12, 14], with female predominance 443 cases (92%).

Out of total 481 cases the distribution based on TBSRTC were as follows, majority of the cases were falls under Category II – Benign – 419 cases (87.1%) [1, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14] were observed in which 371 cases (76.9%) of benign follicular nodule includes colloid cyst, colloid nodule, adenomatous nodule were predominate followed by, 42 cases (8.7%) with chronic lymphocytic thyroiditis, followed by, category I - unsatisfactory – 36 cases (7.5%) [5, 8, 11, 13], percentage of unsatisfactory smear were less as FNAC procedures were done by pathologist and in smaller nodules, procedure were performed under USG guidance, Bedside quick stain were performed to rule out unsatisfactory smear and reporting done by two pathologist.

Table 3: Comparison of clinical detail and cytomorphological character

	Category (%) as per TBSRTC								
	Age Range (yrs.)	**Mean age(yrs.)**	**M:F ratio**	**I**	**II**	**III**	**IV**	**V**	**VI**
Sarma U [1] (N=200)	12-75	NA	1:3	10	71.6	NA	10	NA	18.4
B.Anand *et al;* [5] (N= 646)	7-85	41.78	1: 6.3	13.8	75.9	1.2	3.7	2.6	2.8
Bhartiya *et al;* [6] (N= 238)	7- 78	36.8	1: 4	5.8	84	1.2	2.94	2.52	3.36
Sharma *et al;* [7] (N=200)	9 – 82	43	1: 7	5.5	74	3	2.5	2.5	12.5
S.M Dhage *et al;* [8] (N =358)	NA	NA	NA	8.3	79	00	3.8	1.3	6.8
Jaiswal YP [9] (N=210)	NA	NA	1: 5	6.19	71.74	6.66	7.14	3.33	5.2
Nandedkar SS [10] (N=606)	2-87	37.6	1:4.2	4.29	82.67	0.82	9.07	1.15	1.98
Barman DD *et al;* [11] (N=619)	1.5– 75	NA	1:7	9.5	74	3.2	8.2	0.6	6.1
Pattnaik K *et al;* [12] (N=1724)	11-84	41.5	1: 4.5	2.09	89.67	5.92	1.45	0.29	0.58
P. Mehra *et al;* [13] (N= 225)	NA	NA	NA	7.2	80	4.9	2.2	3.6	2.2
Naz *et al;* [14] (N=528)	14- 84	39.7	1:3.6	4.7	76.3	12.7	2.1	3.4	0.8
Present study (N=481)	16-78	39	1:8.6	7.5	87.1	0.4	1	1	3

Other categories of TBSRTC in present study as follows Category III - Atypia of Undetermined Significance or Follicular Lesion of Undetermined Significance 2 cases (0.4%) [5, 6], Category IV of Follicular Neoplasm or Suspicious for a Follicular Neoplasm 05 cases (1%) [7, 12, 13, 14], category V - suspicious of malignancy 5 cases (1%) [8, 10, 11] were observed. In the last category of TBSRTC category IV – malignancy 14 cases (3%) [5, 6, 12, 13, 14] were observed in which majority of the cases were papillary carcinoma of thyroid 12 cases (2.6%) [1, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14] all classical variant.

Conclusion

Similarly, like breast screening triple assessment in thyroid nodule by clinical examination, Ultrasonography, and FNAC examination will reduce the unsatisfactory smear and can avoid surgical intervention. If procedures performed by cytopathologist and implementing beside Quick stain to see the smear cellularity also reduced unsatisfactory smear cellularity. Following the standard The Bethesda system for reporting of thyroid cytology will give uniform categorization of thyroid smear globally among cytopathologist, and give clear communication to treating surgeon regarding decision on further treatment.

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