

## Pattern and frequency of thyroid pathologies among thyroid cytology specimens: Our institutional experience

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### Abstract

**Introduction:** Thyroid nodules are a very common finding, with an annual incidence rate of 4-8%. Fine needle aspiration cytology (FNAC) is a helpful tool for initial diagnosis and workup of thyroid nodule due to its usefulness and cost effectiveness and lack of major complications.

**Aims:** 1) To study the spectrum and frequency of thyroid lesions and classify it according to Bethesda system for reporting thyroid cytology. (2) To study the correlation of these thyroid lesions with different age groups. (3) Comparing our data with different studies of literature.

**Materials and Methods:** This is a retrospective study conducted at department of pathology in tertiary care center from January 2015 to December 2015 that were referred to our cytopathology laboratory in this period. The data of 144 cases with enlarged thyroid gland were retrieved from past records. Thyroid lesions were classified according to Bethesda system of reporting.

**Results:** Out of 144 cases, Bethesda category I included 5 cases (3.4%), category II consisted of 128 cases (88.8%), [71 cases (49.3%) were benign follicular nodule type II, 33 cases (22.9%) were colloid nodule, 24 cases (16.6%) were hashimoto thyroiditis], category III (AUS/FLUS) consisted of 2 cases (1.3%), category IV (Follicular Neoplasm) included 5 cases (3.4%), category V (Suspicious of malignancy) included 1 case (0.6%), category VI (malignant) had 3 cases (2%). Male to female ratio was 0.09:1

**Conclusion:** FNAC is safe and reliable method as first line evaluation in thyroid gland nodules. Thyroid lesions can be efficiently classified on cytology. The Bethesda system has proved helpful leading to reliable management.

**Keywords:** Cytology, Thyroid pathology, Bethesda system.

### Introduction

FNAC was introduced in the year 1960, in Scandinavia and since then it has been effectively used for evaluation of palpable lesions. Thyroid disorders are one the most common endocrine disorders found throughout the world. Thyroid nodules are very frequent with a large number of studies showing an annual incidence rate of 4-8%.<sup>1</sup> It is preferred to operate only on those patients with suspicion of malignancy, thereby avoiding unnecessary surgery and possible injury of the recurrent Laryngeal nerve, conditions like hypoparathyroidism and thyroid hormone dependence in patients with benign thyroid nodules. The differentiation of these benign from malignant nodules cannot be made on clinical features alone.<sup>2</sup> Thyroid fine needle aspiration cytology (FNAC) is the principal method of preoperative diagnosis in and it has been shown to be more reliable than clinical, radionucleotide or thyroid ultrasound assessment alone. FNAC requires careful aspiration technique and interpretation of the cytological findings. It is a valuable tool for evaluating nodular and diffuse thyroid lesions with a purpose to confirm the benign cases, so that surgery is planned only for those patients with suspicion of cancer. A lot of literature attests the accuracy and benefits of FNAC. In many centres in the world, cytology is now the primary preoperative investigative modality in clinically suspicious thyroid nodules. Most practitioners rely on FNAC alone,

especially for the first attempt at diagnosis. Till 2007, pathologists used various terminologies and diagnostic criteria for reporting thyroid lesions, due to which optimal clinical management was not rendered. Bethesda reporting pattern developed by papanicolau society is one among them<sup>4</sup> which improves the communication and management of thyroid lesions to clinicians and helps reporting the pattern of various thyroid lesion in our population. FNAC of the thyroid gland is now a well established first line diagnostic test for the workup of thyroid nodules with the main purpose of confirming benign lesions and thereby, reducing unnecessary surgery. Data suggest that FNAC has an overall accuracy rate around 95% in the detection of thyroid malignancy

### Aims and Objectives

1. To study the various patterns of thyroid lesions and classify it according to Bethesda system of reporting pattern on cytology.
2. To study the correlation of these thyroid lesions with different age groups.
3. Comparing our data with different studies of literature.

### Materials and Methods

This is a retrospective study conducted at department of pathology in tertiary care center from January 2015 to December 2015 gland that were

referred to our cytopathology laboratory in this period. The data of 144 cases with enlarged thyroid glands that were referred to our cytolaboratory in this period. Thyroid swellings were aspirated using disposable needles using standard procedures. The aspirated contents of needles were expelled onto the glass slides. Slides were immediately fixed in methanol and smears were stained with papanicolau and hematoxlin and eosin stains whereas slides were air dried before staining it with giemsa. The cytological diagnosis was also classified according to Bethesda system of reporting pattern.<sup>5</sup>

**Results**

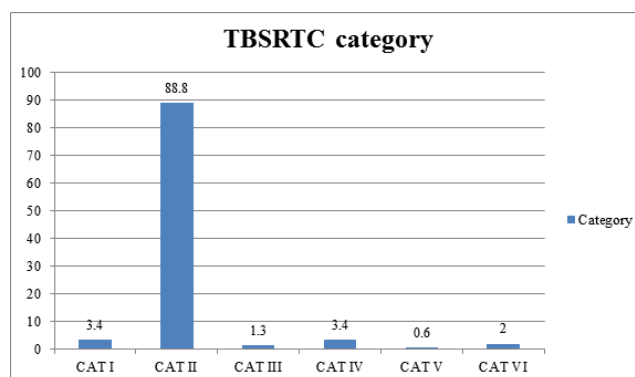
Out of 144 cases, Bethesda category I included 5 cases (3.4%), category II constituted 128 cases(88.8%) out of which 71 cases (49.3%) were benign follicular nodule type II, 33 cases(22.9%) were colloid nodule, 24 cases (16.6%) were hashimoto thyroiditis, category III (AUS) included 2 cases (1.3%, category IV (Follicular Neoplasm) had 5 cases(3.4%), category V (Suspicious of malignancy) included 1 case (0.6%), category VI (malignant) constituted 3 cases(2%). Male to female ratio was 0.09:1. Highest prevalence was noted in 21-30 years of age.

**Table 1: Frequency of cases according to Bethesda system of classification**

	Category	Cases	Percentage
CAT I	Non Diagnostic/Unsatisfactory	5	3.4%
CAT II	BENIGN	128	88.8%
	Benign Follicular Nodule Ii	71	49.3%
	Colloid Nodule	33	22.9%
	Hashimoto Thyroiditis	24	16.6%
CAT III	Atypia of Undetermined Significance	02	1.3%
CAT IV	Follicular Neoplasm Or Suspicious for a Follicular Neoplasm	05	3.4%
CAT V	Suspicious for Malignancy	01	0.6%
CAT VI	Malignant Papillary Carcinoma of Thyroid	03	2%
	Total	144	

**Table 2: Relation of thyroid lesions with sex**

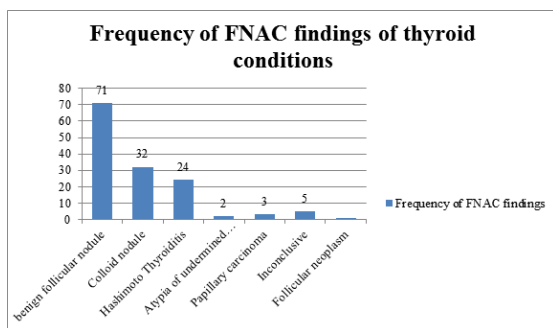
	Category	Cases	Males	Females
CAT I	Non Diagnostic/Unsatisfactory	5	0	5
CAT II	BENIGN	128		
	Benign Follicular Nodule Ii	71	7	64
	Colloid Nodule	33	3	30
	Hashimoto Thyroiditis	24	1	23
CAT III	Atypia of Undetermined Significance	02	0	2
CAT IV	Follicular Neoplasm or Suspicious for a Follicular Neoplasm	05	1	4
CAT V	Suspicious for Malignancy	01	0	1
CAT VI	Malignant Papillary Carcinoma of Thyroid	03	0	3
	Total	144	12	132



**Fig. 1:**

**Table 3: Correlation of thyroid lesions with different age groups**

	0-10 YRS	11-20	21-30	31-40	41-50	51-60	61-70	71-80	Total
<b>Inconclusive</b>	00	00	00	02	01	00	02	00	05
<b>Benign Follicular Nodule</b>	01	08	25	13	13	03	08	00	71
<b>Colloid Nodule</b>	00	03	09	06	11	03	00	00	32
<b>Hashimoto Thyroiditis</b>	00	08	08	02	02	04	00	00	24
<b>Atypia of Undermined Significance</b>	00	00	00	01	00	01	00	00	02
<b>Follicular Neoplasm</b>	00	00	00	00	00	00	00	01	01
Papillary Thyroid Carcinoma	00	01	00	02	00	00	00	00	03
<b>Total</b>	01	20	42	26	27	11	10	01	



**Fig. 2:**

**Discussion**

Present study was conducted in Pathology department in our college. Total number of 144 cases of palpable lesions of thyroid were examined and analysed. Thyroid FNAC is commonly performed outpatient procedure relied by most clinicians and has radically changed the management of patients with thyroid disease. In our study highest number of cases were in 21–30 years, whereas other study reported the median age to be 44 years.<sup>3</sup> Male and female ratio was 0.09:1 in our study, however in other studies the ratio

was 1:9 (gupta et al),<sup>7</sup> 1:5.2 (Sinna et al)<sup>3</sup> and 1:7.7 (Bagga et al).<sup>6</sup>

Inadequate smears were labelled when less than six follicular cells clusters and each cluster containing less than 10 follicular cells were present. Inadequacy rate was 3.4% in present study, 11% were reported by gupta et al, 7.1% as reported by Sinna,<sup>3</sup> Thakkar et al (4.5%), Nayar et al (5%), Yang et al (10.4%), Jo et al (18.6%), Yassa et al (7%), Mondal et al (1.2%) and 34% as reported by Naugler.<sup>8</sup> Unsatisfactory rate was less in our institute because if the smears are inadequate, we remaximise our efforts by repeating the FNAC and also doing ultrasound guides FNAC whenever possible. Frequency of benign lesions in the present study were 88.8% which includes BFN (49.3%), Colloid goiter (22.9%) and Hashimoto Thyroiditis (16.6%). These findings are consistent with study of Mondal et al (87.5%), Gupta et al (78%), thakar et al (85.8%), Nayar et al (64%), Yang et al (64.6%), Yassa et al (66%), Jo et al (59%). Thyroid malignancies accounted for 2% of all cases which is less in comparison to gupta et al,<sup>7</sup> nayar et al<sup>13</sup> where it is 5%, whereas Sinna et al<sup>3</sup> showed 19.5%, Yang et al<sup>15</sup> 7.5%, Jo et al<sup>10</sup> 7%, Mondal et al<sup>9</sup> (4.7%).

**Table 4: Shows comparison of distribution of cases among various categories in present study with previous studies**

TBSRTC CAT	Our Study	Mondal et al <sup>9</sup>	Jo et al <sup>10</sup>	Yassa et al <sup>11</sup>	Yang et al <sup>12</sup>	Nayar et al <sup>13</sup>	Thakkar et al <sup>14</sup>	Gupta et al <sup>7</sup>	Sinna et al <sup>3</sup>
ND/US	3.4	1.2	18.6	7	10.4	5	4.5	11	7.1
Benign	88.8	87.5	59.0	66	64.6	64	85.8	78	33.1
AUS/AFLUS	1.3	1.0	3.4	4	3.2	18	0.7	2	13.5
FN/SFN	3.4	4.2	9.7	9	11.6	6	7.5	3	16.5
Suspicious of malignancy	0.6	1.4	2.3	9	2.6	2	0.7	1	10.1
Malignant	2	4.7	7.0	5	7.5	5	0.7	5	19.5

## Conclusion

TBSRTC provides uniform reporting system for thyroid fine needle aspiration and has high specificity.

The easy reproducibility with a universal terminology can help in better communication among cytopathologists, endocrinologists, surgeons, radiologists who work at the same center leading to a more consistent management approach.<sup>14</sup> This system directly confers risk of malignancy in each category which in turn prompts the recommended clinical management of that category thus establishing an excellent clinico-pathological correlation.

The Bethesda system is very useful for a standardized system of reporting thyroid cytopathology, improving communication between cytopathologists and clinicians, leading to more consistent management approaches.<sup>15</sup> Thyroid Fna can play a pivotal role in the management of patients with thyroid nodules by providing clinicians with a clear and comprehensible cytopathology reports.

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