

## ORIGINAL ARTICLE

### FINE NEEDLE ASPIRATION CYTOLOGY OF THYROID LESIONS-10 YEAR RETROSPECTIVE STUDY AT CHHATTISGARH INSTITUTE OF MEDICAL SCIENCES

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**ABSTRACT: BACKGROUND:** Fine needle aspiration cytology is a well-established simple, safe technique among diagnostic tests for evaluation of thyroid lesions. It helps for the preoperative diagnosis of benign and malignant lesions, thus minimizing and preventing the unwanted surgeries. **OBJECTIVE:** The aim of this retrospective study is to classify various cytomorphological lesions of the thyroid swellings in our setup & to know the age and sex incidence. **METHOD:** A retrospective study of 506 patients was conducted from January 2003 to December 2013 in pathology department of our hospital, Chhattisgarh Institute of Medical Sciences, Bilaspur. Fine needle aspiration of all cases was done after detailed clinical history, physical examination and thyroid function test. Then lesions were classified cytomorphologically. Age and sex incidence was calculated. **RESULTS:** FNAC results were classified as inadequate material, non-neoplastic, neoplastic and malignant. Out of total 506 cases studied. 416(82.2%) were non neoplastic 64(12.6%) were neoplastic 17(3.35%) were malignant lesions and 9(1.77%) cases were inadequate material. Age and sex incidence was calculated. Thyroid lesions showed female predominance, out of 506 cases, 428 were females and 78 were males. Commonest malignancy was papillary carcinoma of thyroid (7 cases). **CONCLUSION:** FNAC is a safe, simple less expensive widely accepted outpatient procedure for diagnosis of thyroid lesions. It also helps to avoid unwanted surgical interventions in patients with benign lesions.

**INTRODUCTION:** Fine needle aspiration cytology (FNAC) is a well-established, safe, non-invasive cost effective and efficient procedure used to differentiate between benign and malignant thyroid swelling.<sup>(1,2)</sup> Over the past 3 decades, confidence in FNAC as a reliable test has grown considerably and it has emerged as a direct, accurate diagnostic procedure in the management of thyroid disease gaining worldwide acceptance.<sup>(3,4)</sup> Thyroid gland is in its superficial and easily accessible position is an ideal tissue for fine needle aspiration cytology<sup>(5,2)</sup> Important factor for the satisfactory test includes representative specimen from the swelling and an experienced cytopathologist to interpret the findings.<sup>(5,2)</sup> Thyroid swelling display range of lesions from non-neoplastic to malignant. They are common lesions encountered in day to day surgical practice<sup>(2)</sup> To make an effective surgical intervention in these lesions, it is very vital to make a preoperative assessment of the morphological nature of lesion.<sup>(2,6)</sup> This study was carried out at our set up to study classify the cytology of palpable thyroid lesions to minimize surgical intervention. And to determine age and sex incidence.

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**MATERIALS AND METHODS:** A cytological retrospective study of 506 cases from April 2003 to April 2013 of palpable thyroid swellings was carried out in Department of pathology, Chhattisgarh Institute of Medical Science (CIMS) Bilaspur. Detailed clinical history, physical Examination, thyroid function test and ultra sonographical examination were obtained in each case; all the patients were referred by clinicians to pathology department for cytopathological diagnosis.

A fine needle was then introduced using a 10ml plastic syringe fitted with a 23-24 gauge disposable needle. The aspirate contents of the needle were expelled on glass slides. Multiple smears were prepared 2-3 slides were immediately fixed in 95% ethyl alcohol and remaining was air dried.

The slides were stained with Haematoxylin and eosin, papanicolaus and MGG stain and examined with light microscope. And result were classified into four groups-

1. Inadequate material.
2. Non-neoplastic [Colloid goiter, colloid goiter with Hyper plastic change, colloid goiter with cystic change, Hashimotos thyroiditis, thyroiditis, thyroglossal cyst].
3. Neoplastic [Follicular neoplasm, hurthle cell neoplasm].
4. Malignant [Papillary carcinoma, medullary carcinoma and anaplastic carcinoma]

After the cytomorphological classification of thyroid swelling age and sex incidence was calculated.

**RESULT:** 506 patients with thyroid lesions were included in the study from April 2003 to April 2013 in all this, cases pre-operative FNAC was done. Out of 506 cases inadequate material was obtained in 9 cases and adequate material was obtained in 497 cases.

Out of 506 cases studied, 428(84.5%) were female while 78(15.5%) were male. The thyroid lesions showed female predominance with the female to male ratio of (5.5:1) Most of the cases were presented between 3<sup>rd</sup> to 5<sup>th</sup> decades of life (388 cases) [76.67%]. The youngest patient in our study was 5 years old boy, while oldest is a 75 year old lady with a mean age of 38.5.

Benign lesions were found commonly in 3<sup>rd</sup> to 5<sup>th</sup> decade of life and malignant lesions were found in 5<sup>th</sup> and 6<sup>th</sup> decade of life. In our study youngest patient diagnosed as follicular neoplasm was of 16 years age and that diagnosed as papillary carcinoma was of 30 years age. Oldest patient was 65 years old which was diagnosed as medullary carcinoma. Out of 506 FNAC cases of thyroid swelling, studied at our set up, of 9 1.77% smears were reported as inadequate material. Remaining 497 cases were studied out of which 416(82.2%) patients showed non-neoplastic lesions, 64(12.6%) patients showed, neoplastic lesion and remaining 17(3.35%) cases were malignant.

In our study under non-neoplastic lesion colloid goiter was the most common non-neoplastic lesion which represent 292 cases (57.7%) while thyroglossal cyst only 8(1.4%) cases least common one. Colloid goitre without cystic change were accounted for about 163 (38.46%) cases and with cystic change were 130(31.25%) cases, 35 cases were recorded as colloid goiter with hyperplastic change 15(3.6%) cases were reported as Hashimotos thyroiditis and lastly under non-neoplastic lesions 65(15.63%) cases were diagnosed as thyroiditis 64 cases (12.6%) where neoplastic out of which follicular neoplasm were 63 (12.1%) and only one was reported as hurthle cell neoplasm.

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17 cases were reported as malignant. Incidence of papillary carcinoma was highest, 7 (1.3%) cases while medullary and anaplastic carcinoma each were 5(0.9%) one case of papillary carcinoma was diagnosed with metastasis in the swelling over forehead.

Sl. No.	Age Group	No. of Cases
01	00 < 10yrs	02
02	11 to 20yrs	60
03	21 to 30yrs	150
04	31 to 40yrs	138
05	41 to 50yrs	100
06	51 to 60yrs	38
07	60 to 70yrs	14
08	70 to 80yrs	04
<b>Total Cases</b>		<b>506</b>

**Table 1: Age wise distribution of Thyroid lesions**

Sl. No.	Lesions	Number of Cases	Percentage
01	Colloid Goiter	163 Cases	38.46
02	Colloid Goiter with cystic change	130 Cases	31.25
03	Colloid Goiter with hyper plastic change	035 Cases	08.41
04	Hashimotos Thyroid	015 Cases	03.61
05	Thyroiditis	065 Cases	15.63
06	Thyroglossal Cyst	008 Cases	1.2
<b>Total Cases</b>		<b>416 Cases</b>	

**Table 2: Distribution of Non-neoplastic thyroid lesions based on FNAC**

Sl. No.	Study	Non Neoplastic	Neoplastic	Ratio
01.	Silverman JF et a (1986) <sup>7</sup>	193	80	2.41:1
02.	Godinho-Matos L et al (1992) <sup>8</sup>	109	22	4.95:1
03.	Uma H et al (2008) <sup>9</sup>	381	31	12.29:1
04.	Sengupta et al (2011) <sup>10</sup>	148	30	4.93:1
05.	Present study	416	81	5.13:1

**Table 3: Comparison of Non neoplastic and neoplastic lesions with other studies**

In our study the non-neoplastic to neoplastic ratio was comparable with the Godinho-matos L et al and Sengupta et al studies. The ratio in other studies varied from 2:41:1 to 12:29:1.

**DISCUSSION:** FNAC is regarded as the gold standard initial investigation in the diagnosis of thyroid swellings. The technique is safe, simple and quick with a low complication rate. Several other tests, such as ultrasonography, radioisotope scanning and FNA biopsy have been used for evaluation of thyroid swellings.<sup>(11,2)</sup> Studies have demonstrated that among all these diagnostic modalities, FNAC is the most accurate, cost effective screening test, for rapid diagnosis of thyroid swelling. FNAC has been shown to have similar or higher sensitivity and accuracy levels than frozen section examination.<sup>(5)</sup>

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In present study, the age of patient ranged from 5-72 years with a mean age of 38.5 years. This age range and mean incidence was slightly higher as compared with the studies.<sup>(3)</sup> We have found majority of patients in 2<sup>nd</sup> decade of life 150 cases (20.8%) as compared to other studies in which majority of patients (44%) were in their third decade of life.<sup>(5)</sup> In our study thyroid swellings manifested at earlier age group as compared to other studies.

The study of 506 cases showed female to male ratio of [5.5:1] with 428 females and 78 males. Thyroid swellings were 11 times more common in females as compared to males.<sup>(5)</sup> Our study showed thyroid swellings were 5-6 times common in females than males.

In the present study out of 497 cases 9 were inadequate material. Non neoplastic accounted for about 416 and neoplastic were 81 ratio about (5.13:1) which is comparable with sengupta et al (2011)<sup>10</sup> and Godinho- Matos et al studied varied from 2.4:1 to 12.29:1.

In present study distribution of non-neoplastic thyroid lesions is colloid Goitre (162) cases (32.01%). Colloid Goitre with cystic change 130 cases (25.69%). Colloid Goitre with hyperplastic change 35 cases (6.91%) Hashimotos thyroiditis 15 cases (2.96%) Thyroidit 65cases (12.84%) and thyroglossal cyst 8 cases-(1.58%).

In addition to clinical information for diagnosis and treatment of thyroid lesions, ultrasonography, serology and radiographic evaluation of the swelling of neck (thyroid) and FNAC studies are essential.<sup>(12)</sup>

**CONCLUSION:** FNAC is regarded as the gold standard initial investigation in the diagnosis of thyroid swellings. Our primary aim of this study was to differentiate thyroid lesions into non-neoplastic and neoplastic categories. Depending upon the cytomorphological classifications of lesions, patients who were diagnosed as benign lesions were kept in close follow up and those diagnosed as malignant were subjected to surgery, thereby decreasing the rate of unnecessary surgery. In our study female to male ratio is 5.5:1, showing female predominance and the swellings were common in second decades. In non-neoplastic lesions colloid goitre is commonest while papillary carcinoma of thyroid is commonest in malignant category. The diagnostic accuracy of FNAC when it is done in conjunction with advanced imaging techniques, immunologic analysis and electron microscopy and there by further reducing misdiagnosis.

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