

## Fine needle aspiration cytology of thyroid lesions with histopathological correlation

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### Abstract

**Introduction:** FNAC of thyroid lesions is a simple, rapid, patient friendly and inexpensive procedure, which can be repeated in cases of inadequate samples. It has the best predictive value of all currently available diagnostic procedures. Along with FNAC, other diagnostic modalities such as thyroid scanning, ultrasonography, thyroid hormone and antibody level measurements enhance the diagnostic accuracy of the technique.

**Material and Methods:** The present study was a prospective and interventional type of study done from January 2013 to December 2013. The study was undertaken in 50 patients to evaluate the cytology of the palpable thyroid lesions and compared them with histopathology to determine its diagnostic accuracy at Department of Pathology, Dhiraj general hospital, Piparia.

**Result:** Among the non-neoplastic lesions, benign follicular lesion (51.16%) and colloid and nodular goitre was commonly encountered (41.86%). Hashimoto's thyroiditis was diagnosed in 3 cases (6.98%). Among the neoplastic lesions (14%), papillary carcinoma was the commonly encountered lesion (56.14%). Histopathological examination was confirmatory in all cases.

**Conclusion:** The diagnostic accuracy of FNAC on palpable thyroid lesions with histopathologic correlation is 100%.

**Keywords:** Fine needle aspiration cytology, thyroid lesions, histopathological correlation.

### 1. Introduction

A clinician is always in search of an easy, harmless and accurate diagnostic modality which will give him the correct picture of a disease. Diagnostic methods for surgical lesions which cannot be diagnosed correctly by biochemical and occasionally by radiological methods also, have undergone a lot of modifications and improved a lot in the 20<sup>th</sup> century.

Fine needle aspiration cytology is one of the most rapidly advancing fields of diagnostic cytopathology. In fact, cytopathology has already attained a status of independent specialization.

Core needle biopsy is a supplementary tool in selected cases, but FNAC remains the first choice for the initial investigation for diagnosis of both superficial and deep lesions.

Fine needle aspiration is an established diagnostic modality which has expanded in recent years to include sampling of masses in virtually any part of body whether

superficial or deep, palpable or non-palpable. The aspiration technique generally applied involves firm attachment of the aspiration needle to a syringe usually held in a specially designed syringe holder, which enables single handed application of suction. The main aim of suction is to hold the cells against the sharp cutting edge of the needle.

Of the initial screening tests for patients with thyroid lesions, fine needle aspiration cytology (FNAC) is a well-developed, frequently used method, which is very cost effective and shows a low morbidity. It is widely accepted as the most accurate procedure to differentiate benign from malignant thyroid nodules and helps preoperatively in selecting patients for surgery.[2]

FNAC is a simple and inexpensive procedure, which can be repeated in cases of inadequate samples. It has the best predictive value of all currently available diagnostic procedures.

The major limitation of FNAC is its insensitivity in correctly diagnosing malignant follicular lesions.[1] In addition; a proportion of cases cannot be evaluated because

of paucity of material. Despite its apparent limitation, however, routine aspiration cytology is the most valuable and appropriate investigation in patients with thyroid lesions.[3,4]

FNAC used together with other diagnostic modalities such as thyroid scanning, ultrasonography, thyroid hormone and antibody level measurements enhances the diagnostic accuracy of the technique.[1,5]

Against this background, we wished to evaluate the accuracy and clinical usefulness of thyroid FNAC in our hospital. We compared the cytological and histological diagnosis of patients who underwent thyroid surgery at Dhiraj General Hospital, Piparia over a period of 1 year (between January 2013 to December 2013).

### 1.1 Aims and Objectives

1. To study the cytomorphology of palpable thyroid lesions by FNAC.
2. To study the diagnostic accuracy of FNAC on palpable thyroid lesions with histopathologic correlation.

## 2. Material and Method

The present study was a prospective and interventional type of study, the study was undertaken to study the cytology of the palpable thyroid lesions and compared them with histopathology to determine its diagnostic accuracy.

All the patients referred for FNAC of thyroid lesions in the cytology until 50 numbers of patients are recruited (between January 2013 to December 2013). This work was carried out in the Department of Pathology, Dhiraj general hospital, Piparia.

All the patients were clinically examined in detail and a careful palpation of the thyroid gland were done to judge precisely the location for aspiration. After brief explanation about the procedure to the patient, aspiration was done with the patient in supine or sitting position with extended neck, so as to make the thyroid swelling appear prominent.

The material was obtained by using a 2.5 cm long, 23-25 gauge needle attached to a 10cc disposable syringe by applying mild suction.

Multiple smears were prepared and equally divided into air dried and wet fixed smears.

Wet fixed smears were immediately fixed in methanol taking precaution that the smears did not get air dried. These smears after fixation were stained with Hematoxylin and Eosin.

The smears intended for Giemsa stain were quickly air dried and fixed with methanol and stained with Giemsa stain.

- Specimen was considered 'unsuitable' for cyto-diagnosis if they consisted mainly of blood or if cellular material was absent, making them inadequate for determination of benign or malignant change.
- Specimen was considered adequate where at least 5-6 clusters of cells with more than 10 cells per cluster in at

least two slides prepared from different aspirates are present.[1]

- However, adequacy also depends upon the lesion being aspirated. For example in case of colloid goitre FNAC many times yielded colloid with scanty cells, but it has been considered adequate when the lesion is taken into consideration.
- No complication occurred in present study. Only pain for few minutes after aspiration was noted in few cases.

The cases were followed by postoperative specimen received from the department of surgery or ENT. Specimens were collected in 10% formalin in fresh state and allowed to fix for 24 hours. Detailed gross examination was done and bits were given. Paraffin embedded H&E stained sections were obtained and studied under light microscopy.

Immunohistochemistry (IHC) has been performed whenever needed.

Cytological diagnosis was correlated with histopathological diagnosis. The diagnostic accuracy, sensitivity and specificity, positive predictive value (PPV) and negative predictive value (NPV) of FNAC in diagnosing thyroid malignancy were calculated.

### 2.1 Inclusion criteria

- All patients, whose FNAC of thyroid done and biopsied subsequently were considered in this study.
- All age groups were included.

### 2.2 Exclusion criteria

- Inadequate specimen and poorly preserved samples were excluded.

## 3. Results and Analysis

In the present study 50 patients presenting with thyroid lesions were subjected to FNAC and subsequently underwent surgery. The paraffin sections were available for cyto-histopathological correlation.

**Table -1: Age and sex distribution of the patients**

Age group (years)	Male	Female	Total
11-20	1	3	4
21-30	1	12	13
31-40	1	10	11
41-50	1	12	13
51-60	1	3	4
>60	0	5	5
<b>Total</b>	<b>5</b>	<b>45</b>	<b>50</b>

### 3.1 Age

Age group of patients referred for thyroid aspirations ranged from 13 years to 85 years with mean age of 40.14 years. Majority of the patients were in the age group of 21-30 and 41-50 years (13 each out of total 50 patients). (Table 1)

### 3.2 Sex

Majority of the patients were females accounting for 45 (90%) of 50 cases forming a male to female ratio of 1:9. (Table 1)

### 3.3 Cytology

In the present study, the non-neoplastic lesions were more commonly encountered than the neoplastic lesions. Out of 50 cases, 43 (86%) were non neoplastic and 7 (14%) were neoplastic lesions. (Table 2)

**Table-2: Distribution of Neoplastic and Non-neoplastic lesions based on cytological study**

Lesions	Numbers	Percentage (%)
Non-neoplastic	43	86
Neoplastic	7	14
<b>Total</b>	<b>50</b>	<b>100</b>

Out of 50 cases, the most common non neoplastic lesion was benign follicular lesion (22 cases), followed by colloid and nodular goiter (18 cases) and hashimoto's thyroiditis (3 cases). The most common neoplastic lesion was

papillary carcinoma accounting for 4 cases followed by 2 cases of malignant neoplasm and 1 case of follicular neoplasm. (Table 3, 4)

**Table-3: Distribution of individual thyroid lesions based on cytological study**

Lesions	Number of cases	Percentage (%)
Colloid and nodular goiter	18	38
Benign follicular lesion	22	42
Hashimoto's thyroiditis	3	6
Follicular neoplasm	1	2
Malignant neoplasm	2	2
Papillary carcinoma	4	8
<b>Total</b>	<b>50</b>	<b>100</b>

**Table-4: Age and sex distribution in non-neoplastic lesions of thyroid gland based on cytological study**

Age (years)	Colloid and nodular goiter		Benign follicular lesion		Hashimoto's thyroiditis	
	Male	Female	Male	Female	Male	Female
11-20	-	1	-	2	1	-
21-30	-	6	1	5	-	1
31-40	-	3	-	3	1	-
41-50	-	5	1	5	-	-
51-60	-	-	1	3	-	-
>60	-	3	-	1	-	-
<b>Total</b>	-	<b>18</b>	<b>3</b>	<b>19</b>	<b>2</b>	<b>1</b>

### 3.4 Non neoplastic lesions

In the present study, among 43 non neoplastic lesions, most common was benign follicular lesion (22 cases), followed by colloid and nodular goiter (18 cases) and hashimoto's thyroiditis (3 cases).

### 3.5 Benign follicular lesion

In the present study, the cytological diagnosis of benign follicular lesion was made in 22 (42%) cases out of

total 50 patients. Majority of these patients were females numbering 19 and 3 were males. The age ranged from 18 to 65 years with maximum number of cases between 21 – 30 and 41 - 50 years (6 cases each).

Histopathological study confirmed the cyto-diagnosis in 20 cases. It differed in 2 cases of which hashimoto's thyroiditis and papillary carcinoma were seen in 1 case each. (Table 5)

**Table-5: Cyto-pathological correlation of benign follicular lesion**

Cytological diagnosis	Histopathological diagnosis					
	Colloid goiter	Nodular goiter	Adenomatoid goiter	Hashimoto's thyroiditis	Follicular adenoma	Papillary carcinoma
Benign follicular lesion						
22	9	3	4	1	4	1

### 3.6 Simple colloid and nodular goitre

In the present study, the cytological diagnosis of colloid and nodular goitre was made in 18 cases out of 50 patients. All of these patients were females numbering 18.

The age ranged from 13 to 80 years with maximum number of cases between 21-30 years (6 cases).

Histopathological study confirmed the cyto-diagnosis in all 18 cases.(Table 6)

**Table-6: Cyto-histo-pathological correlation of colloid and nodular goiter**

Cytological diagnosis	Histopathological diagnosis		
	Colloid goiter	Adenomatoid goiter	Nodular goiter
Colloid goiter	11	3	1
Nodular goiter	2	1	-
18	13	4	1

### 3.7 Hashimoto's thyroiditis

In the present study, cytological diagnosis of Hashimoto's thyroiditis was made in 3 cases out of 50 cases. One case was female aged 26 years and 2 cases were males aged 14 and 40 years respectively.

Histopathological study confirmed the cyto-diagnosis in 2 cases. It differed in 1 case of which nodular goiter was seen. (Table 7)

**Table-7: Cyto-histo-pathological correlation of Hashimoto’s thyroiditis**

Cytological diagnosis	Histopathological diagnosis	
	Hashimoto’s thyroiditis	Nodular goiter
Hashimoto’s thyroiditis	2	1
	3	

**3.8 Neoplastic lesions**

In the present study, 7 neoplastic lesions were encountered cytologically constituting 14% of all thyroid lesions. They include 1 case of follicular neoplasm, 2 cases of

malignant neoplasm and 4 cases of papillary carcinoma (Table 8). The neoplastic lesions were common between the age group of 31-40 years, next common being 41-50 years.

All 7 neoplastic lesions were seen in females. (Table 8)

**Table-8: Age and sex distribution in neoplastic lesions of thyroid gland based on cytological study**

Age (years)	Follicular neoplasm		Malignant neoplasm		Papillary carcinoma	
	Male	Female	Male	Female	Male	Female
11-20	-	-	-	-	-	-
21-30	-	-	-	-	-	-
31-40	-	1	-	1	-	2
41-50	-	-	-	-	-	2
51-60	-	-	-	-	-	-
>60	-	-	-	1	-	-
<b>Total</b>	-	1	-	2	-	4

**3.9 Follicular neoplasm**

Cytological diagnosis of follicular neoplasm was made in 1 case which was female aged 37 years.

Histopathological diagnosis differed and was diagnosed as papillary carcinoma. (Table 9)

Histopathological diagnosis confirmed malignancy in one case, diagnosed as medullary carcinoma. While another case diagnosed as benign follicular adenoma. (Table 9)

**3.11 Papillary carcinoma**

Cytological diagnosis of papillary carcinoma was made in 4 cases. 2 cases of each in age group 31–40 and 41-50 years respectively.

**3.10 Malignant neoplasm**

Cytological diagnosis of malignant neoplasm was made in 2 cases, one was female aged 35 years and another was female aged 85 years.

**Table-9: Cyto-histo-pathological correlation of neoplastic lesion**

Cytological diagnosis	Histopathological diagnosis		
	Follicular adenoma	Medullary carcinoma	Papillary carcinoma
Follicular neoplasm (1)	-	-	1
Malignant neoplasm (1)	1	1	-
Papillary carcinoma (4)	-	-	4

Histopathological diagnosis confirmed papillary carcinoma in all 4 cases (Table 9). On histopathological examination out of 50 cases, 43(86%) cases were benign and 7(14%) cases were malignant. In benign cases goiter (colloid,

nodular and adenomatous) was predominantly diagnosed lesion, found in 27(62.79%) cases. In malignant cases papillary carcinoma was predominantly diagnosed lesion, found in 6(85.71%) cases.

**Table – 10: Cyto-histopathological Correlation of both Non-Neoplastic and Neoplastic lesions**

Cytological diagnosis	Histopathological diagnosis							
	Colloid goiter	Nodular goiter	Adenomatoid goiter	Hashimoto’s thyroiditis	Follicular adenoma	Medullary carcinoma	Papillary carcinoma	
Colloid goiter	11	1	3	-	-	-	-	15
Nodular goiter	2	-	1	-	-	-	-	3
Benign follicular lesion	9	3	4	1	4	-	1	22
Hashimoto’s thyroiditis	-	1	-	2	-	-	-	3
Follicular neoplasm	-	-	-	-	-	-	1	1
Malignant neoplasm	-	-	-	-	1	1	-	2
Papillary carcinoma	-	-	-	-	-	-	4	4
<b>Total</b>	<b>22</b>	<b>5</b>	<b>8</b>	<b>3</b>	<b>5</b>	<b>1</b>	<b>6</b>	<b>50</b>

**Interpretation of cytological results**

Cytological results were divided into following categories:

- 1) Positive results:** Cytological results that were in correlation with histopathological report were considered as positive results.
- 2) False positive results (FP):** Results which are malignant cytologically and benign on histopathological examination are considered as false positive result.

- 3) False negative results (FN):** Results which are benign cytologically and malignant histo-pathologically are considered as a false negative result.
- 4) True positive results (TP):** Results which are malignant cytologically and histo-pathologically both are considered as a true positive result.

- 5) **True negative results (TN):** Results which are benign cytologically and histo-pathologically both are considered as a true negative result.
- 6) Positive predictive value (PPV) = TP / TP + FP
- 7) Negative predictive value (NPV) = TN / TN + FN
- 8) Diagnostic accuracy = TP + TN / TP + TN + FP + FN

**Table – 11: Interpretation of cytological results**

Results	No. of patients	Percentage
Positive results	45	90 %
True positive	6	12 %
True negative	42	84 %
False positive	1	2 %
False negative	1	2 %
Sensitivity	-	85.71 %
Specificity	-	97.67 %
Positive predictive value (PPV)	-	85.71 %
Negative predictive value (NPV)	-	97.67 %
Diagnostic accuracy	-	96 %

**Table – 12: Distribution of results in various series**

Series	Chandanwale et al [2]	Gupta et al [7]	Bagga et al [3]	Ali et al [4]	Bista M et al [10]	Musani et al [12]	Moosa et al [9]	Present study
NO. of Pts	150	75	252	1639	51	105	98	50
HP examination done in	31.3 %	100 %	12.8 %	11.7 %	100 %	100 %	100 %	100 %
Benign	77.6 %	72 %	90.5 %	64.3 %	80.39 %	87.6 %	89.8 %	86 %
Malignant	6.75 %	8 %	1.2 %	7.8 %	19.6 %	12.4 %	8.16 %	12 %
Suspicious	13.65 %	20 %	6.7 %	18.6 %	-	-	2.04 %	2 %

In the study done by Chandanwale et al [2], malignant lesions were 4% out of which 2.6% were papillary carcinoma. In the study done by Moosa et al [9], malignant lesions were 7.9% out of which 6.8% were papillary carcinoma. (Table 13)

#### 4. Discussion

In the present study, most of the patients are females (90%) with 21-50 years age patients affected more commonly (74%). (Table 1)

Table 3 shows cytological diagnosis of all 50 patients. Out of 50 cases histopathology was available in all cases and correlated with cytological diagnosis.

The benign and malignant lesions in various series ranged from 64.3% to 90.5% and 1.2% to 19.6% respectively. The suspicious lesions for malignancy in various series varied from none to 20%. In the present study, out of 50 cases, benign lesions were 86%, malignant lesions were 12% and 2% were suspicious lesions. The results of present study are in close correlation with studies done by Musani et al [12] and Moosa et al [9]. (Table 12)

In the present study, benign lesions constituted 80%, inflammatory lesions 6%, malignant lesions 12% out of which papillary carcinoma were 8% of cases. (Table 13)

**Table – 13: Distribution of various cytological lesions in different series**

	Chandanwale et al [2]	Moosa et al [9]	Present study
	150 cases	98 cases	50 cases
Benign lesions	72.8%	77.75%	80%
Inflammatory lesions	12.6%	8.15%	6%
Follicular neoplasms	8%	2.2%	2%
Malignant lesions	4%	7.9%	12%
Papillary carcinoma	2.6%	6.8%	8%

**Table – 14: Distribution of results in various series**

Series	Chandanwale et al [2]	Gupta et al [7]	Bagga et al [3]	Ali et al [4]	Bista et al [10]	Musani et al [12]	Moosa et al [9]	Nepali et al [11]	Present study
Positive	97.88%	66.7%	96%	97.92%	92.16%	94.28%	97.96%	96%	90%
False positive	0%	13.3%	0%	0%	1.96%	0.95%	0%	2%	2%
False negative	2.12%	20%	4%	2.08%	5.88%	4.77%	2.04%	2%	2%

In above mentioned series (Table 14), positive results ranged from 66.7% to 97.96% while false negative cases ranged from 2% to 20%. False positive cases in different studies ranged from 0 to 13.3%. In the present study positive results were 90%. False positive and false negative

results were 2% each. For statistical purpose, suspicious results were left out. The results of present study correlate with studies done by Bista et al [10] and Nepali Lecturer et al [11].

**Table – 15: Distribution of results in various series**

Series	Chandanwale et al [2]	Gupta et al [7]	Bagga et al [3]	Ali et al [4]	Bista et al [10]	Musani et al [12]	Moosa et al [9]	Present study
Sensitivity	90%	80%	66%	91.6%	70%	61.53%	77.7%	85.7%
Specificity	100%	86.6%	100%	100%	97.5%	98.9%	98.9%	97.67%
Diagnostic Accuracy	87.5%	84%	96.2%	97%	92.1%	94.28%	96.9%	96%

The overall diagnostic accuracy ranged from 84% to 97%, sensitivity ranged from 61.53% to 91.6% and specificity ranged from 86.6% to 100% in various series. In present study, sensitivity was 85.7%, specificity 97.67% and diagnostic accuracy was 96%. The results correlate with those of Ali *et al*[4] and Moosa *et al*[9].

Various studies in literature state that 20% of follicular neoplasms and 25% of papillary carcinomas show cystic change.<sup>1,6</sup> Aspirate in these two neoplasms yield few follicular cells with degenerative changes and macrophages and scanty colloid. This can be explained on the basis of sampling of cystic areas rather than solid cellular areas. The possible remedy is multiple aspirations from different parts of the swelling so that hypercellular areas can also be sampled<sup>6</sup> or USG guided FNAC which could aid in sampling the solid portions of cystic nodules.[1] The sensitivity of FNA diagnosis in cystic neoplasms may be as low as 40% and all cystic lesions should be managed cautiously.[1]

Characteristic intranuclear cytoplasmic inclusions (INCIs) are seen in upto 90% of cases of papillary carcinoma. They have sharp, well-defined, membrane like margins and are not optically clear but resemble the cytoplasmic colour and texture. They are seen in at least 5% of the cells in papillary carcinoma. INCIs are, however, not specific to PC as they can be seen in many other malignancies or suspicious lesions of thyroid. Thus, presence of INCIs in < 5% of the cells in thyroid swelling should raise the suspicion of malignancy and should be reported as a suspicious lesion.[1]

Irregular nuclear shapes, convolutions and longitudinal nuclear grooves or creases are visible in cytology smears (in 85-100% cases) and in sections. Grooves are obvious in alcohol-fixed material but are difficult to discern in Giemsa stained smears. Strict criteria for recognition have been suggested: continuous grooves or creases, clearly defined and running the length of the nucleus. The presence of complete grooves in  $\geq 20\%$  of cells as counted in selective fields where grooves are frequent is highly predictive of PC. Grooves, however, may be found in small numbers in 70-80% of non-papillary neoplasms, in 50-60% of non-neoplastic thyroid lesions.

The presence of  $\geq 3$  of the following features: papillae, psammoma bodies, nuclear grooves, INCIs, and fine granular chromatin has been reported to facilitate cytological diagnosis of PC, with frequent grooves and INCIs most dependable.<sup>1</sup>

In the present study, out of 6 cases of papillary carcinoma 4 were diagnosed on cytology. One case was diagnosed as follicular neoplasm and another case diagnosed as benign follicular lesion with varying amount of cystic change, were surgically removed and showed papillary carcinoma on histology.

Four cases which were diagnosed as papillary carcinoma on cytology, showed syncytial clusters of follicular epithelial cells with anatomical border, pale nuclei having powdery chromatin, intranuclear cytoplasmic

inclusions and nuclear grooves. Psammoma bodies were not seen in any case. All 4 cases were confirmed as papillary carcinoma on histopathological examination out of which 2 cases diagnosed as follicular variant of papillary carcinoma.

Another two cases were reviewed again after histopathology report but papillae were not found. One case predominantly showed macrophages and few epithelial cells, while another case showed micro follicles and showed some nuclear features of papillary carcinoma but did not meet the criteria to be diagnosed as papillary carcinoma.

One false positive case was diagnosed cytologically as malignant lesion showed clusters of crowded cells with hyperchromatism with high N:C ratio without any nuclear features of papillary carcinoma and after surgical removal it was diagnosed as follicular adenoma.

## 5. Conclusion

FNAC of thyroid lesions has been shown to be safe, simple, cost effective and accurate method for management of palpable thyroid lesions. In the present study it was possible to classify non-neoplastic and neoplastic lesions. Subtyping of neoplastic lesions and non- neoplastic lesions was also possible. Use of FNAC can decrease the number of surgeries to be performed.

We wish to stress the importance of doing multiple aspirations because of the fact that thyroid is affected by many lesions at a time. As in other studies we have also encountered coexistent lesions like Hashimoto's thyroiditis with colloid goitre and Hashimoto's thyroiditis with papillary carcinoma. Cystic change can occur in both non-neoplastic and neoplastic lesions. As in other studies we have also encountered cystic change in both non neoplastic (nodular goitre) and neoplastic (follicular adenoma and papillary carcinoma) conditions. In cystic nodules fluid should be aspirated completely and FNAC should be done from the residual mass. If there is no palpable mass, patient should be followed up with USG examination and USG guided FNAC should be done wherever necessary.

However, delay in diagnosis due to false negative needle aspirations may be minimized by the policy of clinical follow up and repeat aspiration to obtain adequate aspirates and a proper cytological diagnosis. The diagnostic accuracy can be improved when combined with advanced imaging techniques, immunologic analysis and electron microscopy and there by the management of thyroid diseases.

### The salient features observed in this study are:

The lesions were common in females with the female to male ratio of 1:9 and the mean age of the patients was 40.14 years. All the patients tolerated the aspiration procedure and there were no complications.

Among the non-neoplastic lesions, Benign follicular lesion (51.16%) and colloid and nodular goitre was commonly encountered (41.86%). Hashimoto's thyroiditis was diagnosed in 3 cases (6.98%).

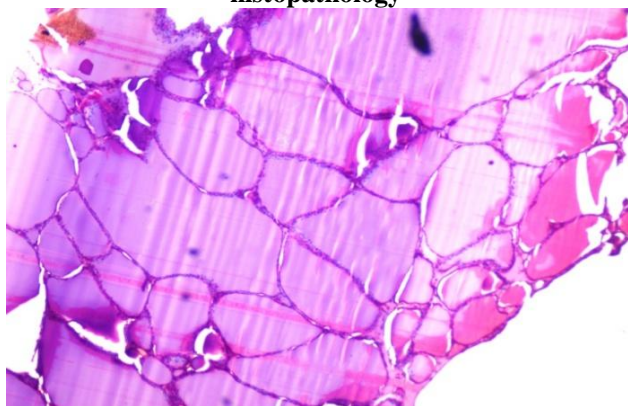
Out of 43 non-neoplastic lesions diagnosed by cytology, histopathological examination was done in all the cases and the diagnosis was confirmatory in 40 cases (Figure 1, 2, 3). It differed in 1 case which was diagnosed as papillary carcinoma. In the remaining 2 cases histopathological diagnosis was different from cytological diagnosis but it remained non-neoplastic.

Among the neoplastic lesions (14%), papillary carcinoma was the commonly encountered lesion (57.14%) (Figure 4, 5, 6). A single case of medullary carcinoma was diagnosed histopathologically which was diagnosed as malignant lesion by cytology.

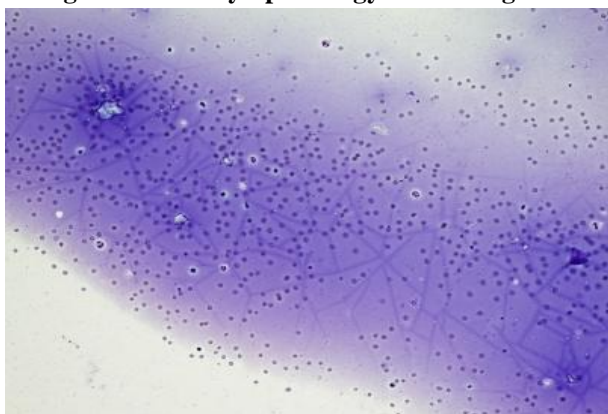
**Figure 1- Gross appearance of cut section of colloid goitre thyroid**



**Figure 2- Scanner (4x) view of colloid goitre histopathology**



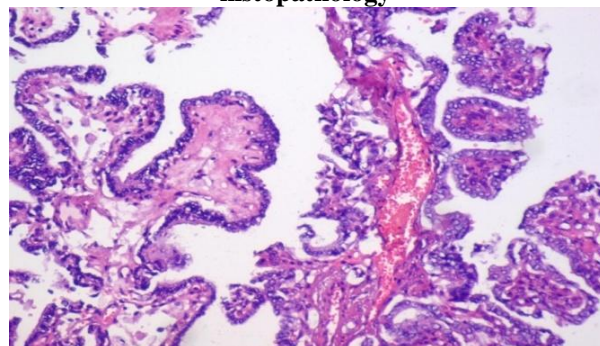
**Figure 3- FNA cytopathology of colloid goiter**



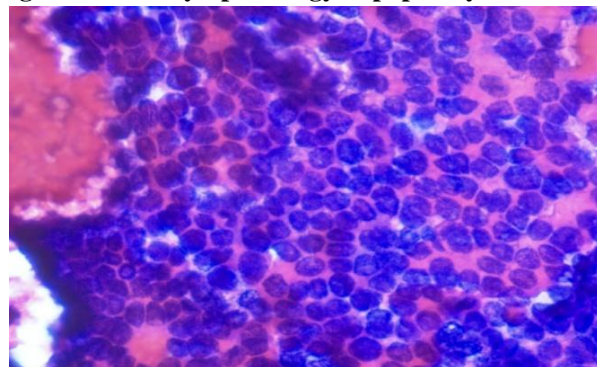
**Figure 4- Gross appearance of cut section of papillary carcinoma thyroid (upper pole)**



**Figure 5- Scanner (4x) view of papillary carcinoma histopathology**



**Figure 6- FNA cytopathology of papillary carcinoma**



One case of suspicious follicular neoplasm diagnosed as papillary carcinoma – follicular variant by histopathology and one case diagnosed as malignant neoplasm by cytology came out to be benign (follicular adenoma) after histopathological examination.

Specificity of fine needle aspiration cytology in detecting malignant lesions was 97.67%, sensitivity was 85.7% and diagnostic accuracy was 96%.

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