

Surprises in Thyroid Neoplasms – A Cytological, Morphological and Clinical Correlation

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I. Introduction

The human body is a real work of art and the more one learns about the details of its function, the more awed one becomes. The thyroid gland is a perfect example of the magnificence of the human body and physiology. The thyroid is a small hormone producing gland in the body that produces just one important hormone – the thyroid hormone. It secretes active hormones influencing the diversity of metabolic process [1]. Diseases of the thyroid, includes a vast array of developmental, inflammatory, hyperplastic and neoplastic disorders are exceedingly common in clinical practice. Swelling of the thyroid gland or in front of neck is called as goiter. Thyroid lesions can present as diffuse, solitary or multinodular swellings and these can belong to any one of the following functional categories: euthyroid, hypothyroid and hyperthyroid. Duffy & Fitzgerald in 1950 were the first to call attention to the clinical significance of the development of thyroid carcinoma after irradiation of thyroid [2]. During last two decades confidence in fine needle aspiration cytology(FNAC) as a reliable test has emerged as the most direct, accurate diagnostic procedure in the management of nodular thyroid disease, gaining world wide acceptance. An adequate thyroid aspirate is necessary for the interpretation of fine needle aspiration cytology[3]. Thyroid nodules constitute the main indication for fine needle aspiration cytology, and the goal of this diagnostic procedure is to detect thyroid neoplasm for surgical resection and identify the non-neoplastic lesions that may be managed conservatively[4]. Over years thyroid FNAC is established as standard procedure for clinical triage of thyroid nodule and considered as safe, reliable and effective method for differentiating benign from malignant nodule. Also it has been claimed that FNAC has substantial cost saving effect on thyroid practice [5]. Histopathological examination of the removed thyroid swelling is the most accurate way to determine the pathology and also predicts the prognosis. Laboratory investigations other than Fnac have limited role to find out the nature of the thyroid swelling. Moreover, these investigations are extremely costly and far beyond the reach of most of poor patients.

Often the goiters are surgically removed on suspicion of malignancy even if the report in FNAC is benign, subjecting the patients to morbidity, complications and expenses of operation. This method of clinical investigation has reduced the number of diagnostic thyroid surgeries for thyroid nodules by 60-85% [6]. More over it has been confirmed that the diagnostic value of clinical data alone is inferior to FNAC alone [7]. The sensitivity ranging from 65% to 98% and specificity ranging from 55% to 100% has been reported in different settings [8]. During the past ten years, research on thyroid gland has developed in many directions and to a much greater extent than might have been foreseen. Despite majority of the thyroid nodules being benign, some of them have underlying malignancy. So far as the biochemistry of the thyroid gland is concerned, the most conspicuous advances have been made by the application of new techniques using radioactive isotopes. There is indeed no field of biochemical research in which the combination of these methods has proved more illuminating, partly owing, of course, to the convenient properties of the isotope I¹³¹ that has mostly been used. Immunohistochemistry is used in diagnosing thyroid cancer as differentiated thyroid cancer containing thyroglobulin and microsomal antigen crossreacting with antibodies and in identifying the metastatic deposits. Clinical evaluation helps in diagnosis but it has limitations. It is difficult to distinguish benign and malignant, So each technique like USG, FNAC has its own drawbacks leading to the diagnosis, but histopathology gives the confirmatory diagnosis and many surprises in the diagnosis.

II. Materials And Methods

A prospective and retrospective was done in the Department of Pathology, Narayana Medical College Hospital, Nellore study, between July 2010 to June 2013 which includes resected and biopsy specimens.

All the patients were evaluated by thorough clinical examination followed by routine investigation, clinical examination, thyroid function tests, FNAC and Histopathological examination. The details of each case were obtained from the clinical records. The specimens were fixed in 10% Formalin for 24 hours after recording

the gross morphological features. Depending on the size and appearance of the tumor, appropriate number of 5mm thick bits were cut from the lesion and submitted for tissue processing, 4-5 μ thick sections were cut with a microtome and stained with Hematoxylin and Eosin stain. Special stains like May Grunwald Giemsa and Papanicolaou were employed whenever indicated. The stained sections were studied under light microscopy as detailed in the proforma. For retrospective cases, the respective paraffin blocks were selected and treated similarly. The processing and staining of tissues was followed according to the procedures given in Cellular pathology techniques, 4th edition, Culling C.F.A et al, (1985) and “Laboratory technique in surgical pathology” by Shameem Sheriff et al, (1999). The diagnosis of thyroid was made on the basis of clinical presentation, gross morphology and light microscopic features of H & E and special stained sections.

III. Observation And Results

The present study was conducted from July 2010 - June 2013 (3 years) included a total number of 300 thyroidectomy specimens received in the department of Pathology, Narayana Medical College, Nellore, which includes non-neoplastic and neoplastic lesions. The present study was done exclusively on neoplastic lesions of the thyroid. Out of 300 specimens 200 specimens were non-neoplastic lesions of the thyroid and 100 specimens were neoplastic lesions. Incidence of neoplastic and non-neoplastic lesions was studied in 300 thyroidectomy specimens. Out of these maximum number of cases were non-neoplastic accounting for 66.6 percent (200 cases) and the remaining were neoplastic comprising 33.3 percent (100 cases). The histopathological diagnosis as benign neoplasms were found to be 35 percent of the cases (35 cases) and malignant neoplasms were found to be 65 percent of the cases (65 cases). Among the benign neoplasms, follicular adenoma was diagnosed in 33 percent of the cases (33 cases). Hyalinizing trabecular adenoma was diagnosed in 2 percent of the cases (2 cases) in benign neoplasms and papillary carcinomas were diagnosed to be the maximum among the 100 total cases taken in this study. Papillary carcinoma was diagnosed in 60 percent of the cases (60 cases). Both Follicular carcinoma and Anaplastic carcinoma were diagnosed in 2 percent of the cases each. Medullary carcinoma was diagnosed in 1 percent of the case (1 case). Age wise distribution of thyroid neoplasms was studied by dividing the cases into seven groups i.e. 10-20 years, 21-30 years, 31-40 years, 41-50 years, 51-60 years, 61-70 years and 71-80 years respectively. In the age group range between 10-20 years, the thyroid neoplasms were diagnosed in 6 percent of the cases (6 cases). In 21-30 years age group range the thyroid neoplasms were diagnosed in 25 percent of the cases (25 cases). In 31-40 years age group range, the maximum cases in diagnosis of thyroid neoplasms were diagnosed in 29 percent of the cases (29 cases). In 41-50 years age group range, the thyroid neoplasms were diagnosed in 23 percent of the cases (23 cases). In 51-60 years age group range, the thyroid neoplasms were diagnosed in 10 percent of the cases (10 cases). In 61-70 years were diagnosed thyroid neoplasms in 5 percent of the cases (5 cases). In 71-80 years of age group range were diagnosed thyroid neoplasms in 2 percent of the cases (2 cases). The age wise distribution of thyroid neoplasms was more common in females. In benign neoplasms, the males was diagnosed in 1 number of the cases, the females was diagnosed in 34 number of the cases. In malignant neoplasms, the males was diagnosed in 9 number of cases, the females were diagnosed 56 number of the cases. On clinical examination of thyroid swelling, the maximum number of cases presented with swelling on the right side of the neck. 54 percent of the cases (54 cases) presented with right side swelling. 27 percent of the cases (27 cases) presented with left side swelling. 19 percent of the cases (19 cases) presented with diffuse swelling in the neck. On palpation of the swelling in the neck, the common consistency of the swelling were firm in 60 percent of the cases (60 cases). The consistency of swelling were nodular in 32 percent of the cases (32 cases). The consistency of the swelling were solid in 6 percent of the cases (6 cases). The consistency of the swelling were hard in 2 percent of the cases (2 cases). Maximum number of patients presented with hoarseness of voice (15 cases). Dysphagia was seen in 6 cases. Increased sweating was seen in 3 cases. Stridor was seen in 3 cases. Loss of weight was seen in 2 cases. Both palpitation and loss of sleep was seen in 1 case in each. The maximum duration of complaints for 1-2 years were seen in 40 percent of the cases (40 cases). The duration of complaints for more than 2 years were seen in 38 percent of the cases (38 cases). The duration of the complaints for 1-12 months were seen in 20 percent of the cases (20 cases). The duration of complaints for less than one month were seen in 2 percent of the cases (2 cases). The clinically diagnosed benign cases 80 and compared to histopathology diagnosis, 35 benign cases were confirmed & remaining 45 cases were confirmed to be malignant. The clinically diagnosed malignant cases were 20 and when compared to histopathology diagnosis all the cases were confirmed. The radiologically diagnosed benign cases 90 and compared to histopathology diagnosis, 35 benign cases were confirmed & remaining 55 cases were confirmed to be malignant. The clinically diagnosed malignant cases were 10 and when compared to histopathology diagnosis all the cases were confirmed. The cytologically diagnosed benign cases 45 and compared to histopathology diagnosis, 35 benign cases were confirmed & remaining 10 cases were confirmed to be malignant. The cytologically diagnosed malignant cases were 55 and when compared to histopathology diagnosis all the cases were confirmed. The sensitivity of the fine needle aspiration in the

diagnosis of thyroid neoplasms were 84 percent and the specificity were 100 percent. The accuracy of the diagnosis were 90 percent.

IV. Discussion

Thyroid swellings are commonly seen in our clinical practice, and majority of the lesions are benign. Interestingly, the biology of thyroid neoplasms represents a spectrum of characteristics ranging from well-differentiated lesions which has excellent prognosis to anaplastic carcinoma which is almost uniformly fatal prognosis.

Incidence of Neoplastic & Non-Neoplastic lesions of the thyroid - The incidence of neoplastic and non-neoplastic lesions of thyroid were studied and comparisons were made with the other studies (table 1). In the present study the neoplastic lesions of thyroid were found in 33 percent of the cases (100 cases) and non-neoplastic lesions of thyroid were found in 67 percent of the cases (200 cases). In Champa et al [9] study, the neoplastic lesions of the thyroid were found in 11 percent of the cases (15 cases) and non-neoplastic lesions of the thyroid were found in 89 percent of the cases (125 cases). In Tabaqchali et al [10] study, the neoplastic lesions of thyroid were found in 39.3 percent of the cases (94 cases) and non-neoplastic lesions of the thyroid were found in 60.7 percent of the cases (145 cases). The non-neoplastic lesions of the thyroid were maximum number of the cases in the present study and were similar to the other studies.

Distribution of benign and malignant neoplasms based on histopathological diagnosis - The distribution of benign and malignant neoplasms based on histopathological diagnosis were studied and comparison of the present study was done with other different studies (table 2). In Md. Shafiqula et al [11] study, 78.88 percent of the cases (71 cases) were benign and 21.11 percent of the cases (19 cases) were malignant. In Tabaqchali et al [10] study, 25.1 percent of the cases (60 cases) were benign and 14.2 percent of the cases (34 cases) were malignant. In the present study in 100 cases, 35 percent of the cases (35 cases) were benign, 65 percent of the cases (65 cases) were malignant.

Histopathologically diagnosed thyroid neoplasms - Histopathology is the gold standard for the confirmation of the diagnosis in thyroid neoplasms. The present study has been compared with the other studies. In the present study maximum number of cases were diagnosed as papillary carcinoma of the thyroid (60 percent of the cases), which were similar in study of Safirullah et al [12] (62.50 percent of the cases). The present study were also been compared with the study of Nepali R et al [13] (16 percent of the cases), also showed the similar findings.

Age wise distribution of thyroid neoplasms - The age wise distribution of the thyroid neoplasms of the present study has been compared with the other studies. In present study, the patients were reported in the age group of 10-80 years range. In Jose R J et al [14] study, the patients age group were in 17-65 years and in Haggi Mazeh et al [15] study, the patients age group were 16-82 years. The present study was very much similar with the other studies.

Sex distribution - The sex distribution of the thyroid neoplasms in the present study were compared with the other studies. In the present study, maximum cases were the females (90 percent) and the less common were the males (10 percent). Majority of the cases showing female preponderance as compared to males in the study of Popivanov et al [16] and MA Tabaqchali et al [10] and were very much similar to the present study. In Popivanov et al, female were 94.2 percent of the cases and males were 5 percent of the cases. In MA Tabaqchali et al, females were 89.1 percent of the cases and males were 10.8 percent of the cases. In the present study, the male:female ratio is 1:15 and were similar to the other study with female dominance ratio. In Popivanov et al study, the male:female ratio were 1:16.5 and in MA Tabaqchali et al study, the male:female ratio is 1.

Site of the thyroid swelling - The maximum number of the cases in the present study had swelling on the right side of the neck. The present study findings were similar with the study of Arup Sengupta et al [17] and Manoj Gupta et al [18]. In the present study, right lobe swelling were seen in 54 percent of the cases (54 cases), in Arup Sengupta et al study were right lobe swelling in 43.3 percent of the cases (77 cases) and in Manoj Gupta et al study were right lobe swelling in 60 percent of the cases (45 cases). In the present study, left lobe swelling were seen in 27 percent of the cases (27 cases), in Arup Sengupta et al study, left lobe swelling was seen in 19.7 percent of the cases (35 cases) and in Manoj Gupta et al study left were left lobe swelling was seen in 28 percent of the cases (21 cases). In the present study, bilateral swelling were seen in 19 percent of the cases (19 cases) and as compared with Arup Sengupta et al study where bilateral swelling were seen in 13.5 percent of the cases (24 cases).

Consistency of the thyroid swelling - The consistency of the thyroid swelling were compared with the consistency of the thyroid swelling of the other studies. The maximum number of the cases in the present study had firm consistency on palpation in 60 percent of the cases (60 cases). The present study findings were similar to the Arup Sengupta et al [17] study and Md. Shafiqula et al [11] study. In Arup Sengupta et al study, the firm in consistency were present in 66.8 percent of the cases (119 cases) and in Md. Shafiqula et al study, firm consistency were present in 77.7 percent of the cases (77 cases).

In the present study hard in consistency were present in 2 percent of the cases (2 cases), in Arup Sengupta et al study, hard in consistency were present in 16.9 percent of the cases (30 cases) and in Md. Shafiqula et al study, hard in consistency were present in 15.5 percent of the cases (14 cases). In Arup Sengupta et al study, soft in consistency were present in 13 percent of the cases (23 cases). In the present study, nodular in consistency were present in 32 percent of the cases (32 cases). The predominant signs and symptoms were studied and comparison has been made in the present study with the other studies. In the present study the maximum number of cases were presented with hoarseness of voice in 15 percent of the cases (15 cases). In C.S. Vyas et al [20], the maximum number were presented with hoarsness of voice 3 percent of the cases (3 cases) and in Nirav Priyadarshi et al [19] study, the maximum number were presented with hoarsness of voice in 6 percent of the cases (2 cases). In C.S. Vyas et al study, the maximum number were presented with loss of weight in 8 percent of the cases (8 cases) and in the study of Nirav Priyadarshi et al study, the maximum number of cases were presented with loss of weight in 18 percent of the cases (6 cases). In the present study, loss of sleep were presented in 2 percent of the cases (2 cases).

Predominant symptoms & signs - In the present study, the number of cases presented were dysphagia in 6 percent of the cases (6 cases). In C.S. Vyas et al study, the number of cases presented with dyaphagia in 6 percent of the cases (6 cases). The present study and C.S. Vyas et al were had similar findings. In Nirav Priyadarshi et al, the number of cases presented with dyaphagia in 3 percent of the cases (1 case).

Duration of swelling was studied and comparison of the present study were made with the other studies. In the present study, maximum number of cases were with duration of 1-2 years (40 percent of the cases). In Manoj Gupta et al [18] study, the number of cases with 1-2 year duration were (12 percent) and in Md. Shafiqula et al¹⁰³ study, the number of cases with 1-2 year duration (73.69 percent). The present study were similar finding with the study of Md. Shafiqula et al study.

Duration of complaints - In Manoj Gupta et al [18] study, the number of cases with more than 2 years duration (52 percent). The present study and Manoj Gupta et al study were similar. The present study the number of cases with more than 2 year duration (38 percent). In Md. Shafiqula et al study, the duration of complaints with more than 2 years (21.05 percent). In the present study, the number of cases with 1-12 months duration (20 percent) and in Manoj Gupta et al study, the number of cases with 1-12 months duration (32 percent). In the present study, the number of cases with less than 1 month duration (2 percent) and in Manoj Gupta et al study, the number of cases with duration less than 1 month (4 percent).

Correlation between radiological diagnosis and histopathological diagnosis - The correlation between radiological diagnosis and histopathological diagnosis in the present study were compared with the other study (table 3). In the present study, the radiological diagnosis were benign in 90 percent of the cases (90 cases) and malignant in 10 percent of the cases (10 cases). In Phuttharak et al [21] study, the radiological diagnosis were benign cases in 74.19 percent of the cases (23 cases) and malignant in 25.8 percent of the cases (8 cases). In the present study, the histopathological diagnosis were benign in 35 percent of the cases (35 cases) and malignant in 65 percent of the cases (65 cases). In Phuttharak et al study, the histopathological diagnosis were benign in 83.9 percent of the cases (26 cases) and malignant in 16.1 percent of the cases (5 cases).

Correlation of Cytological diagnosis and Histopathological diagnosis - The correlation of cytological diagnosis and histopathological diagnosis of the present study were correlated with the other study (table 4). In Safirullah et al [12] study, the cytological diagnosis were benign cases in 83.3 percent of the cases (250 cases) and when compared to histopathology, benign were 82.6 percent of the cases (248 cases), 0.66 percent of the cases (2 cases) were confirmed as malignant. The cytologically diagnosed benign cases 45 and compared to histopathology diagnosis, 35 benign cases were confirmed & remaining 10 cases were confirmed to be malignant (Table 24.1). In Safirullah et al study, the cytologically diagnosed malignant cases were 11.6 percent of the cases (35 cases) and when compared to histopathological diagnosis, benign were 1.66 percent of the cases, 10 percent of the cases (30 cases) were malignant. In the present study, the cytologically diagnosed malignant cases were 55 and when compared to histopathology diagnosis all the cases were confirmed (Table 24.2).

In the Safirullah et al study, the sensitivity and specificity of the fine needle aspiration cytology were 94 percent and accuracy were 94.08 percent. In our study, the sensitivity of the fine needle aspiration in the diagnosis of thyroid neoplasms were 84 percent and the specificity were 100 percent. The accuracy of the diagnosis were 90 percent.

V. Conclusion

The current study has showed the surprises we get in thyroid neoplasms in Fine Needle Aspiration Cytology screening test which is almost to some way proved to be different diagnosis in clinical and histopathology. Most of the cases of malignancy cannot be diagnosed accurately in clinical palpations of the thyroid swellings and the exact differences between benign and malignant cannot be made out. In the same way

radiological diagnosis cannot confirm malignant from benign lesion. Radiology can only distinguish cystic and solid lesions.

Fine Needle Aspiration Cytology is a safe and valuable procedure with 85% sensitivity. But Fine Needle Aspiration Cytology may sometimes miss minute tumor foci, which cannot be picked up on ultrasonography also. Such lesions are diagnosed as malignancies on histopathology only after thyroidectomy surgeries.

Conflict Of Interest

None of the authors has any conflict of interest.

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Figures



Figure 1(a)

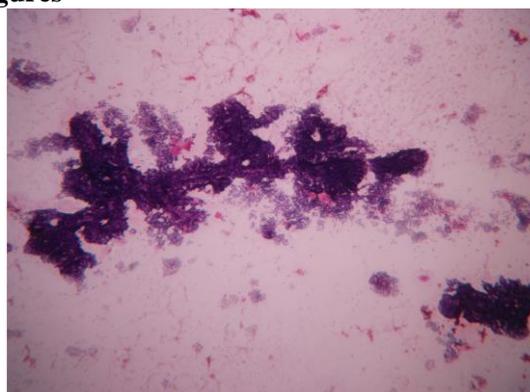


Figure 1(b)



Figure 2(a)

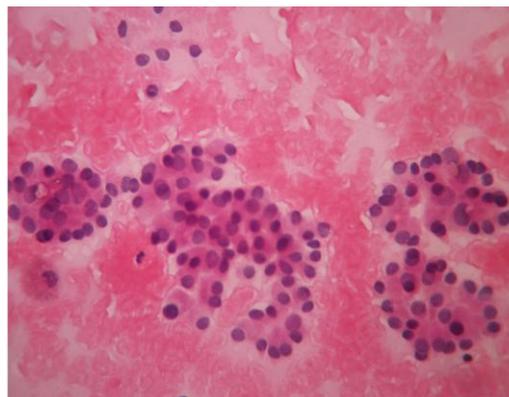


Figure 2(b)

Legends:

Figure 1(a) shows the gross picture of papillary carcinoma with papillary pattern and granular pattern.

Figure 1(b) shows the microscopic picture of papillary carcinoma with cells arranged in papillary branching pattern (H&E, x400).

Figure 2(a) shows the gross picture of follicular neoplasm with grey nodular and capsular invasion.

Figure 2(b) shows the microscopic picture of follicular carcinoma with the cellular smears, cells arranged in rosettes and back to back pattern (H&E, x400).

Tables

Table 1:

LESION	NO. OF CASES	PERCENTAGE (%)
NON- NEOPLASTIC	200	67%
NEOPLASTIC	100	33%
TOTAL	300	100%

Table 2:

TYPE OF NEOPLASM	NO. OF CASES	PERCENTAGE (%)
BENIGN	35	35%
MALIGNANT	65	65%
TOTAL	100	100%

Table 3:

Sl. No.	Neoplasm	No. of cases	
		Radiological diagnosis	Histopathological diagnosis
1	Benign	90	35
2	Malignant	10	65

Table 4:

Sl. No.	Neoplasm	No. of cases	
		Cytological diagnosis	Histopathological diagnosis
1	Benign	45	35
2	Malignant	55	65