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Study of spectrum of thyroid neoplasms with emphasis on immunohistochemistry

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Abstract

Introduction: Thyroid neoplasms represent the most common neoplasms of endocrine system and pose significant challenge to pathologists, surgeons and oncologists. Conventional methods of evaluation of thyroid diseases include clinical history, physical examination, thyroid function tests, thyroid imaging and ultrasonography. Histopathological analysis of surgically resected specimens provides the most definitive diagnosis.

Aims and Objectives: To study the spectrum of neoplastic lesions of thyroid with the use of immunohistochemistry.

Materials and Methods: A retrospective study on thyroid neoplasms was conducted in the Department of Pathology Guntur Medical College, Guntur over a period of two years from June 2011 to May 2013. The data necessary for study has been received from the histopathology records at the department. The type of specimens included total thyroidectomy specimens, hemithyroidectomy specimens and trucut biopsies. The applied nomenclature is adopted by the 2007 WHO classification.

Results: The incidence of spectrum of thyroid neoplasms was studied. Study was conducted in the Department of pathology, Guntur Medical College. The conventional criteria on the basis of histopathology was applied to all neoplasms. Immunohistochemistry was used in cases where definite diagnosis could not be established. CK 19 was used in all cases of FVPTC. Follicular adenoma is most common benign neoplasm and papillary carcinoma is the most common malignant lesion.

Conclusion: Malignant thyroid tumours predominated in the present study in contrast to many other studies because the study is conducted in a tertiary care referral hospital. Papillary thyroid carcinoma is most common malignant neoplasm. Almost all variants of papillary carcinoma have been reported of which the most common were classical variant followed by follicular variant. Immunohistochemistry has a definite role in thyroid neoplasms and is helpful in establishing diagnosis in cases medullary carcinoma and non hodgkins lymphoma where histopathology was not very conclusive. CK 19 positivity in FVPTC in the present study is 40% indicating that more careful histopathological evaluation for nuclear features is needed along with IHC correlation.

Keywords: IHC, thyroid neoplasms, histopathology, malignant

Introduction

Thyroid neoplasms represent the most common neoplasms of endocrine system and pose significant challenge to pathologists, surgeons and oncologists [1]. Benign neoplasms outnumber thyroid carcinomas by a ratio of nearly 10:1. Women are affected more frequently than men with female to male ratio varies from 1.4:1 to 4:1. The major factor predisposing to thyroid carcinoma is exposure to ionising radiation and is associated with increased incidence of papillary carcinoma [2]. Conventional methods of evaluation of thyroid diseases include clinical history, physical examination, thyroid function tests, thyroid imaging and ultrasonography. Histopathological analysis of surgically resected specimens provide the most definitive diagnosis.

Aims and Objectives

1. To study the spectrum of neoplastic lesions of thyroid in the Department of Pathology, Guntur Medical College during the period of two years from June 2011 to May 2013.
2. To study the incidence of thyroid neoplasms with reference to age.
3. To study the incidence of thyroid neoplasms with reference to gender.
4. To establish accurate diagnosis in thyroid neoplasms by utilising immunohistochemistry wherever necessary.

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Material and Methods

A retrospective study on thyroid neoplasms was conducted in the Department of Pathology Guntur Medical College, Guntur over a period of two years from June 2011 to May 2013. The data necessary for study has been received from the histopathology records at the department. A total of 121 cases of thyroid neoplasms were studied in detail correlating the clinical, radiological and histopathological findings. The biopsy material was provided by the Department of surgery and ENT, GGH Guntur. The type of specimens included total thyroidectomy specimens, hemithyroidectomy specimens and trucut biopsies. The applied nomenclature is

adopted by the 2007 WHO classification.

Observation and Results

The present study includes all the thyroid neoplasms that are reported in the Department Of Pathology. A total of 121 cases are obtained. Malignant neoplasms predominated in the present study attributing to 64.5% whereas benign lesions representing 35.5%. Follicular adenoma is the most common benign neoplasm and papillary carcinoma is the most common malignant neoplasm. Immunohistochemical staining was with CK 19 in 20 cases of FVPTC. Sensitivity in our study is 40%.

Table 1: Number and Percentage of thyroid neoplasms

| S. No | Histopathological Diagnosis | Number of Cases | Percentage |
|-------|-----------------------------|-----------------|------------|
| 1 | Conventional Type | 41 | 57.7% |
| 2 | Follicular Variant | 25 | 35.2% |
| 3 | Micropapillary Variant | 2 | 2.8% |
| 4 | Clear Cell Variant | 1 | 1.4% |
| 5 | Tall Cell Variant | 1 | 1.4% |
| 6 | Hürthle Cell Variant | 1 | 1.4% |

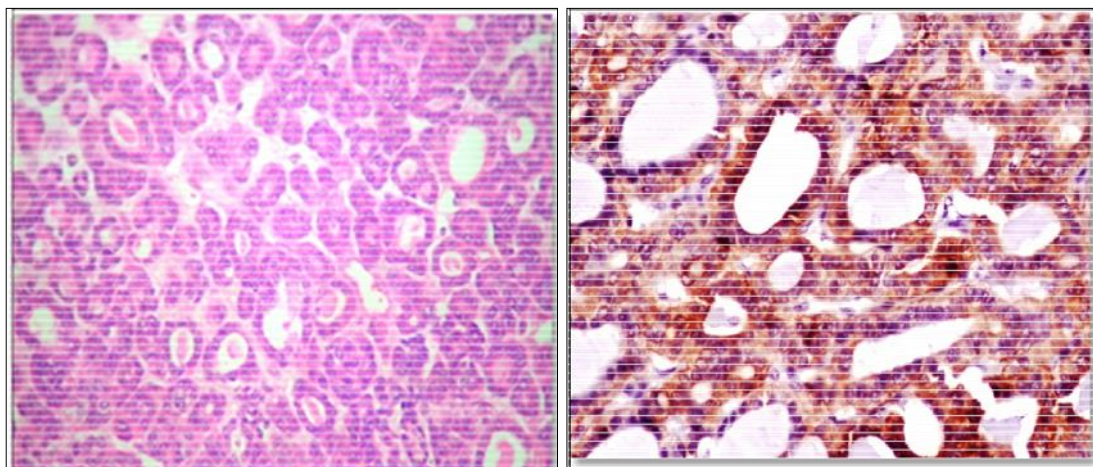


Fig 1&2: Follicular variant-Diffuse strong cytoplasmic staining for CK19

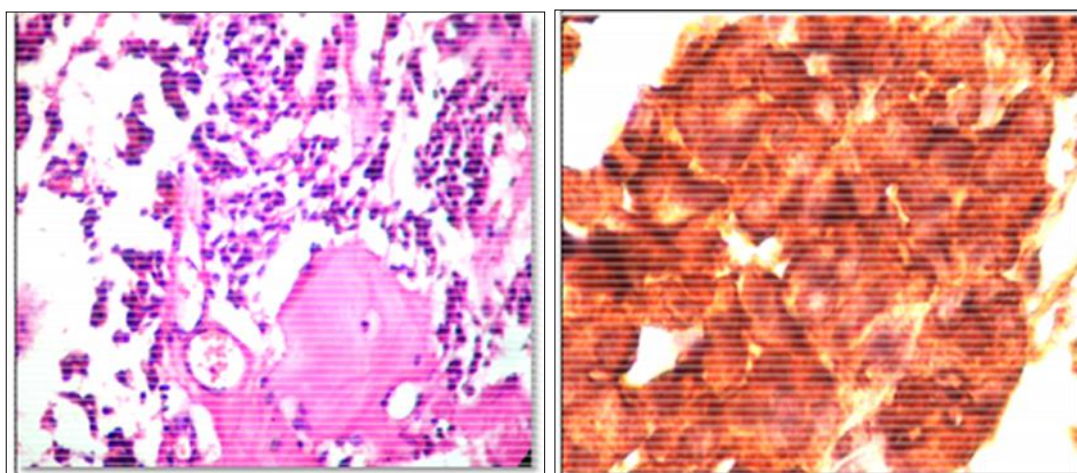


Fig 3 and 4: Medullary carcinoma, calcitonin strong positivity

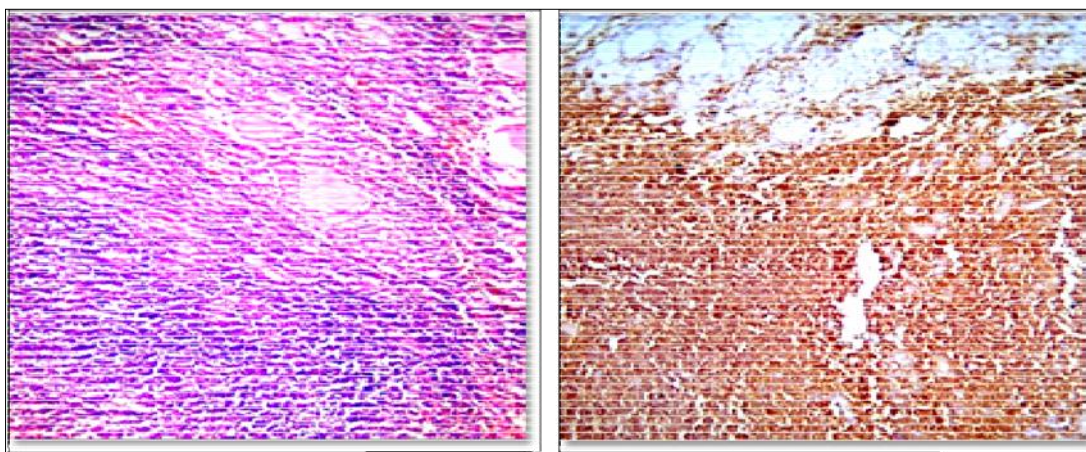


Fig 5& 6: Non Hodgkin lymphoma, Diffuse and strong positivity for CD20

Discussion

In the present study, a general overview of thyroid neoplasms is presented, where in a period of two years (June 2011 to May 2013) a total of 121 cases of thyroid neoplasms are diagnosed. In the current study malignant thyroid neoplasms predominated accounting to 64.55 with the benign lesions representing 35.5%. Similar distribution was seen in the study of O.O.ARIBI *et al.* [3]. Unlike majority of the studies which showed predominant benign lesions.

Thyroid neoplasms are more common in females. In our study male to female ratio is 1;12 which is in accordance with figure of 1:9 to 1:13, that has been reported in the series published from Japan, but this ratio is markedly higher when compared to other studies reported from USA(1: 2.5) [4] and Saudi (1.01:1.08) by Ahmed *et al.* [5]

In the present study among the benign neoplasms, follicular adenoma is the most common tumor similar to the study of Sheetal G.Goel. [6]. Variants in our study included one case of hurthle cell adenoma and one case of microfollicular adenoma or fetal adenoma.

This study has shown the predominance of papillary carcinoma among malignant thyroid neoplasms accounting to 90.9%. This is in concordance with studies of O.O.Arifibi *et al.* [3] Thomas & Ogunbiyi [7] Ahmed *et al.* which showed 41.8%, 45.3% and 80% respectively. Criteria evaluated for the diagnosis of papillary carcinoma nuclear features (ground glass nuclei, grooving, pseudo inclusions and nuclear overlapping), papillary patterns, psammoma bodies and lymphocytic infiltrate.

Our study showed 18.4% incidence of papillary thyroid carcinoma associated with hashimotos thyroiditis is a predisposing factor in the development of papillary carcinoma. Patil PV *et al.* [8] Reported frequency of carcinoma in hashimotos thyroiditis varies between 0.5% to 23.7%. In the present study the incidence of papillary carcinoma in multinodular goiter is 8.1% in concordance to the study of Pic Pac Ganddfiet *et al.* [9]

In the present study classical papillary carcinoma is diagnosed in 41 cases on the basis of nuclear features and complex branching patterns. Psammoma bodies are seen in 8 cases. Majority of papillary carcinomas fit into classical papillary carcinoma, very much similar to the study of Mohammad Muzaffar *et al.* [10]

Follicular variant of papillary carcinoma is the most common variant diagnosed I our study, 25 out of 71 cases of papillary carcinoma are reported as FVPTC representing an

incidence of 35.2%, a figure similar to the 33% incidence found in a study carried out by Lin HW *et al.* Immunohistochemical staining was done CK 19 in 20 cases of FVPTC. A diffuse positivity with moderate to severe intensity is noted in 8 cases and labelled as positive. Sensitivity of CK 19 in FVPTC in our study is 40%. With regard to other studies, sensitivity was 50% in the study of Sunatisahoo *et al.* and 57% in cheung *et al.* The relative lower percentage positivity in our study is mainly because of resource constraint and smaller sample size.

A single case of clear cell variant, tall cell variant and papillary micro carcinoma is reported in our study.

Only two cases of follicular carcinoma are reported in our study and the incidence being 2.6%. Incidence is significantly higher in other studies. Two cases of medullary carcinoma have been reported in our study, the incidence being 2.6% in accordance with the study of Louise Davies *et al.* [11].

A single case of anaplastic carcinoma has been reported in the present study. Incidence of anaplastic carcinoma in the present study is 1.3%. O.O. Arifibi *et al.* study reported an incidence of 2.6% and Thomas & Ogunsiyi *et al.* reported an incidence of 4.4%. Two cases of Non Hodgkins lymphoma have been reported. Incidence in our study is 2.6% similar to the study of Sajid Shah *et al.* Both the cases occurred in the background of lymphocytic thyroiditis. Both the cases are females showing female predominance, similar to the study of Sajidet *al* and Ahmed *et al.*

Conclusion

Malignant thyroid tumors predominated in the present study in contrast to many other studies because the study is conducted in a tertiary care referral hospital. Papillary thyroid carcinoma is most common malignant neoplasm. Almost all variants of papillary carcinoma have been reported of which the most common were classical variant followed by follicular variant. Immunohistochemistry has a definite role in thyroid neoplasms and is helpful in establishing diagnosis in cases of, medullary carcinoma and non hodgkins lymphoma where histopathology was not very conclusive. CK 19 positivity in FVPTC in the present study is 40% indicating that more careful histopathological evaluation for nuclear features is needed along with IHC correlation.

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