

Cytomorphological Profile of Thyroid Lesions on Fine Needle Aspiration Cytology

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ABSTRACT

Background and Objectives: Fine needle aspiration cytology (FNAC) of thyroid offers an alternative, as an immediate, preliminary procedure associated with low cost, little trauma and complications. Being superficial and easily accessible it is an ideal organ for FNAC. It is useful in diagnosis of inflammatory, infectious and neoplastic conditions. The aim of this study was to evaluate the cytomorphological profile of thyroid lesions on FNAC with application of Bethesda system for reporting and perform cyto-histopathology correlation whenever possible with regards to age and sex distribution.

Methodology: This two-year prospective study was conducted in the Cytology section of Pathology Department & included 243 cases of thyroid gland enlargement. The detailed history of the patient including age, sex, presenting symptoms and duration of thyroid gland enlargement along with any other significant findings was noted. FNAC was performed as per the protocol using a 23-gauge needle and smears stained using Haematoxylin & Eosin (H&E) and Papanicolaou stain, while air-dried smears were stained with Giemsa stain.

Results: The study period included a total of 243 FNACs of thyroid enlargement. The age of patients ranged from 10 to 80 years with male to female ratio of 1.4. The diagnosis on FNAC was as follows Colloid Goitre (54.7 %), Lymphocytic Thyroiditis (9.54%), Follicular Neoplasm (7.05%), Hashimoto Thyroiditis (5.80 %), Benign Thyroid Lesions (3.31%) and Multinodular Goitre (2.90%).

Conclusion: Thyroid fine needle aspiration cytology has proven to be a first line tool to evaluate the thyroid lesions because of its cost effectiveness and high patient acceptance. Fine

needle aspiration cytology is highly successful in triaging patients with thyroid nodules into operative and non-operative groups and enables surgeons to take an early decision regarding mode of treatment. The Bethesda system for reporting of thyroid lesions aims at standardization of reports. It makes the cytology report unambiguous and clinically relevant.

Key words: Fine needle aspiration cytology, thyroid lesions.

INTRODUCTION

The word 'Thyroid' originated from 'Thyreos', a Greek word meaning shield. In healthy individuals, this inconspicuous butterfly shaped gland situated in the anterior neck, produces the hormone thyroxine, which facilitates system wide effects. After diabetes mellitus, the thyroid gland is the most common organ to cause endocrine disorders ^[1]. Thyroid pathology presents with a wide spectrum of lesions either due to altered parenchymal functions or anatomical abnormalities. Fine needle aspiration (FNA) cytology plays a pivotal role in screening thyroid lesions, once a clinical suspicion has been set in. Given the high prevalence of nodules, combined with the impracticability of surgically excising all nodules, FNA plays a vital role as a screening test ^[2,3]. The Bethesda system for reporting of thyroid FNA aims at standardization of reports and makes the cytology report unambiguous and clinically relevant.

MATERIALS & METHODS

The following study was two-year prospective hospital-based study on the cytomorphological spectrum of thyroid lesions procured using fine needle aspiration samples of patients presenting with neck swelling diagnosed clinically. Patient's relevant details of clinical history, physical examination was obtained in each case. Patient was explained about the procedure and informed consent taken. FNA procedure was performed as per the standard protocol. A minimum of three slides prepared. One air dried and stained by Giemsa and other two slides fixed in alcohol and stained with Haematoxylin & Eosin and Papanicolaou

stain. The results of FNAC were reported using the 'Bethesda system' [4, 5, 6] reporting template of thyroid FNA which were then further correlated with histopathological diagnosis from paraffin embedded sections of tissue blocks, whenever available.

RESULTS

The two-year prospective study comprised of 243 cases of thyroid lesions of which 197 cases were female subjects and only 46 were male. The age ranged from 10 to 80 years with a mean age of 40.3 years. The maximum incidence of thyroid lesions, were between the ages of 41-50 years, mostly women. (Fig 1)

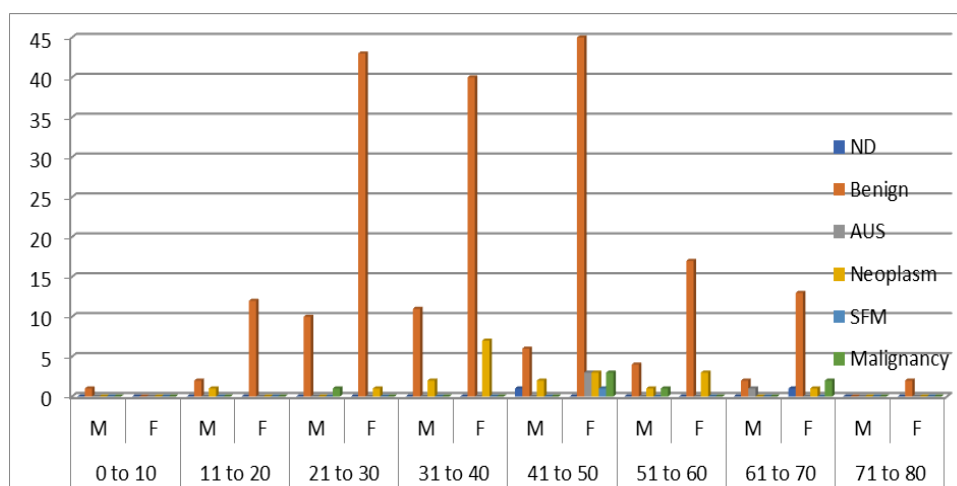


Figure 1: Distribution of cases according to Bethesda Categories.

(M- Male, F- Female; ND- Non diagnostic, AUS- Atypia of undetermined significance, SFM- Suspicious for malignancy)

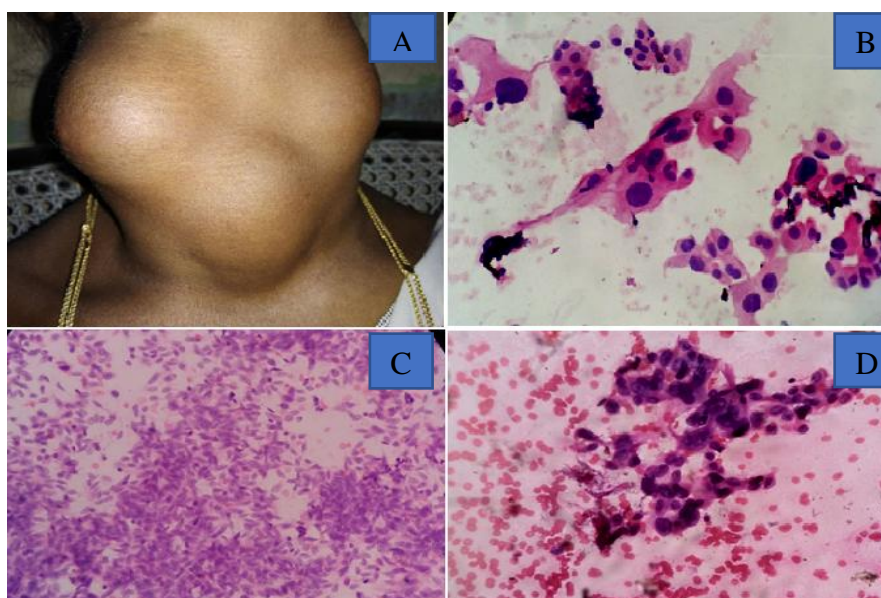


Figure 2 A: Clinical Photograph: diffuse neck swelling that moved with deglutition
 B: Hurthle cell neoplasm: aggregates of follicular epithelial cells with Hurthle cell change with scanty colloid. (H&E x 400)
 C: Medullary carcinoma: elongated spindled tumour cells (H&E x 200)
 D: Papillary carcinoma: tumour cells with intra nuclear inclusions. (H&E x 400)

The most common clinical symptom was neck swelling which moved with deglutition followed by dysphagia, sometimes accompanied by palpitation, anxiety, dyspnoea and pain (Fig 2). Cytological smears meeting the adequacy criteria were 241 cases (99.1%), 2 cases proved to be inadequate for diagnosis.

The reporting was done in accordance with the 'Bethesda System of reporting of thyroid lesions' [4,5,6] (Fig 1). In the 'Benign' category (Category II), the most common lesions were Colloid goitre 132(54.7%) cases followed by Lymphocytic Thyroiditis 23 cases (9.54%). There were a total four cases in Atypia of Undetermined significance (AUS- Category III), two of which were available for histopathological correlation, confirmed as benign entities. The 'Malignant' (category VI) included 4 cases (1.65%) of Papillary thyroid carcinoma and 3 cases (1.24%) of Medullary thyroid carcinoma (Fig 2). The test sensitivity of FNA in the present study was 83.33% and specificity was 95.12%. Our study had a positive predictive value of 71.42% and negative predictive value of 97.5%. False positive rate was found to be 4.25% and false negative rate was 2.12%.

Figure 3: Distribution of thyroid lesions according to the Bethesda System of reporting.

Bethesda category	Number of Cases	Percentage (%)
I	2	0.82
II	207	85.1
III	4	1.64
IV	22	9.05
V	1	0.41
VI	7	2.88
Total cases	243	100

DISCUSSION

In the 243 patients studied, the male to female ratio was 1:4.2, which correlated with Sangalli G et al [7], Handa U et al [8] and Mandal S et al [9] whose findings accounted for 1: 4.2, 1: 6.3 and 1: 5.1 respectively. The mean age of patients was 40.3 years which were comparable to the Sangalli G et al [7], Gupta et al [10] and Rangaswamy M et al [11]. In this study, maximum numbers of cases were seen in the fifth decade (25.9%).

For a thyroid FNA specimen to be satisfactory for evaluation, it is customary that at least six groups of benign follicular cells, each group composed of at least 10 cells [12]. Unless the smears were of lesser cellularity and with significant suspicion of atypia or malignancy, should be reported as satisfactory. The satisfactory yield of smears in this study was 99% of cases the remainder designated as non-diagnostic, similar in comparison to Mondal SK et al [13], however, Nandedkar SS et al [14] showed unsatisfactory smears which accounted to 4.2%. Benign lesions were the most common (85.1%) in the present study, the percentage of benign lesions surpassed the percentage of 'suspicious for malignant' and 'malignant lesions', in concurrence with Mondal SK et al [13], Nandedkar SS [14] Nayar R & Ivanovic M et al [15] which showed 87.5%, 57.07% and 64% respectively. Out of total 243 cases, 47 cases underwent surgery and histopathologic correlation was done. 61.7% cases were included under the 'Benign' category of Bethesda system. Among the 47 cases with 'Benign' diagnosis, multinodular goitre was the most common histopathology diagnosis. Nandedkar SS et al, [14] showed an 83 % cytohistologic correlation of benign entities. The probable cause in our study might have been that a lower percentage of benign entities were operated on until they proved to be symptomatically or aesthetically troublesome.

The AUS category included four cases out of which, two cases underwent surgery. The histopathological diagnosis yielded both benign accounting to 1.6% of the study, correlating with Mondal SK et al [13] and Nandedkar SS et al [14] accounting to 1% and 0.8% respectively. This shows a good approach to prevent ambiguous reporting conveyed to the clinician; when compared to Nayar R and Ivanovic M et al [15], their study showed AUS category accounting for 18%, which may have been attributed to a very large sample size. 'Neoplasm/suspicious for neoplasm' category accounted for 9% of the study, when followed up on histopathology, one

case turned out to be follicular variant of papillary carcinoma on histopathology, rest were all benign accounting for follicular adenoma, Hurthle cell adenoma and adenomatoid goitre. The 'Suspicious for malignancy' was only a single case followed up on histopathology as follicular adenoma. The 'Malignant' category included 2.88%, which were confirmed on histopathology. In comparison, Nayar R and Ivanovic M et al^[15] and Mondal SK et al^[13] showed 5% and 4.7% of cases in the 'Malignant' category.

Diagnosis on FNA was correlated with histopathology and showed a sensitivity of 83.33% and specificity of 95.12%. In comparison, Chao TC et al^[16], Nandedkar SS et al^[14] where sensitivity was 86% and 85.7% respectively and specificity were 59% and 98.6%. Our study was comparable to Nandedkar SS et al^[14].

CONCLUSION

FNA proves to be a reliable, simple, cost-effective and a rapid procedure which can be used as a first line diagnostic procedure with high patient acceptance and negligible complications. The procedure has an acceptable sensitivity and specificity in a wide range group of patients in experienced hands and hence can be followed as a pre-operative diagnostic modality in the management of patients with thyroid lesions, thus reducing the number of surgeries.

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Ethical Approval: Approved

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