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Study of Fine Needle Aspiration Cytology of Thyroid Lesions by Bethesda System in a Tertiary Health Care Centre –A One Year Retrospective Study

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Background: *Thyroid disorders and associated nodular enlargement of thyroid gland is very common.Fine needle aspiration cytology of thyroid has been introduced as most reliable and cost effective methods for diagnosing clinically important thyroid disorders. To eliminate confusion Bethesda system for reporting thyroid cytopathology (TBSRTC) has been implemented with main objective being to standardise the diagnostic terminology.*
Objectives: *This study aims to study and classify various cytomorphological lesions of the thyroid according to The Bethesda System for Reporting of Thyroid Cytopathology (TBSRTC)*
Material and Methods:*. We did a one year retrospective study of results of FNAC in thyroid lesions in Dr Shankarrao chavan government medical college,Vishnupuri, Nanded . Fine needle aspiration done on 100 patients with palpable thyroid lesions were analyzed and classified according to TBSRTC.*
Results:*Out of total 100 cases studied,70 (70%) were non neoplastic, 15 (15%) were neoplastic, 10 (10%) was indeterminate and 5 (5%) was inadequate.*
Conclusion; *FNAC is a simple, safe, cost effective and widely accepted modality for evaluation of thyroid lesions. FNA helps to avoid unnecessary surgery in patients with benign lesions. TBSRTC brings standardisation in reporting thyroid FNAC. Reduced the inter-observer variation and provides definitive management guidelines.*

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I. Introduction:

Thyroid gland has been the subject of intense research studies due to the vast array of developmental, inflammatory, hyperplastic and neoplastic disorders which are common in clinical practice[1.]

Fine Needle Aspiration Cytology (FNAC)is safest and most accurate of diagnostic tools in thyroid lesions with a sensitivity of 93.4%,a predictive value of malignancy of 98.6% and a specificity of 74.9%.The test can be used to differentiate thyroid lesions which require surgical excision from conditions which can be managed medically[2].

Reporting of thyroid FNA specimens should follow a standard format that is clinically relavant.National Cancer Institute (NCI) proposed the Bethesda System for Reporting Thyroid Cytology (TBSRTC) that has attempted to standardize the diagnostic approach of reporting by laying down cytomorphological criteria[3,4].It entails the format of report, evaluation of adequacy and diagnostic categories. The adoption of this system has facilitated better communication among the pathologist and clinician.
TBSRTC is organized in six diagnostic categories
from Bethesda I to VI as given

I.**Non diagnostic or unsatisfactory**
· Cyst fluid only
· Virtually acellular specimen
· Other (obscuring blood,artifact, etc.

II. Benign
· Consistent with benign follicular nodule (includes adenomatoid nodule, colloid nodule etc)
· Consistent with lymphocytic (Hashimoto's) thyroiditis in proper clinical context
· Consistent with granulomatous (subacute) thyroiditis
· Other
III. Atypia of undetermined significance or follicular lesion of undetermined significance (AFLUS)
IV. Follicular neoplasm or suspicious for follicular neoplasm (FN or SFN)
Specify if oncocytic (Hurthle cell) type

V. Suspicious for malignancy (SM)
· Suspicious for papillary carcinoma
· Suspicious for medullary carcinoma
· Suspicious for metastatic carcinoma
· Suspicious for lymphoma
· Other

VI. Malignant
· Papillary thyroid carcinoma
· Poorly differentiated carcinoma
· Medullary thyroid carcinoma
· Undifferentiated (anaplastic) thyroid carcinoma
· Squamous cell carcinoma
· Carcinoma with mixed feature
· Metastatic carcinoma
· Non Hodgkin lymphoma
· Other

This classification establishes correlation between the cytology of FNA contents and the different thyroid diseases,mainly in terms of malignancy associated risk.
In this context, the present study was conducted and analysis of the cytomorphology was done.
BETHSEDA system of reporting thyroid cytopathology :implied risk of malignancy and recommended clinical management[5,6].

Diagnostic category	Risk of malignancy(%)	Usual management
I. **Non diagnostic or unsatisfactory**	5-10	Repeat FNAC with ultra sound guidance
II. Benign	0-3	Clinical and sonographic follow up
III. Atypia of undetermined significance or follicular lesion of undetermined significance (AFLUS)	10-30	Repeat FNAC ,molecular testing or lobectomy
IV. Follicular neoplasm or suspicious for follicular neoplasm (FN or SFN)	25-40	molecular testing or lobectomy
V. Suspicious for malignancy (SM)	50-75	Near total thyroidectomy or lobectomy
VI. Malignant	97-99	Near total thyroidectomy or lobectomy

II. Materials And Methods:

The present study was a retrospective study under taken in the Department of Pathology . Patients with thyroid swelling having clinical indication for FNAC were examined and after taking consent, they were subjected to FNAC . All the patients were examined clinically in detail according to the prescribed proforma and were given an explanation on the FNAC procedure in their own language. Patient was made to lie supine with a pillow behind the neck for hyperextension, after explain the patient to refrain from swallowing ,under aseptic precautions lesion was needled with a fine needle 23 gauge quickly and gently at different angles and points of entry. The needle was then attached to an air filled syringe and material deposited and smeared on clean glass slides. Where ever fluid was aspirated, the fluid was centrifuged and smears were prepared from sediment and stained. The reporting was done according to Bethesda system for reporting thyroid cytopathology (TBSRTC)

III. Results

In our study we included 100 subjects. 80 were females and 20 were males. Age distribution was from 17 years to 75 years.

Maximum cases were in the age group of 25-50 years. In present study there was female predominance with 80% cases,male to female ratio is 4:1.

15 cases were reported in category 1 with 10(66.66% of cat I) showing only cyst fluid and haemorrhages which is unsatisfactory followed by non- diagnostic in 5(33.3% of cat I) . Majority of the cases were in Category II 70 (70% of total lesions).They included 45(64.28% of cat II) cases of benign follicular nodule with 30 cases (66.66% of benign follicular nodule) of colloid goitre followed by 10 cases (22.22% of benign follicular nodule) of hyperplastic nodule and 5 (11.1% of benign follicular nodule) cases of nodular

goitre. Thyroiditis was reported in 25 cases with 20 (80% of thyroiditis) cases of Hashimotos thyroiditis and 5 (20% of thyroiditis) of granulomatous thyroiditis. Category III included 3 cases (3%).4 cases were categorised into category IV , 2 were catergorised in category V and 6 cases were malignant papillary carcinoma of category VI .

Fig 1:CAT II: COLLOID GOITRE WITH CYSTIC CHANGE: Small monolayered sheets of follicular epithelial cells along with cyst macrophages containing colloid with in on a background of blood mixed with colloid.

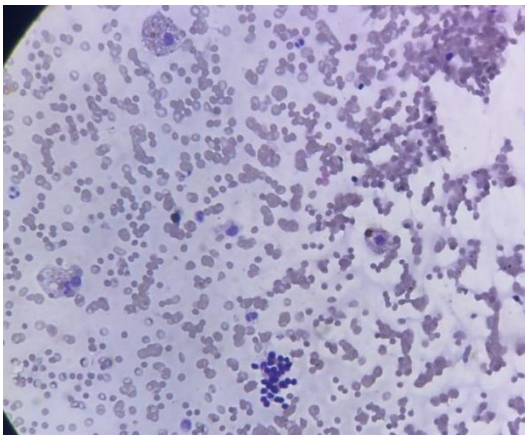


Fig 2: CAT II:Lymphocytic thyroiditis:Showing follicular cells and hurthle cells along with lymphocytes.

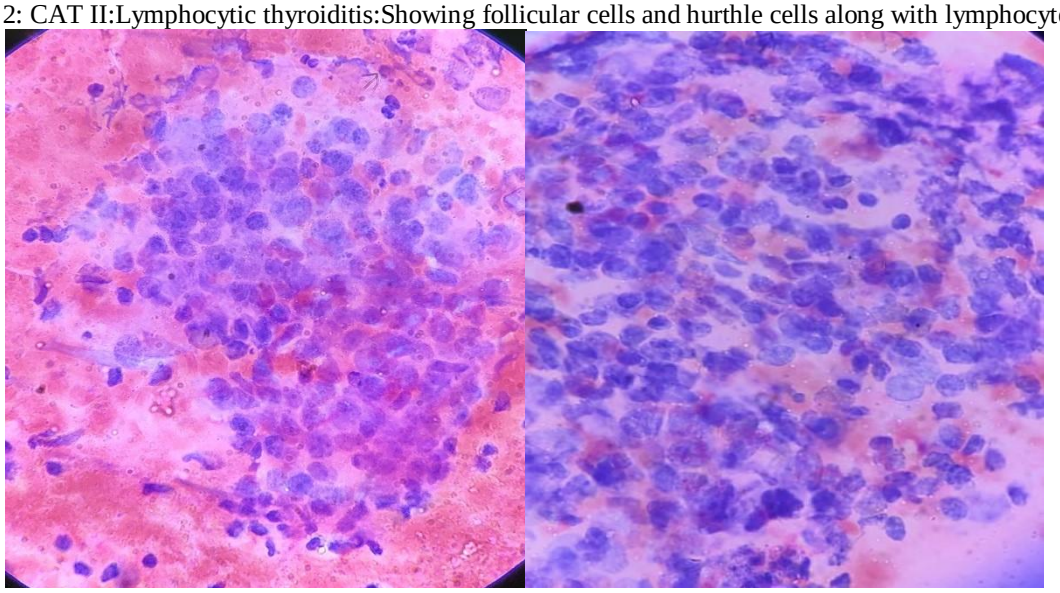


Fig 3:CAT IV :Follicular neoplasm: Architectural atypia with micro follicle formation.

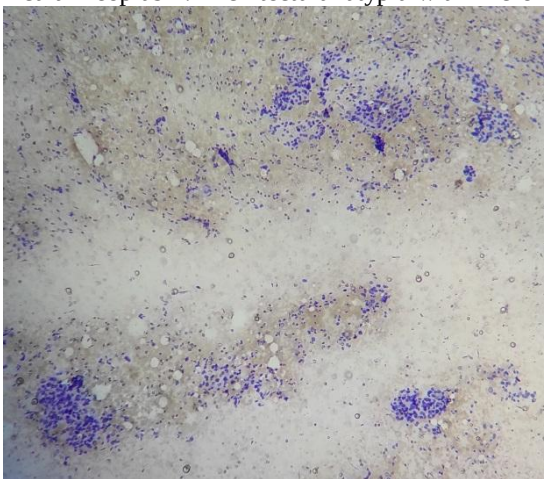


Fig 4:CAT IV Follicular neoplasm ; High power view:

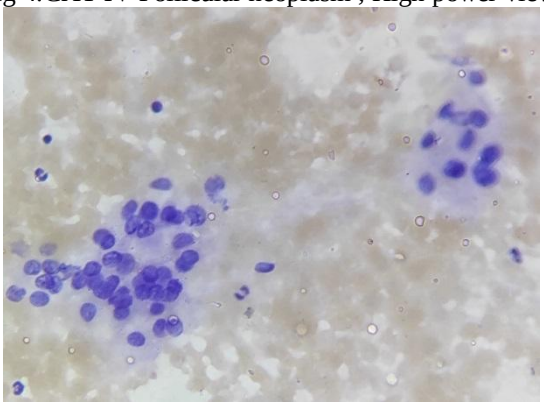


Fig 5:CAT IV: Highly suspicious of follicular neoplasm

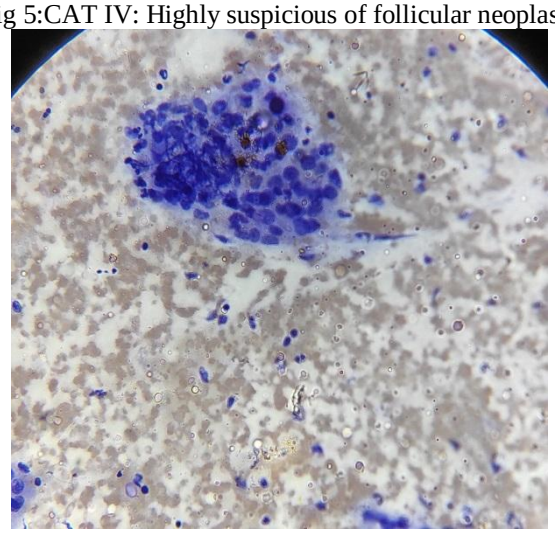
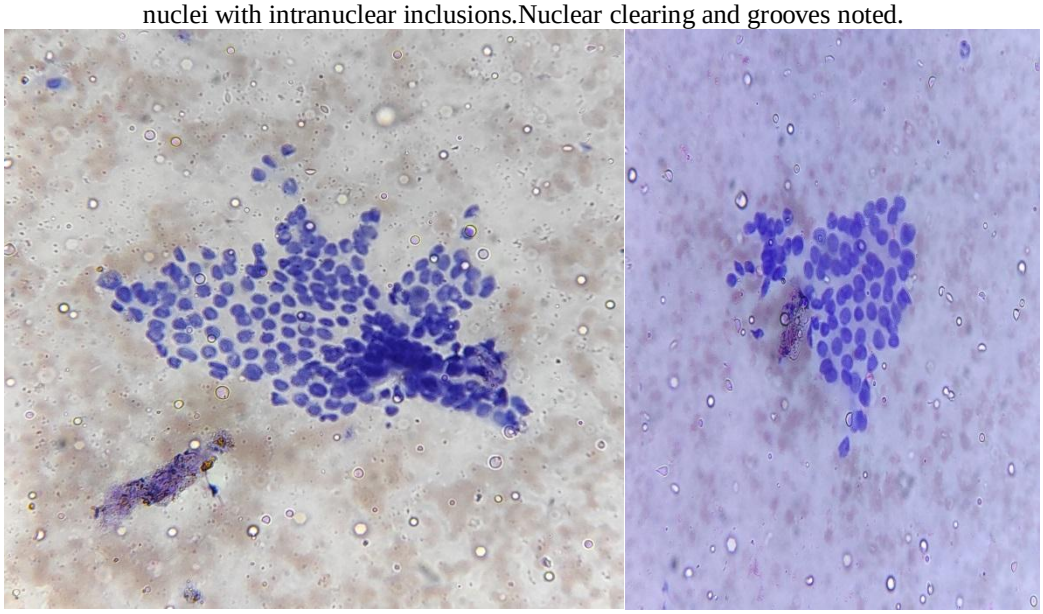
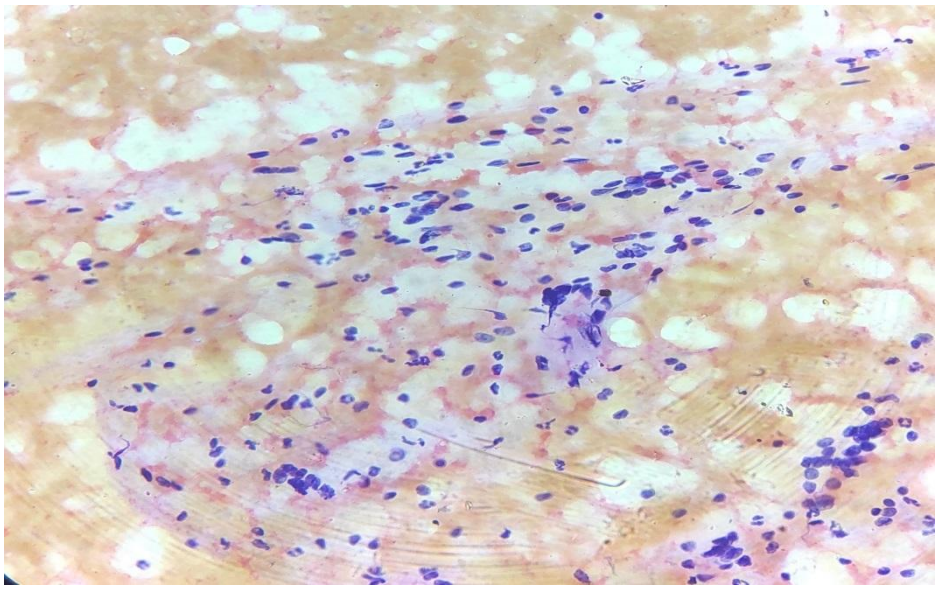


Fig 6:CAT VI : Papillary carcinoma thyroid: Papillary arrangement. Plump cells having round to oval vesicular nuclei with intranuclear inclusions.Nuclear clearing and grooves noted.





IV. Discussion:

Thyroid lesions are frequent with an annual incidence rate of 4-8%[7]. Fine Needle Aspiration Cytology is the single most sensitive,specific, and cost effective method of investigation, which distinguish neoplastic from non neoplastic lesions of the thyroid and can effectively triage patients[8]. Few borderline thyroid lesions often create confusion on cytopathological examination. To eliminate this confusion Bethesda system for reporting thyroid cytopathology (TBSRTC) has been implemented with main objective being to standardise the diagnostic terminology[9]. TBSRTC brings standardisation in reporting thyroid FNAC thus reducing inter-observer variation and providing definitive management guidelines. Incorporation of category III in Bethesda system increased reproducibility of diagnosis. Histopathology is not required in most of the cases and patients can remain on follow up of FNA[10].

In the present study majority of the patients referred for FNAC of Thyroid lesion were 80 (80%) in the age group of 25-50 years. Similarly, in the study of Dhanadia et al7 (2014) most of cases 72 (72%) were in the age group of 20-49 years[11].

Female sex has a predilection for thyroid disorders[12] . In present study there was female predominance with 80% cases,male to female ratio is 4:1.

Our study observed benign lesions belonging to CAT II were most frequent accounting for 70% of cases followed by non diagnostic/ unsatisfactory cases belonging to CAT I accounting for 15%.Similar findings were noted in other studies also [9,13,14,15].Those categorised as CAT I with only cystic fluid aspirated or haemorrhages were considered for re aspiration because cystic fluid containing macrophages and no epithelial cell does not rule out possibility of cystic neoplasm. It is important to re-aspirate the lesion under ultrasound guidance as cystic change is commonly associated with 25% of papillary carcinomas and 20% of follicular neoplasms [2,16].

In CAT II cases benign follicular nodules(colloid)where most common and second most common was hashimoto's thyroiditis.Similar findings were noted in other studies also[13]. Incorporation of category III in Bethesda system increased reproducibility of diagnosis.

Papillary carcinoma is most common type of thyroid cancer occurring predominantly in females[4].In our study also papillary carcinoma of thyroid was most common among CAT VI lesions 6 (6%)cases of papillary carcinoma of thyroid were present .

V. Conclusion:

The primary objective of FNAC of the thyroid is to differentiate those patients who require surgery for a neoplastic disorder from those who have a functional or inflammatory abnormality and who can be followed clinically or treated medically. Incorporation of category III in The Bethesda System for Reporting of Thyroid Cytopathology (TBSRTC) has increased the FNA sensitivity and decreased false positive and false negative rates.FNAC reporting with Bethesda system has simpilified and reduced the confusion and thus that has helped clinicians to decide the treatment options and reduced unnecessary intervensions and surgeries.

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