

SCOPE OF FNAC IN THYROID LESIONS AND STUDY OF HISTOPATHOLOGICAL CHANGES

Dr. Sanjay Pralhad Ingle

Assistant Professor, Department of Pathology, SSPM Medical College & Lifetime Hospital, Padve, Kudal (Sindhudurga), Maharashtra

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Corresponding author: Sanjay Pralhad Ingle

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Abstract

Aim: The aim of the present study was to evaluate sensitivity and specificity of FNAC of thyroid lesions and cytological features with histopathological study.

Methods: The present study was undertaken to analyze the role of FNA in the cytomorphological features of various thyroid lesions with histopathological correlation wherever the surgery was done and to determine its diagnostic accuracy. All the patients were clinically examined in detail according to the proforma and a careful palpation of the thyroid gland was 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.

Results: Majority of the patients were females accounting for 88% forming a male to female ratio of 1:7.3. In the present study, it has been observed that the incidence of thyroid lesions were more in the age group of 21-40yrs with 58cases, and least common in the age group of 0-20yrs with 3 cases. The mean age is 39.66 yrs. The youngest patient was 20yrs female and oldest was 80yrs female. Among the total thyroid aspirations, 91% constituted Non-neoplastic lesions and the remaining 9% were Neoplastic lesions. **Conclusion:** FNAC of thyroid lesions has been shown to be safe, simple, cost effective and accurate method for the management of palpable thyroid lesions. It helps to categorize Non-neoplastic from Neoplastic thyroid lesions. Its use has decreased the number of surgeries performed. It is a minimally invasive technique done by disposable 10 cc syringe, with no complications. The syringe used in the present study, is cost effective than other expensive methods.

Keywords: FNAC, Thyroid lesions, Histopathological changes, Clinical evaluation, Thyroid swellings

Introduction

Thyroid lesions are one of the common conditions encountered in clinical practice. The diseases of thyroid are of great importance because most of them are amenable to medical or surgical treatment.¹ Often it is difficult to make an accurate diagnosis by clinical evaluation alone. Hence Fine Needle Aspiration Cytology (FNAC) study of such lesions along with clinical evaluation is emphasized in order to make an accurate diagnosis. As all palpable lesions can be assessed by FNAC technique, early diagnosis is often possible.² FNAC is a diagnostic tool in which cells are aspirated from a palpable swelling using syringe and fine needle. It is a simple, minimally traumatic and an ideal first line diagnostic test.² It is also a speedy, safe, cost effective and an accurate technique being used world wide. FNAC is being increasingly used for evaluation of thyroid swellings.²

FNAC examination has proved to be a simple, accurate, safe, and cost effective method for the preoperative diagnosis of benign and malignant thyroid nodules.³ Its uses have decreased the number of thyroid surgeries performed and increased the ratio of malignant to benign lesions resected. As a result, many thyroid surgeries for benign diseases have been avoided.⁴ The clinical value of thyroid FNAC is useful in the diagnosis of inflammatory, infective

and neoplastic conditions.^{5,6} The aim of the present study was to evaluate sensitivity and specificity of FNAC of thyroid lesions and cytological features with histopathological study.

Materials and Methods

The present study was undertaken to analyze the role of FNA in the cytomorphological features of various thyroid lesions with histopathological correlation wherever the surgery was done and to determine its diagnostic accuracy.

The study was undertaken in the Department of Pathology, Medical College and Hospital, duration of 245 days. The study comprised of 100 patients who presented with the history of swelling of thyroid which were referred from the Departments of Surgery, Medicine & ENT.

All the patients were clinically examined in detail according to the proforma and a careful palpation of the thyroid gland was 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. Under aseptic precautions 21 gauge needle with syringe was inserted into the lesion and to and fro movements performed quickly. Under negative pressure material gets collected in the needle, after

collection of material negative pressure was released, needle with syringe holder was removed, the material was spread over a clean labelled slides and smears were prepared. Few smears were wet fixed in 95% ethyl alcohol and stained with Haematoxylin and Eosin (H & E) and some were air dried and stained with Leishman. Whenever fluid was obtained all the contents were aspirated and centrifuged, smears were made from the sediment and stained by the stains as described above. Stained smears were studied under light microscopy. Whenever fluid was obtained, all the contents were aspirated and centrifuged. Smears were made from the sediment and stained by the stains described earlier. Whenever a residual mass was observed, material was collected by the technique as described earlier. When the surgery was done, the received specimens were fixed with 10% formalin and detailed gross examination was done and sections were taken from the representative areas for paraffin sections and stained by H & E. The sections were studied under light microscopy.

Cytological diagnosis was correlated with histopathology where ever possible and efficacy of FNAC was estimated by using the following methodology of Galen and Gambino.^{7,8}

Significance was interpreted as: $0.05 < P < 0.10$ Suggestive of significance $0.01 < P \leq 0.05$ Moderately significant $P \leq 0.01$ Strongly significant.

Results

The FNAC of thyroid lesions and determination of the diagnostic accuracy of the aspiration cytology with histopathological correlation.

Age

Age group of patients referred for thyroid aspirations ranged from 20 years to 80 years with mean age of 39.66 years. Majority of the patients were in the age group of 21-40 years.

Sex

Majority of the patients were females accounting for 88% forming a male to female ratio of 1:7.3.

In the present study, it has been observed that the incidence of thyroid lesions were more in the age group of 21-40yrs with 58cases, and least common in the age group of 0-20yrs with 3 cases. The mean age is 39.66 yrs. The youngest patient was 20yrs female and oldest was 80yrs female. Among the total thyroid aspirations, 91% constituted Non-neoplastic lesions and the remaining 9% were Neoplastic lesions.

Among the 91 non neoplastic lesions, the incidence was high between the age group of 21- 40yrs with 54 cases, 29 cases were seen in the age group of 41-60yrs, 2 cases were seen in the age group of 0-20yrs, 6 cases in the age group of 61-80yrs. The incidences of non-neoplastic lesions were more in females. From the total of 91 cases, 81 were

females and 10 were males. The most common lesion found in FNAC was Nodular colloid goiter with 65 cases, least common was Hyperplastic nodule with 2 cases. Different lesions seen in the thyroid aspirates are given above with Nodular colloid goiter being more common with 71% and least common was Hyperplastic nodule with 3%. Among the 9 Neoplastic lesions, 2 were Follicular neoplasm, 6 were Papillary carcinoma and 1 was Hurthle cell neoplasm.

The incidence of Papillary carcinoma was more with 66%, followed by Follicular neoplasm with 22% and Hurthle cell neoplasm with 12%.

Histopathological diagnosis

In the present study of 100 cases, 70 patients underwent surgery and the histopathological diagnosis of the cases are given below.

Table 1: Showing age distribution of Neoplastic and Non neoplastic lesions

Age group(yrs)	Thyroid lesions		Total
	Neoplastic	Non-Neoplastic	
1 - 20	1	1	2
21 - 40	5	34	39
41 - 60	4	20	24
61-80	0	5	5
Total	10	60	70

Table 2: Showing sex distribution of Neoplastic and Non neoplastic lesions

Sex	Thyroid lesions		Total
	Neoplastic	Non-Neoplastic	
Female	9	55	64
Male	1	5	6
Total	10	60	70

Patients who underwent surgery, were more in the age group of 21-40 yrs with 38 cases. Least were in the age group of 0-20 yrs with 2 cases. Others were in the age group 41-60 yrs with 25 cases and 61-80 yrs with 5 cases. From total number of 70 cases, 64 were females and 6 were males in the present study. Among 70 patients who underwent surgery, 60 (85%) were Non-neoplastic, and 10(15%) were Neoplastic lesions. The overall incidence of Non-neoplastic lesions in both FNAC & Histopathology was found to be more between the age group of 21-40yrs. The mean age group was 37.9 yrs.

Table 3: Showing Sex distribution of different Non-neoplastic lesions upon Histopathology

LESION	FEMALE	MALE	TOTAL
Multinodular goiter	48	4	52
Colloid cyst	2	0	02
Hashimoto thyroiditis	6	0	06
Total	56	4	60

The incidence was more common in females with 56 cases and males were 4 cases.

In the present study, the incidence of Multinodular goiter was more on histopathology with 52 cases, of which 4 were

males followed by Hashimoto thyroiditis with 6 cases and 2 cases of Colloid cyst.

Multinodular goiter:

There were 52 cases of of Multinodular goiter in our study. Aspirations yielded 0.2 ml of colloid like material. Smears studied were cellular and showed both hyperplastic and involutinal forms of benign thyroid follicular cells arranged in cohesive monolayered sheets, clusters and dispersed singly in a background of thick and thin colloid , haemorrhage and few cyst macrophages.

Gross: They were thyroidectomy specimens with outer surface showing nodularity. Cut surface (C/S) showed multiple colloid filled grey tan areas along with areas of haemorrhage, cystic change with few showing calcification.

Histopathology:

Sections studied showed benign thyroid follicles of varying sizes lined by flattened to cuboidal epithelium, containing colloid and separated by fibrous septae. Few of the cases showed areas of haemorrhage, cystic change, fibrosis and areas of calcification.

Table 4: Showing Sex distribution of different Neoplastic lesions on histopathology

LESIONS	FEMALE	MALE	TOTAL
Follicular adenoma	1	0	1
Hurthle cell adenoma	1	0	1
Papillary carcinoma	7	1	8
Total	9	1	10

Among the 10 Neoplastic lesions, 8 were Papillary carcinoma with a ratio of 80%, Follicular adenoma was 1 with a ratio of 10 % and Hurthle cell adenoma was 1 with a ratio of 10%. Of the 8 Papillary carcinomas, 1 was follicular variant, 1 was encapsulated variant, 1 was encapsulated follicular variant, 1 was cystic papillary carcinoma, 3 Papillary carcinomas and 1 Papillary carcinoma with Multinodular goiter which was a rare finding in our study.

Table 5: Cyto-Histopathological Correlation of Non-Neoplastic Lesions

Lesions	FNAC	Histopathology		
		Multinodular goiter	Hashimoto Thyroiditis	Colloid cyst
Nodular colloid goiter	50	50	-	-
Hashimotos thyroiditis	5	-	5	-
Colloid cyst	5	1	-	2
Total	60	51	5	2

In the present study of cytohistopathological correlation, 60 cases of Non- neoplastic lesions were correlated. There were 2 cases of Colloid cyst which were reported as Neoplastic lesions (Papillary carcinoma) on histopathology. Hence the false negative rate was 2.8% in the present study.

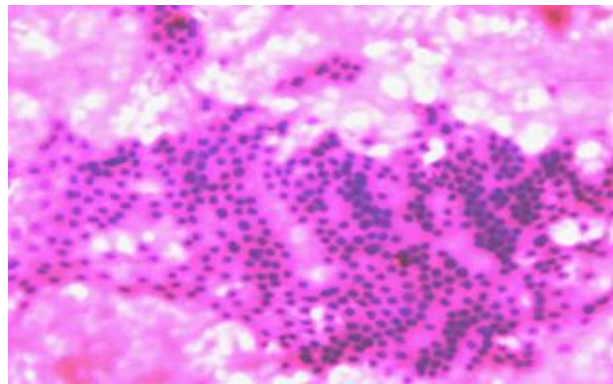


Fig. 1: Nodular colloid goiter showing benign thyroid follicular cells and colloid

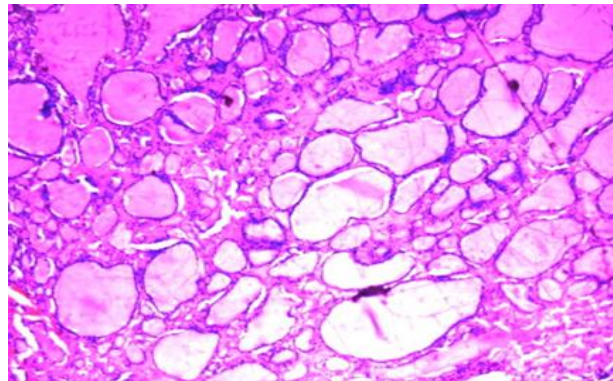


Fig. 2: Multinodular goiter showing colloid filled follicles of varying sizes

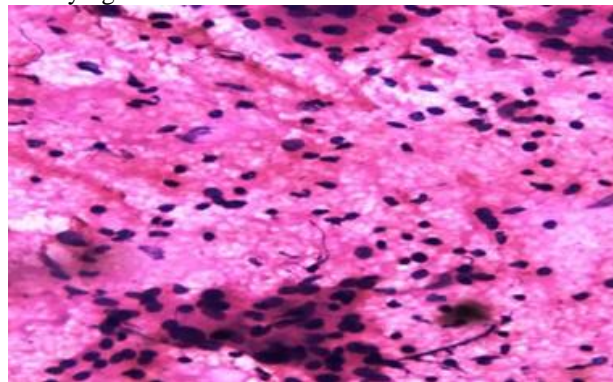


Fig. 3: Hashimoto thyroiditis showing thyroid follicular cells

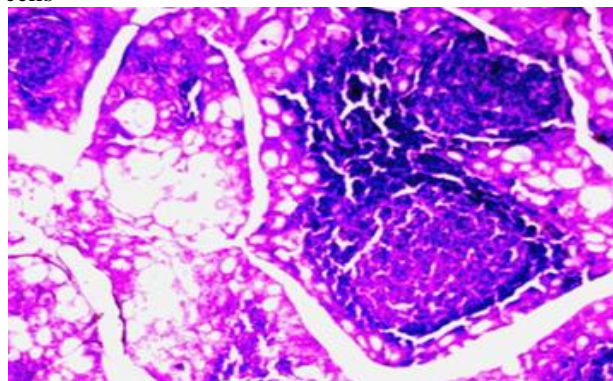


Fig. 4: Hashimoto thyroiditis showing lymphoid follicles and thyroid tissue

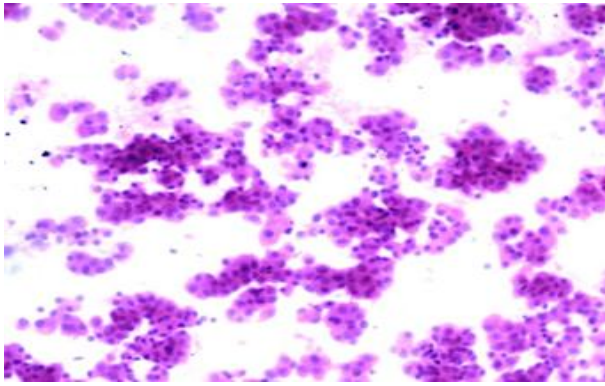


Fig. 5: Hurthle cell neoplasm showing monomorphic population of hurthle cells

Discussion

Fine needle aspiration cytology is a safe, simple and inexpensive technique that has emerged as a valuable and popular adjunct in the diagnosis and management of various thyroid lesions. Nature of the disease, experience and understanding of certain limitations determine its diagnostic utility.⁸ In the present study, cytological features of thyroid lesions were studied and correlated with histopathology wherever available to determine its diagnostic accuracy. The present study was undertaken to evaluate preoperatively with the help of FNAC, the type of thyroid lesion and to correlate the observations with the histopathological examination in order to determine the usefulness and diagnostic accuracy of this technique.^{9,10} The fine needle aspiration cytology of the thyroid gland was performed in 100 patients, duration of 24 months in the Department of Pathology, Medical College and Hospitals of which 70 patients were followed by excision biopsy. A comparison of various parameters in our present study was done with that of studies by other authors.

Since most of the papillary carcinomas undergo cystic degeneration and cystic papillary carcinomas yield fluid aspirate with scant follicular cells, which masks the diagnosis of Papillary carcinoma giving a false negative result is consistent with the studies.^{11,12}

Braga M et al (2001) found that cystic thyroid nodules are considered to be one of the major causes of non diagnostic and false negative results on conventional fine needle aspiration biopsy, thus limiting the potential of this method for the evaluation of complex thyroid nodules. Ultrasound guided fine needle aspiration cytology is suggested as an excellent modality for the evaluation of the complex nodules and also for the re- evaluation of those nodules with non-diagnostic result on the conventional fine needle aspiration biopsy.¹³

Goellner JR in his study commented that cyst fluid showing no pathologic change and containing only degenerative foam cells should be interpreted as “nondiagnostic” rather than “negative”.^{14,15}

Conclusion

FNAC of thyroid lesions has been shown to be safe, simple, cost effective and accurate method for the management of palpable thyroid lesions. It helps to categorize Non-neoplastic from Neoplastic thyroid lesions. Its use has decreased the number of surgeries performed. It is a minimally invasive technique done by disposable 10 cc syringe, with no complications. The syringe used in the present study, is cost effective than other expensive methods.

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