



INTERPRETATION OF FINE NEEDLE ASPIRATION CYTOLOGY FOR MORPHOLOGICAL VARIANTS OF THYROID LESIONS IN A TERTIARY HEALTH CARE CENTRE

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ABSTRACT

For evaluation of thyroid lesions FNAC is the gold standard among diagnostic tests as it prevents unwarranted surgeries. A retrospective study of 88 cases with thyroid swellings was conducted from July, 2015 to May, 2017 in the pathology department of Silchar Medical College and hospital, Silchar, Assam to determine the cytomorphology of the thyroid lesions and to correlate the cytological and histological diagnosis wherever possible. FNA analysis showed colloid goitre to be the commonest lesion (52.3%). Follicular neoplasm comprised 3.4% of thyroid lesions whereas 3.4% was diagnosed cytomorphologically as papillary carcinoma. Histopathological correlation was done in the surgically treated cases wherever possible.

FNAC is easy to perform, cost effective and minimally invasive with few complications. It has high sensitivity in diagnosis of thyroid malignancy and also has high diagnostic accuracy in the evaluation of thyroid disorders.

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INTRODUCTION

FNAC prevents unwarranted surgeries for a neoplastic disorder differentiating it from functional or inflammatory abnormalities. Statistical evidence strongly suggests that the use of aspiration biopsy has markedly reduced the number of thyroidectomies.

In patients with thyroid nodules thyroid malignancies occur in small proportion of population ranging from 5-20% of general population and 18-30% among population exposed to ionizing radiations.¹ This is a fact that 1 out of 15 thyroid cancers is clinically manifested and is proven by prevalence of clinical thyroid cancers of 2.5 cases per 1000 persons² but prevalence of occult thyroid cancers upon autopsy of 36 cases per 1000.³ Reducing total health care cost, rapid assessment and accurate diagnosis of needle aspiration smears has become increasingly popular.⁴

MATERIALS AND METHODS

This retrospective study was done in the Department of Pathology, Silchar Medical College and hospital, Assam for a period of two years from July 2015 to May 2017. Thyroid swellings were aspirated using 23/24 gauge disposable needles fitted with 10/20 ml disposable syringes using standard procedures. Aspiration was done with detailed clinical history, physical examination and thyroid function test. FNAC results were compared with final histopathological diagnosis wherever possible. The aspirated material was smeared into

glass slides with preparation of both air dry smears for May-Grunwald Giemsa stain and 95% alcohol fixed smears for Papanicolaou stain. Ziehl-Neelsen stain was performed whenever required. Cytological diagnosis was based on cytomorphology and clinical findings. Subsequently, results were correlated with histopathological examination results, wherever possible.

RESULTS

A total of 88 cases underwent FNAC for evaluation of thyroid lesions. All age groups and sex were included. Females comprised the majority of cases 48(54.5%) with 40(45.5%) males. The youngest patient was 4yrs old girl whose cytological features were consistent with lymphocytic thyroiditis while the oldest was 77yrs old male diagnosed with follicular carcinoma. Median age was with majority of patients in age group of 36-45yrs.

Table No I Shows Age and Sex Distribution of the Cases with Thyroidlesions

AGE GROUP(IN YEARS)	MALE	FEMALE	TOTAL
<5YRS	2	1	3(3.4%)
5-15YRS	1	1	2(2.3%)
16-25YRS	6	4	10(11.4%)
26-35YRS	11	12	23(26.1%)
36-45YRS	10	20	30(34.1%)
46-55YRS	4	6	10(11.4%)
56-65YRS	2	1	3(3.4%)
66-75YRS	2	2	4(4.5%)
>75YRS	2	1	3(3.4%)
TOTAL	40(%)	48(%)	88(100%)

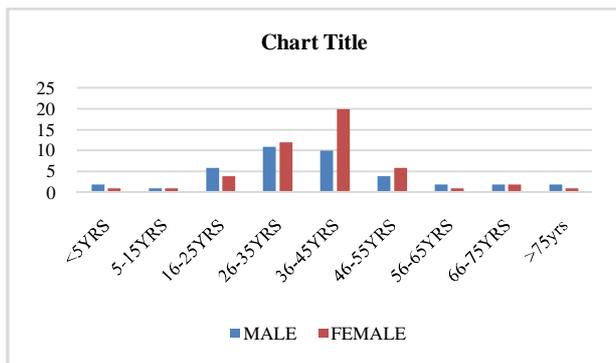


Fig.No1 Age and Sex Distribution of the Cases with Thyroidlesion

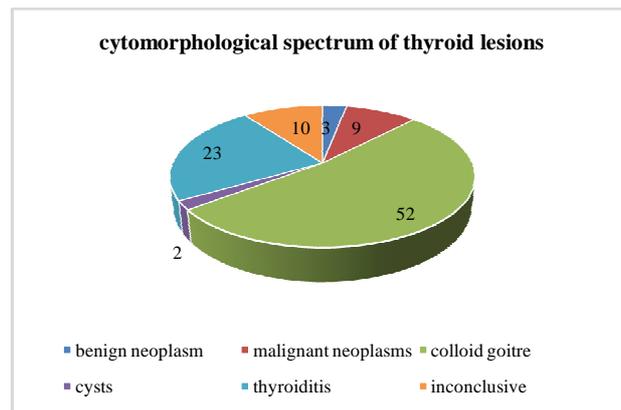


Fig II Pie Diagram Showing Cytomorphological Spectrum Of Thyroid Lesions

Table No. II Shows the Cytomorphological Spectrum of Cases

1.Neoplastic	Male	Female	Total
Benign:Follicular Neoplasm	1	2	3(3.4%)
Malignant:			
• Papillary ca	1	2	3(3.4%)
• Follicular variant of papillary	-	1	3(3.4%)
• Medullary ca			
• Anaplastic ca	1	-	1(1.1%)
	-	1	1(1.1%)
2.Non Neoplastic			
• Colloid Goitre With Cystic Changes	13	23	36(40.9%)
• Colloid Goitre With hyperplastic changes	4	6	10(11.4%)
• Thyroglossal Cyst	1	1	2(2.3%)
• Granulomatous Thyroiditis	2	6	8(9.1%)
• Lymphocytic Thyroiditis	3	9	12(13.6%)
3.Others(inconclusive)			
Hemorrhagic	1	3	4(4.6%)
Normal follicular cells	3	2	5(5.7%)

The cases were classified into neoplastic - benign and malignant, non neoplastic and others (inconclusive) group. The commonest lesion found is colloid goiter (52.3%) with or without secondary changes. Benign tumours (3.4%) were found to be more common than malignant ones (9%). Out of the 10 cases of thyroiditis diagnosed on FNAC, lymphocytic thyroiditis was found to be the commonest (12 cases).

Out of the total 88 cases, 22 had undergone operative intervention. Out of the 46 cases of colloid goiter, only 14 cases were operated and were confirmed as colloid goiter on histopathological examination. One case of thyroglossal cyst was diagnosed as same on histopathological examination. Only one case out of three cases of follicular neoplasm were operated which was diagnosed as follicular variant of papillary carcinoma on histopathological examination and the other two cases lost to follow up or may have attended a different institute. Out of the three cases of papillary carcinoma as diagnosed on FNAC, only two were operated and histopathological reports were the same and the rest lost to follow up or may have attended a different institute. Only one case of medullary carcinoma diagnosed by FNAC was later confirmed by histopathology. On FNAC diagnosed case of anaplastic carcinoma was lost to follow up or may have attended a different institute for histopathology.

DISCUSSION

By providing a preoperative morphological diagnosis that require further surgery, scope of FNAC has gone a long way in obviating unnecessary surgeries as well as in planning proper surgical and other treatment protocols .⁵ The sensitivity and diagnostic accuracy of thyroid surgery has been shown to be as high as 85-95% in experienced hands ^{6,7}. Positive predictive value of 89-98%, negative predictive value of 94-99%^{8,9} and false negative rates as low as 5-10% ¹⁰ has established FNA as an invaluable diagnostic modality. Although there is a large body of world literature claiming the accuracy and usefulness of thyroid cytology, there is also evidence showing possible limitations and pitfalls of this procedure. ¹¹

Comparable experiences have been reported by others.

Table No. III Shows the Comparison of Non-Neoplastic and Neoplastic Lesions with Other Studies

Study	Non neoplastic	Neoplastic	Ratio
Silverman JF <i>et al</i> (1986) ¹²	193	80	2.4:1
Godinho-Matos L <i>et al</i> (1992) ¹³	109	22	4.91:1
Uma H <i>et al</i> (2008) ¹⁴	381	31	12.29:1
Sengupta <i>et al</i> (2011) ¹⁵	148	30	4.93:1
AkhilaSekhar <i>et al</i> (2015) ¹⁶	118	31	3.8:1
Our study	23	11	2.1:1

In all the above studies, the ratio between non neoplastic and neoplastic lesion was in between 2.41:1 to 12.29: 1. In our study this ratio was found to be 2.1:1 which is well within this range and is similar to the study by Silverman JF *et al* (1986) The abundance of female cases (54.5%) in our study was also consistent with other reports.¹⁷

In all the studies the mean age ranged from 36.5 to 48.98and our study is most comparable with the study by Arvinthan *et al* (2007).¹⁸

The commonest lesion found in this study is colloid goiter (52.3%) with or without secondary changes. This is comparable to most other studies by Silverman *et al.* (1986)¹², Gupta *et al.*(2010)¹⁹, Sathiyamurthy *et al.* (2014)⁴

The positive influence of FNAC on the management of thyroid disease is perhaps best highlighted in the low rate of surgical intervention (15.2%) in the study by Uma Handa *et al* where surgery was avoided mainly in colloid goiter and thyroiditis.¹⁴ In our study too, only 14.6% of cases came for surgical intervention and remaining cases were lost to follow up.

Table no IV Shows the Comparision of Age Range and Mean Age with Other Studies

Authors	Age Range (years)	Mean Age(years)
Silverman JF <i>et al</i> (1986) ¹²	16-79	44.8
Arvinthan <i>et al</i> (2007) ¹⁸	26-59	46
Gupta <i>et al</i> (2010) ¹⁹	22-58	38.9
Sathiyamurthy <i>et al</i> (2014) ⁴	10-76	36.5
Our study	6-75	48

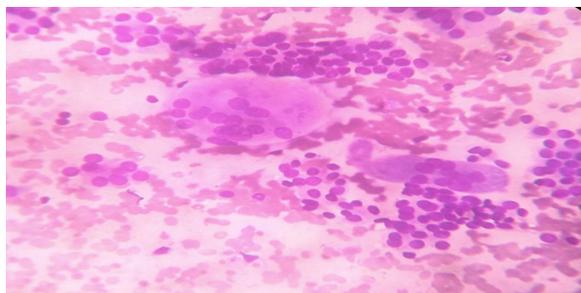


Fig III Papillary Carcinoma Thyroid Showing Giant Cells(MGG, 40X)

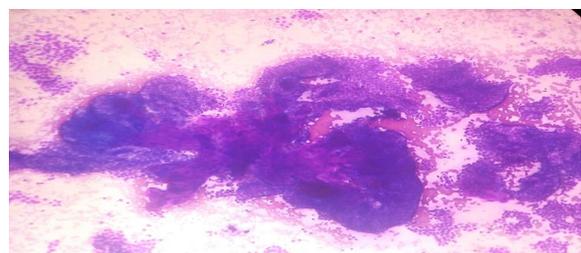


Fig IV Papillary Carcinoma Thyroid (MGG, 10X)

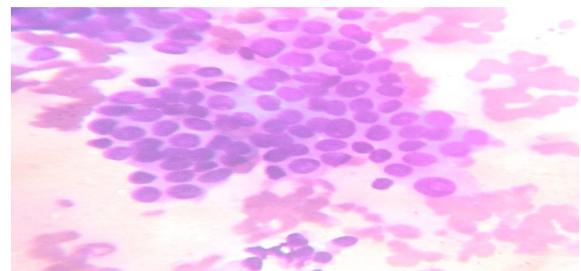


Fig V Papillary Carcinoma Thyroid Showing Pseudoinclusions (MGG, 40X)

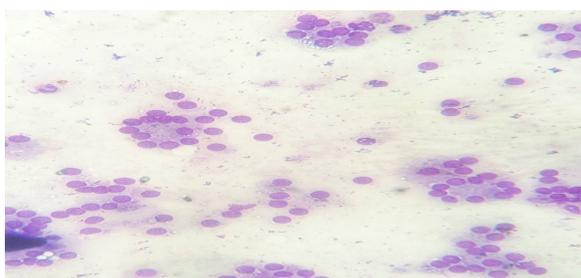


Fig VI Follicular Carcinoma Thyroid (MGG, 40X)

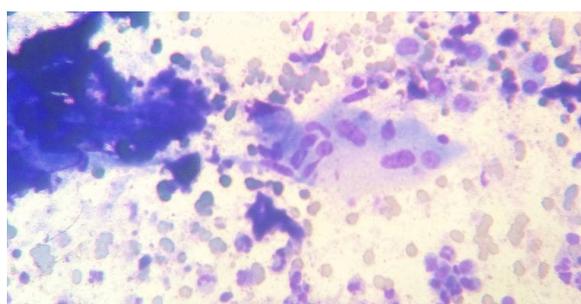


Fig VII Granulomatous Thyroiditis (MGG, 40X)

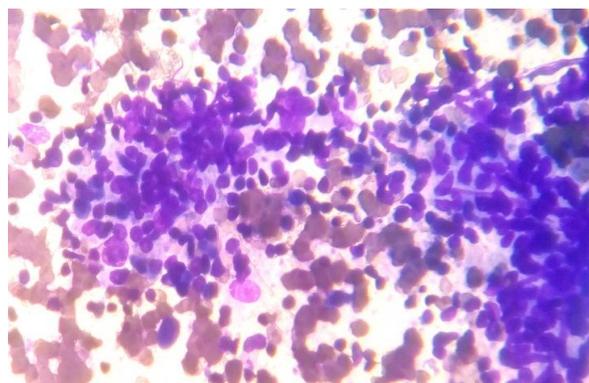


Fig VIII Lymphocytic Thyroiditis (MGG, 40X)

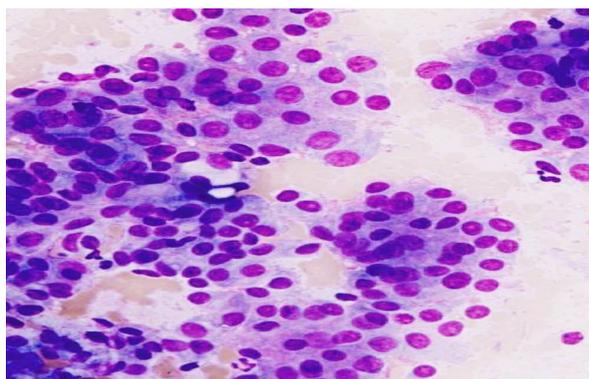


Fig IX Colloid Goiter (MGG, 40X)

CONCLUSION

FNAC is a cost effective procedure with minimum complications. Patients can be followed up in case of benign lesions and can be subjected to surgery in case of malignant ones. Thus, it helps in reducing the rate of unnecessary surgeries. The reported pitfalls are those related to specimen inadequacy, lack of skill of the aspirator, inexperienced cytopathologist interpreting the diagnosis and overlapping cytological features between benign and malignant follicular neoplasms.

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