



Fine Needle Aspiration of Thyroid Lesions and its Histopathological Correlation

KEYWORDS

Cyto-histocorelation, FNAC , Thyroid lesion

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ABSTRACT Background :

Thyroid swelling most common clinical presentation of thyroid lesion. , observed in 4-7 % of population. and affects females more commonly than males. Excising all thyroid lesion is associated with risk and not necessary. Thus by FNAC diagnosis, many thyroid surgeries can be prevented.

Aims and Objectives: Present study was carried out to evaluate the accuracy of FNAC in diagnosis of thyroid lesion and its correlation with histopathology diagnosis.

Material and Methods: The present retrospective and prospective study was carried out in the department of Pathology, Government medical college, Miraj from January 2012 to June 2014 . 1147 cases were studied.

Results: Out of 1147 cases the cytological diagnosis were thyroglossal cyst in 14 cases(1.22%), Thyroiditis in 53 cases (4.62%), colloid cyst in 184 cases (16.04%), Goiter (simple, Nodular, toxic) in 751 cases ,(65.47%) adenoma in 13 cases(1.13%),and Malignancy in 51 cases(4.45%)., suspicious in 2 cases (0.17%) and 79 smears (6.89%) were unsatisfactory. Out of 1147 cases histological correlation could be made only in 102 cases. In the present study we found sensitivity 0.92 ,Specificity 0.97 and overall accuracy 97.06%.

Conclusion : Present study as well as previous studies highlight routine use of FNAC in thyroid lesion as safe, cost effective and initial diagnostics modality, along with others like Ultrasonography and thyroid function test that avoids unwanted surgeries.;

1) .INTRODUCTION :

In clinical practice thyroid lesion are common, observed in 4-7 % of population .Excising all thyroid lesions is impracticable and associated with risk(1, 2). Evaluation of nodule of the thyroid is one of most common problem faced by physician and surgeon. Almost any condition affecting thyroid can present as nodule , degenerative disease, hyperthyroidism, thyroiditis, and benign or malignant tumors. Thus practitioner is faced with dilemma

.Aspiration biopsy cytology bridges diagnostic gap between initial palpatory examination and conclusive diagnosis and thus reduce need for diagnostic surgery.

Martin and Ellis at Memorial Hospital for Cancer and Allied Diseases, New York , in 1930 first reported biopsy of thyroid for cytological purposes

Crile in North America introduced FNAC about 50 years ago (Crile and Vickery 1952), but its value as diagnostic tool received little recognition, except in few large thyroid centres until recently.

Several advances have occurred in last decade. A more critical analysis of cost effectiveness of fine needle aspiration of thyroid as screening method for selecting cases for surgery has been undertaken . Its use in conjunction with ultrasound imaging (Sutton et al 1988), its particular value in endemic goiter (Harach et al 1989, Schmid et al 1989), in diagnosis of metastatic malignancy (Chacho et al 1987) and goiter in pregnancy and childhood has been described.

The routine use of FNAC in thyroid lesions, has reduced number of patient subjected to surgery (thyroidectomy) for benign lesions.

The efficacy and diagnostic accuracy of FNAC is reliable in case of adequate aspirate and in availability of

trained cytopathologist . Different imaging modalities are used for diagnosis of thyroid nodules, like radionuclide scan, high resolution sonography .However FNAC is regarded as most accurate , cost effective, reliable , particularly when used in combination with ultrasonography or radionuclide scan .

2) MATERIALS AND METHODS:

The present retrospective and prospective study was carried out in the department of pathology, Government medical college, Miraj from January 2012 to June 2015. Total 1147 cases were studied. All these cases were admitted in surgical wards of hospital or were attending cytology OPD.

A complete clinical details of the patient in relation to lesion were obtained and entered in proforma and after local , systemic examination , routine and special investigation (USG, Thyroid function test), patient were subjected to FNAC.

Before going for procedure consent of patient was obtained and proper information was given regarding procedure .Needle used were 23-24 Gauge, 1.5-2 cm in length. Under all aseptic precaution,, with 10 cc syringe FNAC procedure was done . Wet and dry smears were prepared and stained with H & E, PAP, and Giemsa and reported by experienced cytopathologist .(T,S Kline 1981, Chery et al 1983). For some patient fine needle capillary sampling was done .FNAC result were classified into 4 groups.

Benign / Negative

Positive/Malignant

Suspicious

Inadequate

3) RESULT:

.Thus majority of patient in our study belonged to the age group between 21 – 40 years (58.59%) whereas least cases were found in 1-10 years and 71-80 years (0.52%) . Sex distribution of the cases in present study is shown in Table No 1

Table No 1 : Sex distribution in present study

Sex	No of cases	Percentage
Males	188	16.39%
Female	957	83.61%
Total	1147	100%

Thus in this study Female dominated over males by ratio of 5.1:1.

Table 2: Age and Sex distribution in present study.

Age groups years	Male , No of cases	Male percentage	Female, No of cases	Female percentage
1-10	0	0%	6	0.63%
11-20	18	9.57%	124	12.93%
21-30	45	23.93%	325	33.89%
31-40	47	25%	255	26.59%
41-50	39	20.74%	140	14.60%
51-60	23	12.23%	79	8.24%
61-70	14	7.44%	26	2.71%
71-80	2	1.06%	4	0.4%

Thus in present study maximum no cases in males were found in 31-40 years of age (25%) whereas in female it was 21-30 years of age (33.89%).The minimum Number of patient were found in 1 st decade in males (0%) and 7 th decade in females. (shown in Table No 2 .)

The duration of swelling (most common clinical presentation of thyroid lesion) in the neck varied from less than 1 month to more than 10 years The Gross appearances of the aspirated material in present study of 1147 cases was as in table no 3.

Table 3; The Gross appearances of the aspirated material in present study

Nature of aspirate	No of cases	Percentage
Hemorrhagic	367	32.00%
Amber coloured	176	15.34%
Mixed with blood	478	41.67%
Sticky White	126	10.99%
Total	1147	100%

Repeat aspiration were done in purely hemorrhagic aspirate so as to obtain good aspirate.

The present study of 1147 cases of thyroid enlargement showed swelling of varying sizes. The smallest size of the swelling 1x2 cm and the largest was 10x10cm.

The cytological diagnosis made in the present study of 1147 cases is shown in Table no 4.

Table 4: Cytological diagnosis of thyroid lesions

Sr.No.	Cytological Diagnosis	Cases	Percentage
1	Congenital Anomalies Thyroglossal duct cyst	14	1.22%

2	Inflammatory lesions		
	Thyroiditis:	53	4.62%
	Acute	6	0.52%
	Granulomatous	9	0.78%
	Hashimoto's	38	3.31%
3	Degenerative changes	184	16.04%
	Colloid cyst		
4	Hyperplasia	751	65.47%
	Simple Colloid goiter	634	55.27%
	Nodular Goiter	109	9.50%
	Graves Disease	8	0.70%
5	Benign Neoplasm	13	1.13%
	Follicular Adenoma	10	0.87%
	Hurthle cell adenoma	3	0.26%
6	Carcinoma	51	4.45%
	Follicular Carcinoma	33	2.88%
	Papillary carcinoma	10	0.87%
	Anaplastic carcinoma	7	0.61%
	Medullary carcinoma	1	0.09%
7	Suspicious of malignancy	2	0.17%
8	Unsatisfactory	79	6.89%
	Total	1147	100%

All the 1147 cases can be classified in one of 4 categories as in Table 6 .

Table 5: Cytodiagnostic categories in present study

Cytodiagnosics categories	No of Cases	Percentage
Negative /Benign	1015	88.49%
Positive/Malignant	51	4.45%
Suspicious	2	0.17 %
Inadequate	79	6.89%
	1147	100%

Out of 1147 cases studied, surgical confirmation of cytological diagnosis was obtained in only 102(8.89%) cases.

Histopathological diagnosis of 102 cases was as follows, Table 7

Table 6: Histopathological diagnosis in present study

Histopathological Dignosis	No of cases	Percentage
1 Thyroglossal duct cyst	5	4.90%
2 Thyroiditis	3	2.94%
3 Colloid Cyst	7	6.86%
4 Simple Colloid Goiter	22	21.57%5
5 Nodular Goiter	50	49.02%
6 Adenoma	3	2.94
7 Follicular Carcinoma	5	4.90
8 Papillary Carcinoma	7	6.87
Total	102	100%

Correlation between cytological and histological diagnosis of thyroid lesion is shown in Table 8

Table 7 : Correlation between cytological and histological diagnosis of thyroid lesion

Sr.No	Histopathological Diagnosis	No of cases	Cytologically Consistent	Cytologically Inconsistent
1	Thyroglossal duct cyst	5	5 (4.90%)	-
2	Thyroiditis	3	3 (2.94%)	-
3	Colloid Cyst	7	6 (5.88%)	1 (0.98%)
4	Simple Colloid Goiter	22	22 (21.57%)	-
5	Nodular Goiter	50	48 (47.06%)	2 (1.96%)
6	Adenoma	3	3 (2.94%)	-
7	Follicular Carcinoma	5	5 (4.90%)	-
8	Papillary Carcinoma	7	7 (6.86%)	-
	Total	102	99 (97.06%)	3(2.94%)

DISCUSSION :

The utility of FNAC in diagnosis of thyroid lesions has been well documented since 1930. A good correlation between fine needle aspiration cytology and paraffin section has been recorded in many series .Out of 1147 cases, 79(6.89) aspirations were unsatisfactory.

Out of remaining 1068 cases (93.11 %) the cytological diagnosis were thyroglossal cyst in 14 cases(1.22%), Thyroiditis in 53 cases (4.62%), Colloid Cyst in 184 cases (16.04%), Simple colloid goiter in 634 cases(55.27%), Nodular goiter in 109 cases(9.50 %), Graves Disease in 8 cases(0.70 %), adenoma in 13 cases(1.13%),and carcinoma in 51 cases(4.45%). Out of 1147 cases histological correlation could be made only in 102 cases.

The incidence of Goiter (colloid and nodular) in present study is 70.58% on histological examination , which is comparable with Altavilla et al (1989) ,Charu et al (2001) who reported 66.93% and 80% cases respectively.(3, 4), while it was lower in Harach et al (1989)(5). Thyroid cyst was observed in 7 cases (6.86%) which was much higher than other studies done by Harach et al , Altavilla et al (1989), Charu et al (2001) and also patel et al(2015) and Shemy et al (2015)(3, 4, 5, 21, 22).Follicular carcinoma was observed in 5 cases(4.90%)in our study ,papillary carcinoma in 7 cases (6.87%)which was comparable to other studies ,Altavilla et al(1989)and charu et al(2001).(3, 4)

Cytological Examination of thyroid aspiration in present study of 1147 cases showed Maximum number of benign lesions 1015 (88.49%) followed by 79(6.89%) inadequate ,51(4.45%) malignant and 2 suspicious . Cytological diagnosis with other authors shownd in Table 9

Table 8: Comparison of cytological diagnosis with various studies.

Au-thors	cases	Benign	Malignant	Suspicious	Unsatisfactory
Pandit et al (1986)	80	68(85%)	08 (10%)	03	01
Charu et al (2001)	507	470 (92.70)	30(5.91%)	----	7(1.38%)
Present study	1147	1015(88.49)	79(6.89%)	02(0.17%)	79(6.89%)

In present study we found 1015 cases (88.49) benign lesions , which is in accordance with the findings Schwartz et

al (1982) , Pandit et al (1986) and Charu et al (2001) (4, 6, 19) while the findings reported by Lowhagen et al (1979) , Friedman et al (1979) ,Chu Elizabeth et al (1979) and Ghoshal et al (1984) were lower than our findings(10,13, 14, 16)

Ages of patient affected in present study are in accordance with age range published by various authors. (Rao et al 1971), Bhansali (1982), Charry et al (, 1983,) Dave et al 91983), Pandit et al 1986, Dr. shamy et al 2015, . Patel et al(2015) (6, 7,7, 12,18,21,22)

Female preponderance in present study is in accordance with finding of various studies of authors, (Rao et al 1971, Bhansali 1982, Charry et al 1983, Achraman et al 1985, Pandit et al, 1986, Shamy 2015, patel 2015. (6,7 ,1 8,21,22)

Duration of symptoms in present study (1 month to 10 years) was comparable to Rao et al1971, Bhansali 1982, Dave et al 1983, Patel 2015(7,12, 18,21, 22)

In the present study of 1147 cases we found sensitivity 0.92 ,Specificity 0.97 ,overall accuracy of FNAC in present study was 97.06%, which is comparable to studies done by other authors and Showed in Table No 10 (4,11, 13,15,19,20,21,22)

Table 9: Comparing accuracy rate with various Authors

	Authors	cases	Correct diagnosis	False positive	False negative	Accuracy rate
1	Friedman et al(1979)	310	308	01	01	91.0%
2	Colacchio et al (1980)	300				97.3
3	Young et al (1981)	156	148	06	02	94.8%
4	Goldfarb walter et al (1982)	192				86.0%
5	Schwartz et al (1982)	102	93	03	06	92.8%
6	Charu et al (2001)	145	142	01	02	97.06%
7	Patel et al , 2015	100				92.7%
8	Shemy et al, 2015	50				98%
9	Present study	102	99	02	01	97.06%

By applying the test of sensitivity and specificity it is found that present study result are comparable to the result of others authors as shown in table no 11.(4, 8, 17,21,22)

Table 10 : Comparing Sensitivity and specificity with various authors.

Sr. No.	Authors	Sensitivity	Specificity
1	Manual et al(1997)	0.65	0.88
2	Cap et al (1999)	0.86	0.74
3	Charu et al (2001)	0.89	0.99
4	Patel et al (2015)	66.6	1

5	Shemy et al (2015)	0.88	1
6	Present Study	0.92	0.97

CONCLUSION:

FNAC is safe , simple, reliable and inexpensive method . Diagnostic operation can be avoided in many patient . FNAC does not cause any complication, and it has good acceptance by the patient . Fine needle aspiration cytology can not differentiate between a follicular adenoma from carcinoma . In such cases the final diagnosis depends on histologic examination only .If combined with clinical history, ultrasound, nuclear medicine, high accuracy rate can be achieved in detection of malignancy. Thus FNAC is gold standerd test for diagnosis of thyroid lesions with high diagnostic yield, accuracy, sensitivity, and specificity. It is most cost effective, minimally invasive , OPD procedure for diagnosis of thyroid lesions, and planning treatment strategy.

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