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Research Paper

Cytomorphological spectrum of thyroid lesions in a tertiary care hospital.

Medical Science

KEYWORDS : Thyroid, FNAC, Cytomorphology, Papillary carcinoma

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ABSTRACT

Fine Needle Aspiration Cytology (FNAC) is the gold standard among diagnostic tests for evaluation of thyroid lesions and prevents unwarranted surgeries. A retrospective study of 116 cases with thyroid swellings was conducted from January, 2013 to December, 2015 in the pathology department of Jorhat Medical College and hospital, Jorhat, 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 (71.55%). Follicular neoplasm comprised 6.03% of thyroid lesions whereas 3.45% was diagnosed cytomorphologically as papillary carcinoma. Histopathological correlation was done in the surgically treated cases. 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

Introduction:

The primary objective of FNAC of the thyroid is to select 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 (Poller et al, 2000; Werga et al 2000; Carpi et al, 1996, 1999; Mazzaferri, 1993; Cohen and Choi, 1988; Einhorn and Franzen, 1962; Soderstrom, 1952) [1]. Children and adolescents should not be excluded because they may also harbor malignant tumours (Khurana et al, 1999) [1]. Statistical evidence strongly suggests that the use of aspiration biopsy has markedly reduced the number of thyroidectomies, whereas the proportion of carcinomas in the surgically treated population has increased significantly. (Koss et al, 1992) [1].

Thyroid cancer occurs in a small proportion of patients with thyroid nodules, ranging from 5-20% in this group for the general population and from 18-30% for the population exposed to ionizing radiation [2, 3].Clinical thyroid cancer has a prevalence of approximately 2.5 cases per 1000 persons [4], but occult thyroid cancer is found at autopsy with a prevalence of 36 cases per 1000[5], indicating that only 1 of 15 thyroid cancers is clinically manifested.

However, rapid assessment and accurate diagnosis of needle aspiration smears has become increasingly popular due to the global trend in reducing health care costs (Yang and Alvarez, 1995) [6]. This study is undertaken to identify the cytomorphological spectrum of thyroid lesions and to correlate with histomorphological features wherever necessary.

Materials and method:

This retrospective study was done in the Department of Pathology, Jorhat Medical College and Hospital, Jorhat,, Assam for a period of three years from January 2013 to December 2015. Thyroid swellings were aspirated using 23/24 gauge disposable needles fitted with 10/20 ml disposable syringes using standard procedures. Aspiration was done after 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 evaluation was performed and cytological diagnosis from each case was based on cytomorphology and clinical findings. The cytological results were correlated with clinical features, thyroid function tests and histopathological examination.

Observations:

The study included a total of 116 cases that underwent FNAC for evaluation of thyroid lesions. All age groups and both sexes were included in the study. Females comprised the majority of cases 99(85.34%) and only 17(14.66%) were males. The youngest patient was a 6 years old girl who was diagnosed with an inflammatory lesion of thyroid consistent with lymphocytic thyroiditis and the oldest was a 75 years old female diagnosed with colloid goiter. Median age of occurrence is 40.5 years with maximum number of cases in the age group 31-40 years.

Table 1 shows age and sex distribution of the cases with thyroid lesions

AGE GROUP(Years)	MALE	FEMALE	TOTAL (%)
0-10	nil	02	02 (1.72%)
11-20	02	10	12 (10.35%)
21-30	05	22	27(23.28%)
31-40	03	40	43(37.07%)
41-50	02	14	16(13.79%)
51-60	03	05	08(6.90%)
61-70	02	05	07(6.03%)
71 and above	nil	01	01(0.86%)
	17(14.66%)	99(85.34%)	116

Figure1 shows age and sex distribution of the cases with thyroid lesion

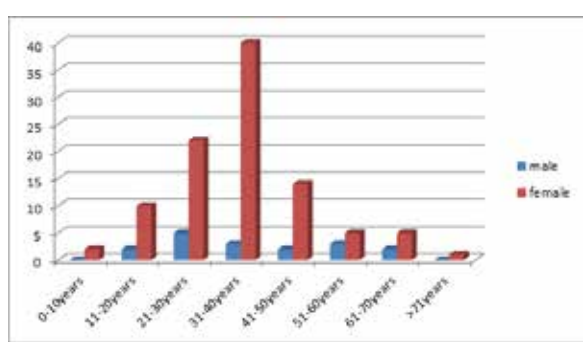

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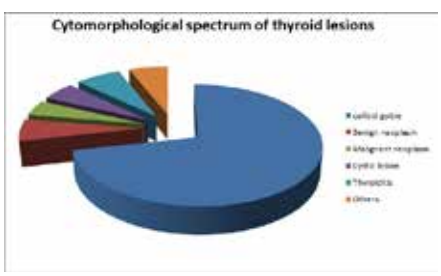
Table 2 shows the cytomorphological spectrum of cases

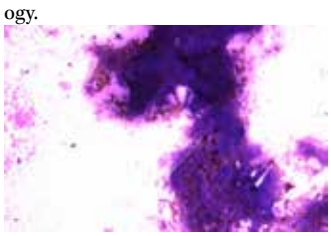
A.NEOPLASTIC	MALE	FEMALE	TO-TAL
Benign: Follicular neoplasm	02	05	07
2. Malignant: Papillary carcinoma	01	02	03
Follicular variant of papillary Ca	-	01	01
Medullary carcinoma	01	-	01
NON-NEOPLASTIC			
Simple Colloid goiter			
Colloid goiter with cystic changes	04	51	55
Colloid goiter with hyperplasic changes	02	09	11
Adenomatous goiter	01	02	03
2. **Cystic lesions**: Simple cyst	02	12	14
Thyroglossal cyst	01	04	05
3. **Thyroiditis:**Autoimmune(Hashimotos)	-	01	01
Granulomatous	01	-	01
Sub-acute lymphocytic	01	03	04
Acute suppurative	-	02	02
	-	01	01
Others(inconclusive):			
1. Haemorrhagic	01	03	04
2. Normal follicular cells	-	03	03

According to the cytomorphology, the cases were classified into neoplastic - benign and malignant, non neoplastic and others (inconclusive) group. The commonest lesion found is colloid goiter (71.55%) with or without secondary changes. Benign tumours (6.03%) were found to be more common than malignant ones (4.31%). Out of the 8 cases of thyroiditis diagnosed on FNAC, granulomatous type was found to be the commonest (4 cases).

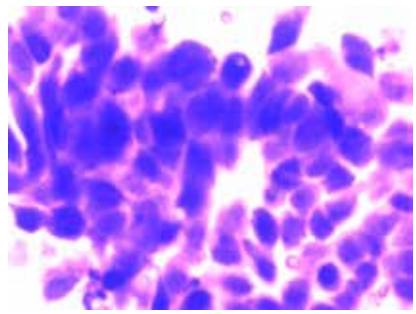
Figure 2 shows the cytomorphological spectrum of thyroid lesions



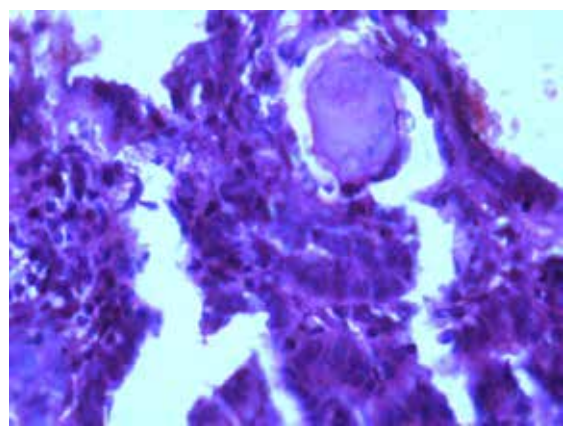
Out of the total 116 cases, 22 had undergone operative intervention. Out of the 83 cases of colloid goiter, only 14 cases were operated and were confirmed as colloid goiter on histopathological examination. One case of thyroglossal cyst was diagnosed as same on histopathological examination. Only four cases out of seven cases of follicular neoplasm were operated. One case of follicular neoplasm was diagnosed as follicular variant of papillary carcinoma on histopathological examination and the other three cases lost to follow up or may have attended a different institute. Out of the four 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.



Photomicrograph 1 shows FNAC from colloid goiter.MGG stain (Low power view).



Photomicrograph 2 showing FNAC from papillary carcinoma thyroid. MGG stain (high power view).



Photomicrograph showing HPE from papillary carcinoma thyroid. H&E stain (high power view)

Discussion:

Today FNAC is practiced worldwide [7]. The scope of FNAC in selecting cases that require surgery and in providing a preoperative morphological diagnosis has gone a long way in obviating unnecessary surgeries as well as in planning proper surgical and other treatment protocols [8]. The sensitivity and diagnostic accuracy of thyroid surgery has been shown to be as high as 85-95% in experienced hands [9, 10]. Positive predictive value of 89-98%, negative predictive value of 94-99%, [11, 12] and false negative rates as low as 5-10% [13] 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. [14]

7 (0.63%) cases were inconclusive and were included in a separate group. Comparable experiences have been reported by others. [15]

Table 3 shows the comparison of Non-neoplastic and neoplastic lesions with other studies.

Study	Non neoplastic	Neoplastic	Ratio
Silverman JF *et al* (1986) [16]	193	80	2.41:1
Godinho-Matos L *et al* (1992) [17]	109	22	4.91:1
Uma H *et al* (2008)[18]	381	31	12.29:1
Sengupta *et al* (2011) [19]	148	30	4.93:1
Akhila Sekhar *et al* (2015) [20]	118	31	3.80:1
Sathiyamurthy *et al.*(2014)[6]	100	10	10:1
Our study	97	12	8.08:1

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 in 8.08:1 which is well within this range and is similar to the study by Sathiyamurthy *et al.*(2014)[6] The abundance of female cases (85.34%) in our study was also consistent with other reports. [21]

Table 4 shows the comparision of age range and mean age with other studies.

Authors	Age range (years)	Mean age (years)
Silverman *et al.* (1986)[16]	16-79	44.8
Arvinthan *et al.* (2007)[22]	26-59	46
Gupta *et al.* (2010)[23]	22-58	38.9
Sathiyamurthy *et al.*(2014)[6]	10-76	36.5
Our study	6-75	48.98

In all the above studies the mean age ranged from 36.5 to 48.98 and our study is most comparable with the study by Arvinthan et al (2007) [22].

The commonest lesion found in this study is colloid goiter (71.55%) with or without secondary changes. This is comparable to most other studies by Silverman *et al.* (1986) [16], Gupta *et al.* [23] (2010), Sathiyamurthy *et al.* (2014) [6]

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. [18] In our study too, only 18.96% of cases came for surgical intervention and remaining cases were lost to follow up.

Conclusion:

Fine needle aspiration cytology is a cost effective procedure that provides specific diagnosis rapidly with minimum complications. Based on the cytology findings, patients can be followed in cases of benign diagnosis and subjected to surgery in cases of malignant diagnosis thereby decreasing the rate of unnecessary surgery. Different imaging techniques are now used for preoperative diagnosis of thyroid nodules like radionuclide scanning, high-resolution ultrasonogrphy etc. 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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