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Original Article

Cytological Patterns of Thyroid Lesions: A One-Year Prospective Study in a Tertiary Centre

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ABSTRACT

Background: *Thyroid lesions are formed with different cytological patterns due to diseased thyroid gland. These are classified as non-neoplastic or neoplastic. Goitre, thyroiditis, hyperplastic nodules, simple cyst and thyroglossal cyst are forms of non-neoplastic lesions, while follicular neoplasm, papillary, medullary and anaplastic carcinomas are forms of neoplastic lesions. Thyroid lesions present as either nodules or enlargement of the gland itself.*

Objective: *The study was conducted to identify the various cytological patterns of thyroid lesions by FNAC.*

Materials and Methods: *The prospective, one-year study was conducted on 140 patients of palpable thyroid lesions in the Department of Pathology, Government Medical College, Jammu. Cases of non-palpable thyroid lesions requiring image guided FNA were excluded from the study. Cytological diagnosis of the thyroid lesions were done and recorded after proper cytomorphological evaluation of the smears and clinical findings. The cytological results were categorised into two groups: non-neoplastic and neoplastic.*

Results: *Most of the patients were in their 3rd (42; 30%) decade of life. Mean age of the patients was 38.17 years. Females dominated the males with a ratio of 5.36:1. A total of 89.29% thyroid lesions were non-neoplastic and 10.71% neoplastic. Colloid goiter was the most frequent non-neoplastic thyroid lesion observed in 51.43% patients, followed by lymphocytic thyroiditis in 28.57% patients. Neoplastic lesions included follicular neoplasm and papillary carcinoma thyroid observed in 4.29% patients each, followed by anaplastic carcinoma thyroid in 1.42% patients and medullary carcinoma thyroid in 0.71% patient. Both, non-neoplastic and neoplastic lesions, were predominant in female patients.*

Conclusion: *For the management of thyroid lesions FNAC is an important tool management. It is simple, cost-effective technique without any major complications and can be used as a safe outpatient procedure with minimal discomfort to the patient. Cytological diagnosis can decrease the rate of unnecessary thyroid surgeries, however limitations of FNAC in interpretation of follicular neoplasm should be fully understood beforehand.*

Keywords: *Palpable thyroid lesions, Non-neoplastic, Neoplastic, Cytological patterns, Carcinomas.*

INTRODUCTION

Thyroid gland is unique among endocrine organs. It is the first gland to develop in foetal life and the largest endocrine gland in our body. Thyroid enlargement is a common occurrence in most regions of the world. India has the world's biggest goiter belt in the sub-Himalayan region including the state of Jammu and Kashmir. Thyroid diseases are not uncommon in our environment of study and being a referral hospital in Jammu Division, patients are referred for further management.

Diseases of thyroid gland result in formation of thyroid lesions with different cytological patterns [1]. These lesions are characterized as either non-neoplastic or neoplastic. The non-neoplastic lesions of thyroid gland include – goitre, thyroiditis, hyperplastic nodule, simple cyst and thyroglossal cyst. Neoplastic lesions include – follicular neoplasm, papillary carcinoma, medullary carcinoma and anaplastic carcinoma. Clinical presentation of most of the thyroid lesions is in the form of swellings, either as nodules or a diffuse enlargement of the gland itself. Thyroid nodules are common presentation with an annual incidence of 4% in a general population, majority being benign in its clinical form [2].

Cytology plays an important role in thyroid swellings for preoperative/pretreatment diagnosis of benign and malignant lesions. Array of tests are available for evaluation of thyroid nodules, fine needle aspiration cytology (FNAC) being the gold standard diagnostic test [1].

The primary objective of FNAC of the thyroid lesions is to differentiate those patients who require surgeries for neoplastic thyroid disorders from those who can be clinically followed or medically treated for functional or inflammatory abnormalities [3,4]. However, studies suggest that the use of FNA biopsy has reduced the numbers of thyroidectomies whereas the proportion of carcinomas in the surgically treated population has increased significantly [5].

This study was conducted to identify the various cytological patterns of thyroid lesions by FNAC.

MATERIALS AND METHODS

The present prospective study was carried out on 140 patients of palpable thyroid lesions presented as thyroid swellings for FNAC analysis during one-year period in the cytopathology section of Department of Pathology, Government Medical College and Associated Hospitals, Jammu. Inclusion criteria included all the OPD patients and patients admitted to the hospital with thyroid nodules or swellings (diagnosed by palpation) irrespective of consistency, size of lesions, age and sex of the patients. Cases of non-palpable thyroid lesions requiring image guided FNA and patients not willing to participate were excluded from the study.

After obtaining informed consent from patients fulfilling inclusion criteria, detailed history was taken. Clinical examination of each case was carried out. 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. The material was obtained by using 21-23 gauge needle attached to a 10cc disposable syringe by applying mild suction. Minimum four slides smear were made, two were air dried and then fixed and remaining were immediately fixed in 95% ethyl alcohol for about 15 minutes. The slides were stained with May Grunwald Giemsa (MGG), PAP stain and Haematoxylin and Eosin (H&E) respectively and examined with light microscope. Ziehl-Neelsen staining were performed wherever required. Cytological diagnosis of the thyroid lesions were done and recorded after proper cytomorphological evaluation of the smears and clinical findings. The cytological results were categorised into two groups: non-neoplastic and neoplastic.

RESULTS

The present one-year observational prospective study was conducted on 140 patients of palpable thyroid lesions referred to the Department of Pathology by various clinical departments, including outpatient and indoor patients of

Government Medical College and Associated Hospitals, Jammu as well as patients referred from other hospitals.

Table 1. Age distribution of patients

Age group (in years)	Total	
	No.	%
<10	9	6.43
11 – 20	12	8.57
21 – 30	27	19.29
31 – 40	42	30.00
41 – 50	20	14.29
51 – 60	16	11.43
61 – 70	9	6.43
71 – 80	2	1.43
>81	3	2.14
Total	140	100.00

Most of the patients were in their 3rd (42; 30%) decade of life. Mean age of the patients was 38.17 years with a range of 2 to 90 years, median age being 37.5 years.

Table 2. Sex distribution of patients

Sex	Total	
	No.	%
Male	22	15.71
Female	118	84.29
Total	140	100.00

The study observed female (118; 84.29%) preponderance over male (22; 15.71% patients, with female to male ratio of 5.36:1.

Table 3. Nature of thyroid lesions

Nature of thyroid lesions	Total	
	No.	%
Non-neoplastic	125	89.29
Neoplastic	15	10.71
Total	140	100.00

A total of 125 (89.29%) thyroid lesions were non-neoplastic, while only 15 (10.71%) thyroid lesions were neoplastic in nature.

Table 4. Frequency of thyroid lesions

Thyroid lesions		Total	
		No.	%
Non-neoplastic	Colloid goiter	72	51.43
	Lymphocytic thyroiditis	40	28.57
	Thyroglossal cyst	7	5.00
	Colloid cyst	4	2.86
	Subacute thyroiditis	2	1.43
Neoplastic	Follicular neoplasm	6	4.29
	Papillary CA thyroid	6	4.29
	Anaplastic CA thyroid	2	1.42
	Medullary CA thyroid	1	0.71
Total		140	100.00

Colloid goiter was the most frequent non-neoplastic thyroid lesion observed in 72 (51.43%) patients, followed by lymphocytic thyroiditis in 40 (28.57%) patients, thyroglossal cyst in 7 (5%) patients, colloid cyst in 4 (2.86%) and subacute thyroiditis in 2 (1.43%) patients.

Follicular neoplasm and papillary carcinoma thyroid was observed in 6 (4.29%) patients each, followed by anaplastic carcinoma thyroid in 2 (1.42%) patients and medullary carcinoma thyroid in 1 (0.71%) patient. These all were neoplastic thyroid lesions.

Non-neoplastic thyroid lesions were predominant in females (105; 84%) and most of them were observed in the age group of 31-40 years. Neoplastic thyroid lesions were again found to be more common in females (13; 86.67%) than males (2; 13.33%) and most of them were observed in the age group of 21-30 years.

DISCUSSION

Thyroid disorders vary in terms of their presentation and characteristics. Thyroid swellings/nodules demand a sequence of investigations to rule out the possibility of a neoplasm or thyroiditis [6]. Fine needle aspiration cytology (FNAC) is an important tool for the cytological assessment of patients with superficial as well as deep seated lesions.

The present study was conducted on 140 cases of palpable thyroid lesions referred to the Department of Pathology by various clinical departments including outpatient and indoor patients of Government Medical College and Associated Hospitals, as well as patients referred from other hospitals.

In the study, most of the patients were in their third decade of life (42; 30%). Mean age of the patients was 38.17 years with a range of 2 to 90 years, median age being 37.5 years. Female patients (118; 84.29%) dominated the study with female to male ratio of 5.36:1 *i.e.*, females were five times more vulnerable of developing thyroid lesions as compared to males.

Jain *et al.* [7] also reported similar findings. In their study of 110 patients with thyroid nodules, mean age of the patients was 38 years and majority of them were in the age group of 31-40 years. Female patients comprised 83.6% with female to male ratio of 5.1:1. Tayde *et al.* [8] evaluated cytological diagnosis of thyroid lesions in 123 patients, out of which 101 (82.12%) were females and 22 (17.88%) were males with female to male ratio of 4.6:1. The majority of patients presenting with thyroid swelling were in third decade of life. Incidence was low in children and old people. These results are in consonance with our study. Tauro *et al.* (6) also reported similar findings.

In the present study, 125 (89.29%) of thyroid lesions were non-neoplastic, comprising of 72 (51.43%) colloid goiter, 40 (28.57%) lymphocytic thyroiditis, 7 (5%) thyroglossal cyst, 4 (2.86%) colloid cyst and 2 (1.43%) subacute thyroiditis cases. A total of 105 (84%) female and 20 (16%) male patients were observed with non-neoplastic thyroid lesions. Most of the female patients either had colloid goiter (63; 50.40%) or thyrioditis (38; 30.40%)

Neoplastic lesions were diagnosed in 15 (10.71%) cases, comprising of follicular neoplasm and papillary carcinoma thyroid in 6 (4.29%) cases each, anaplastic carcinoma thyroid in 2 (1.42%) cases and medullary carcinoma thyroid in 1 (0.71%) case. A total of 13 (86.67%) female and 2 (13.33%) male patients were observed with neoplastic thyroid lesions. Follicular neoplasm and papillary carcinoma thyroid were observed in only females (6; 40% each), anaplastic carcinoma thyroid lesion 1 (6.67%) each in male and female, and medullary carcinoma in 1 (6.67%) male patient.

These results were comparable with the studies by Mahajan and Sharma [9], Pandey *et al.* [10] and Patel *et al.* [11].

The present study also analyzed non-neoplastic and neoplastic lesions according to age group. Most of the non-neoplastic thyroid lesions 39 (31.20%) were observed in the age group of 31-40 years, comprising 20 (16%) colloid goiters, 17 (13.60%) thyroiditis and 1 (0.80%) each colloid cyst and thyroglossal cyst. This was followed by 23(18.40%) thyroid lesions in the age group of 21-30 years, comprising 12 (9.60%) colloid goiters, and 11 (8.80%) thyroiditis. There were 18 (14.40%), 16 (12.80%), 10 (8%), 8 (6.40%), 7 (5.60%) non-neoplastic thyroid lesions in the age group 41-50, 51-60, 11-20, <10 and 61-70 years respectively. Moreover, 2 (1.60%) each were observed in age groups 71-80 and >81 years.

Most of the neoplastic thyroid lesions 4 (26.67%) were observed in the age group of 21-30 years, comprising of 3 (20%) follicular neoplasms and 1 (6.67%) papillary carcinoma thyroid. This was followed by 3 (20%) thyroid lesions in the age group of 31-40 years, comprising 2 (13.33%) papillary carcinoma thyroids and 1 (6.67%) follicular neoplasm. Two (13.33%) each neoplastic thyroid lesions were observed in age groups 11-20, 41-50 and 61-70 years respectively. One (6.67%) each thyroid lesion was observed in age groups <10 and >81 years. No neoplastic thyroid lesions were observed in age groups 51-60 and 71-80 years.

Mary and Rathinaswamy [12] studied 99 cases, out of which 58.8% of the cases were benign lesions, whereas malignancies accounted for 41.2% of the cases. Thyroid swelling and benign lesions were more common in the 21 to 30 years age group, whereas malignancies were more common in the age group of 31 to 40 years. However, these results are not comparabe with our study.

LIMITATIONS

The major limitation of FNAC is its insensitivity in correctly diagnosing malignant follicular lesions. In addition, a proportion of cases could not be evaluated because of paucity of material [13].

CONCLUSION

FNAC is an invaluable tool in management of thyroid lesions. It is simple, safe and cost effective technique without any major complications and can be used as a safe outpatient procedure with

minimal discomfort to the patient. Based on the cytological diagnosis of the thyroid lesions, patients with thyroid lesions may be subjected to surgeries or medical treatments and can decrease the rate of unnecessary thyroid surgeries. The limitations of FNAC should be fully realised especially in interpretation of follicular neoplasms.

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