

Study on Clinical Evaluation of Solitary Thyroid Nodule and its Correlation with Cytology and Histopathology

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Abstract

Aim of the Study: To evaluate solitary thyroid nodules clinically, to study the role of FNAC in these lesions, and to correlate clinical findings with cytology and histopathology. *Materials and Methods:* This was a prospective study done over a period of two years, in the department of General Surgery, Kakatiya Medical College, MGM Hospital, Warangal, Telangana. A total of 110 patients were included in the study. Clinical examination, cytology and histopathology findings were correlated. *Results:* Age of the patients ranged from 11 to 68 years and the male to female ratio was 1:2.6. Majority of cases were seen in the fourth decade. After comparison of results of FNAC with histopathology, FNAC showed overall diagnostic accuracy of 89.8% with specificity of 100%, sensitivity of 50% for malignant lesions, positive predictive value of 100% for malignancy and negative predictive value of 88.7%. *Conclusion:* Solitary thyroid nodules are more common in the fourth decade of life and have a female preponderance. Fine needle aspiration cytology of these lesions has a good overall diagnostic accuracy of almost 90% but is less sensitive in detecting malignant lesions. FNAC is a very useful procedure for assessment of solitary thyroid nodules especially in conjunction with complete clinical evaluation whenever a malignancy is suspected.

Keywords: Solitary Thyroid Nodule; Cytology;

Histopathology; Goitre; Follicular Neoplasm.

Introduction

The thyroid is an important endocrine gland that can be affected by various inflammatory, non-neoplastic and neoplastic diseases. An enlarged thyroid often presents as a diagnostic enigma for the clinician as it can have a malignant or benign etiology to it [1].

The incidence of malignancy in multinodular goitre is very low and is around 0.5% and it is slightly higher in solitary nodular goiter, around 2% [2]. A solitary thyroid nodule is defined as a palpable swelling in thyroid gland that has otherwise a normal appearance [3].

Most of the thyroid nodules are asymptomatic and only about 5% of all palpable nodules are found to be malignant [4].

Solitary thyroid nodule is defined as a discrete mass which is palpable in the thyroid gland. Many lesions of thyroid gland have solitary thyroid nodule (STN) presentation clinically. More often than not the thyroid nodules which are detected clinically as solitary nodules are actually hyperplastic nodules occurring in multinodular goitres [5].

Studies related to STN have shown that it is common in women, while the incidence of malignancy is more in men [6,7]. Fine needle aspiration cytology is a well-established technique for preoperative investigation of thyroid nodules. The technique is a simple, rapid, cost-effective, and efficient method of differentiating benign and malignant thyroid nodules in many cases [8-10]. Many investigators have shown that fine needle

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aspiration cytology is the single most sensitive, specific, and cost-effective method in the investigation of solitary thyroid nodules [11,12].

Even though FNAC is a good technique it has a major drawback of not being able to differentiate between follicular adenoma and follicular carcinoma. This differentiation is possible only on histopathology [13,14].

Aim of the Study

To evaluate solitary thyroid nodules clinically, to study the role of FNAC in these lesions and to correlate clinical findings with cytology and histopathology.

Materials and Methods

This was a prospective study done over a period of two years, from April 2015 to May 2017, in the department of General Surgery, Kakatiya Medical College, MGM Hospital, Warangal, Telangana. Ethical committee permission was taken. Informed consent of all patients included in the study was taken. A total of 110 patients were included in the study.

A thorough clinical evaluation was done which included patient demography, presenting complaints with duration, personal and family history, followed by complete general and local examination. The characteristics of the thyroid nodule were examined. All patients were advised for routine investigations like hemogram, thyroid function tests, ultrasonography of thyroid and also of neck region for any possible lymph nodes, fine needle aspiration cytology (FNAC) and histopathological examination.

FNAC was done by concerned pathologist under all aseptic conditions. Disposable 5cc syringes and disposable 23 or 24 gauge needles were used for the procedure. The material was collected with or without aspiration technique. In cases of thin colloid or fluid aspiration, it was collected in syringes, transferred to test tubes, centrifuged and smears were prepared from the sediment. After procedure, firm pressure was applied for a few minutes at the aspiration site to stop any oozing. In all cases, the smears were fixed in ethyl alcohol-95% alcohol solution, and staining was performed using routine stains of hematoxylin and eosin and Papanicolau's staining.

All the 110 cases were later admitted in the department of General surgery and were taken for appropriate surgical procedures of lobectomy/ thyroidectomy (hemi/subtotal thyroidectomy).

The surgical specimens were sent to department of pathology for histopathological examination. Specimens were sampled adequately and processed in automated tissue processor. The sections were cut at five microns and stained with routine haematoxylin and eosin stains. The sections were then examined under light microscope for histopathology.

The cytology reports were compared with the histopathological diagnoses and histopathology was taken as the gold standard.

Correlation of histopathological findings was performed with FNAC. Sensitivity, specificity, accuracy, positive predictive value, and negative predictive value were calculated.

Inclusion Criteria

1. Both genders and all ages of patients with solitary thyroid nodule detected clinically.
2. Ultrasound guided aspirates of solitary thyroid nodules were also included.
3. Patients in whom all three modalities of examination ie, clinical, cytological and histopathological were available.

Exclusion Criteria

1. Patients with diffuse thyroid swellings.
2. Already known cases of thyroid malignancy on follow up.
2. Patients who underwent clinical evaluation at our centre but had subsequent surgery and histopathology examination at other hospitals.

Results

A total of 110 patients with solitary thyroid nodule were studied. Age of the patients ranged from 11 years to 68 years. The majority of the patients 54.5% belonged to 31-40 years.

Gender-Wise Distribution

There were 80 (72.7%) females and 30 (27.2%) male patients. The male to female ratio was 1:2.6

Site of Lesion

The right and left lobe was involved in 70 (63.6%) and 30 (27.2%) cases respectively. There were 10 (9%) cases that had solitary nodule in the isthmus region.

Clinical Presentation-Wise Distribution

All the patients presented with swelling in the

thyroid with additional symptoms of discomfort or pain. Thyroid swelling only as the clinical presentation was seen in 80 (72.7%) cases. Thyroid swelling with discomfort was seen in 28 (25.4%) cases and painful thyroid swelling was the main symptom in 2 (1.8%) cases. On examination, these two cases had large, firm to hard solitary swelling with fixity to overlying skin and underlying muscles. Both the painful swellings were diagnosed on pathology to be anaplastic carcinoma of thyroid. Two cases had

enlarged multiple cervical lymph nodes along with solitary thyroid nodule. None of our patients gave history of any thyroid disease in other family members.

Duration of Symptoms

Duration of complaints ranged from less than 1 year to more than 3 years and majority of the patients had symptoms for one to three years. Duration of symptoms was less than 1 year in 30 (27.2%) cases, and it was between 1 to 3 years in 60 (54.5%) cases

Table 1: Age-wise distribution of patients

Age in Years	No. of Cases	Percent (%)
10-20	05	4.5 %
21-30	13	11.8 %
31-40	60	54.5 %
41-50	20	18.1 %
51-60	10	9.0 %
60-70	02	1.8 %
Total	110	100 %

Table 2: Cytology and histopathology findings

Pathology Findings	FNAC findings		Histopathology findings	
	No. of Cases	Percent (%)	No. of cases	Percent (%)
Colloid goitre	6	5.4%	6	5.4 %
Nodular goitre	22	20%	17	15.4 %
Hashimoto's thyroiditis	8	7.2%	8	7.2 %
Follicular neoplasm	66	60%	-	-
Follicular adenoma	-	-	67	60.9 %
Follicular carcinoma	-	-	4	3.6 %
Papillary carcinoma	4	3.6%	4	3.6 %
Medullary carcinoma	2	1.8%	2	1.8 %
Anaplastic carcinoma	2	1.8%	2	1.8 %
Total	110	100 %	110	100 %

Table 3: Correlation between cytology and histopathology

FNAC Findings	No. of Cases	Histopathology findings	No. of cases	Remarks
Colloid goitre	6	Colloid goitre	6	True negatives
Nodular goitre	22	Nodular goitre	17	True negatives
		Follicular adenoma	4	False negatives
		Follicular carcinoma	1	False negatives
Hashimoto's thyroiditis	8	Hashimoto's thyroiditis	8	True negatives
Follicular neoplasm	66	Follicular adenoma	63	True negatives
		Follicular carcinoma	3	False negatives
Papillary carcinoma	4	Papillary carcinoma	4	True positives
Medullary carcinoma	2	Medullary carcinoma	2	True positives
Anaplastic carcinoma	2	Anaplastic carcinoma	2	True positives

and for more than 3 years in 20 (18.1%) cases.

After comparison of results of FNAC with histopathology, FNAC showed overall diagnostic accuracy of 89.8% with specificity of 100%, sensitivity of 50% for malignant lesions, positive predictive value of 100% for malignancy and negative predictive value

of 88.7% in our study.

Discussion

In the present study a total of 110 patients with

solitary thyroid nodule were studied.

Age Distribution: Age of the patients ranged from 11- 68 years. The majority of patients, 54.5%, belonged to fourth decade followed by 18.1% cases among 41- 50 years. Least commonly affected age group was above 60 years.

Gupta et al [15] studied a total of 75 patients with solitary thyroid nodule with patient age ranging from 22 to 58 years. In their study also the fourth decade was commonly affected and the mean age was 38.7

years. Hossain et al [16] studied 30 patients with solitary thyroid nodule with patient age ranging from 22 to 58 years and with a mean age of 38.7 years. In their study also higher age group ie above 50 years, only 10% patients were encountered. Keshri et al, [17] Venkatachalapathy et al [18] and Sudarshan Babu et al [19] also observed the fourth decade to be most common for thyroid pathology.

Gender Distribution: In the present study, majority (72.7%) were females as compared to males (27.2%)

Table 4: Comparative studies on FNAC findings

FNAC findings	Gupta et al ^[15]	Hossain et al ^[16]	Keshri et al ^[17]	Present study
Colloid goitre	45	16	-	6
Colloid cyst / colloid nodule	-	3	25	-
Benign cystic lesion	-	-	13	-
Nodular goitre	-	1	16	22
Chronic lymphocytic thyroiditis	-	-	4	-
Granulomatous thyroiditis	-	-	-	-
Hashimoto's thyroiditis	-	-	-	8
Follicular neoplasm	12	-	18	66
Hurthle cell neoplasm	6	-	-	-
Papillary carcinoma	9	4	8	4
Medullary carcinoma	-	-	3	2
Poorly differentiated carcinoma	-	2	-	-
Anaplastic carcinoma	-	-	1	2
Suspected malignancy	3	4	6	-
Inadequate aspirate	-	-	6	-
Total	75	30	100	110

Table 5: Comparative studies on histopathology findings

Histopathology Findings	Gupta et al ^[15]	Hossain et al ^[16]	Keshri et al ^[17]	Present study
Colloid goitre	42	16	-	6
Colloid nodule	-	-	24	-
Hyperplastic nodule	-	-	2	-
Benign cyst	-	-	10	-
Nodular goitre	-	-	8	17
Chronic lymphocytic thyroiditis	-	-	4	-
Granulomatous thyroiditis	-	1	-	-
Hashimoto's thyroiditis	3	-	-	8
Follicular adenoma	12	1	31	67
Hurthle cell adenoma	3	-	-	-
Hurthle cell carcinoma	3	-	-	-
Follicular carcinoma	-	2	4	4
Papillary carcinoma	12	8	13	4
Medullary carcinoma	-	-	3	2
Poorly differentiated carcinoma	-	2	-	2
Anaplastic carcinoma	-	-	1	-
Total	75	30	100	110

Table 6: Comparative studies for sensitivity and specificity of cytology

Study	Sensitivity	Specificity	Accuracy	Positive Predictive value	Negative Predictive value
Gupta Et Al ^[15]	80%	86.6%	84%	80%	86.6%
Hossain Et Al ^[16]	75.0%	94.0%	86.6%	90%	80%
Present Study	50%	100%	89.7%	100%	88.7%

and the male to female ratio was 1:2.6.

Gupta et al, [15] Hossain et al [16] and Venkatachalapathy [18] also observed a female preponderance in their studies with 92%, 70% and 69% female patients respectively. In the studies by Keshri et al [17] and Sudarshan Babu et al [19] also there was definite female predominance with the male to female ratio being 1: 2.3 and 1:7.3. Our findings compare well with the above authors.

Duration of Symptoms: In the present study, duration of complaints ranged from less than 1 year to more than 3 years and majority of the patients presented with a history of complaints between 1 to 3 years. All the patients presented with swelling in the neck, with or without associated discomfort or pain. There was no significant family history of thyroid disease in any of our patients.

In the study by Keshri et al [17] the duration of complaints ranged from 15 days to 10 years. Majority of the patients (76%) presented between >6 months to 3 years of onset of swelling. None of the patients had significant past or family history.

In the study by Gupta et al [15] also the commonest presentation was of neck swelling in 80% of the patients. Duration of complaints ranged from six days to twenty years and mean duration was 1.7 years. In the study by Venkatachalapathy et al [18] also all the patients presented with swelling in the neck and some also had pain in the swelling. Duration of complaints ranged from 1 week to 8 years and majority of the patients presented between 6 months to 3 years. None of the patients had any significant family history.

Sudarshan Babu et al [19] also reported the most common presentation to be swelling in front of the neck which moved with deglutition (seen in all 50 patients, 100%). Pain in the neck and dry cough were present in 4% each of their cases.

Site of Lesion: In the present study, right lobe was involved in 63.6% cases and left lobe in 27.2% cases. Hossain et al [16] in their study observed left lobe to be involved more (53.3%), than right lobe (36.6%) and isthmus was least involved (10%). In Sudarshan Babu et al [19] study the right lobe was involved more commonly (80%) compared to left lobe (20%).

Conclusion

Solitary thyroid nodules are more common in the fourth decade of life and have a female preponderance. Fine needle aspiration cytology of

solitary thyroid nodules has a good overall diagnostic accuracy of almost 90% but is less sensitive in detecting malignant lesions. FNAC is a very useful procedure for assessment of solitary thyroid nodules especially in conjunction with complete clinical evaluation whenever a malignancy is suspected.

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