

Role of clinicopathological and Radiological study in the evaluation of thyroid swelling

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Abstract

Introduction: Thyroid disease is the most common endocrine disorder. Thyroid swelling is the most common sign and the most common cause of thyroid swelling is iodine deficiency. Thyroid swelling can be benign or malignant. Due to common use of ultrasonography in the clinical practice the incidence of thyroid nodule has increased to 14-50%. However, less than 5% are actually malignant.

Objective: The aim of this study was to evaluate thyroid nodule based on clinicopathological and radiological examination.

Methods: A prospective, observational study done on 70 patients with thyroid swelling from March 2022 to February 2023 in the Department of Otorhinolaryngology and Head and Neck Surgery Government Medical College Anantnag Kashmir. A complete clinical, radiological, cytological and histopathological examination was done on all patients.

Results: In our study of 70 patients, the maximum number was in the age group of 31-40 years (36%) with female preponderance. Ultrasound revealed that non-neoplastic lesions were present in 62 (88.55%) and neoplastic lesions were present in 8 (11.45%) patients and the commonest ultrasound scoring was TIRADS-2 (thyroid imaging reporting and data system). Fine needle aspiration cytology (FNAC) revealed non-neoplastic lesions in 56 (80%) patients and neoplastic lesions in 14 (20%) patients. On histopathological examination non-neoplastic lesions were found in 54 (77.14%) and neoplastic lesions were found in 16 (22.86%) patients.

Conclusion: Thyroid swelling was the most common during third and fourth decade with female predominance. The commonest clinical presentation was colloid nodule (60%) and the ultrasound scoring was TIRADS-2. Diagnostic accuracy of FNAC was 87.15%. Since none of the investigations were confirmatory, it was concluded that histopathological examination (HPE) is the gold standard.

Keywords: colloid nodule, ultrasonography, HPE, papillary carcinoma

Introduction:

Thyroid gland diseases are common and affect a large portion of general population. Thyroid disease is the most common endocrine disorder. In India about 170 million people suffer from thyroid disease [1]. Most common cause of thyroid swelling is deficiency of iodine [2]. Thyroid is troubled by various developmental, inflammatory and neoplastic disorders [3]. Thyroid swelling can be benign or malignant. Some swellings grow extremely slow such as multinodular goitre, solitary goitre, papillary and follicular carcinoma and some grow faster like anaplastic carcinoma. Among all thyroid carcinomas papillary carcinoma is the most common accounting for 81%, followed by follicular carcinoma, medullary carcinoma, anaplastic carcinoma and lymphoma with incidence of 10%, 5%, 3% and 1% respectively [4]. Both benign and malignant lesions of thyroid commonly present with a nodule. Various forms of thyroid cancer are relatively common and amenable to be detected by physical examination. Prevalence of thyroid nodule ranges from 0.2% to 1.2% in children and from 4-10% in general adult population [5]. Due to common use of ultrasonography in the clinical practice the incidence of thyroid nodule has increased to 14-50% [6]. However, less than 5% are actually malignant [7,8]. Any thyroid swelling must be investigated to rule out neoplasm. Ultrasound (USG) guided fine needle aspiration cytology (FNAC) is the first line investigation for evaluation of thyroid swelling. Ultrasound of thyroid gland is as important as FNAC for evaluation of any thyroid swelling which may be benign, malignant or inflammatory. USG is the noninvasive, easily available, cost effective investigation for the evaluation of thyroid swelling. It can differentiate benign nodule from malignant nodule on the basis of hypoechogenicity, microcalcification, irregular margins, central hypervascularity, incomplete halo, and taller than wider. Ultrasound finding of thyroid is based on TIRADS (Thyroid Imaging Reporting and Data System) [9,10]:

TIRADS 1: normal thyroid gland

TIRADS 2: benign lesion (0% risk of malignancy).

Avascular anechoic lesion with echogenic specks (colloid type I). Vascular hetero-echoic non-expansile, non-encapsulated nodules with peripheral halo (colloid type II). Iso-echoic or hetero-echoic, non-encapsulated, expansile vascular nodules (colloid type III)

TIRADS 3: probably benign lesions (<5% risk of malignancy)

None of the suspicious malignant sonographic features. These lesions are mostly benign with <5% risk of malignancy.

TIRADS 4: suspicious lesion (5% to 80% risk of malignancy)

Solid nodule with marked stiffness on elastography; markedly hypoechoic nodule; micro-lobulations or irregular margins; microcalcifications; taller than wider

TIRADS 4a: one suspicious feature (5-10% risk of malignancy)

TIRADS 4b: two suspicious feature (10-80% risk of malignancy)

TIRADS 4c: three/four suspicious feature (10-80% risk of malignancy)

TIRADS 5: probably malignant lesions (>80% risk of malignancy)

All five suspicious features (>80% risk of malignancy)

TIRADS 6: biopsy proven malignancy.

The aim of this study was to evaluate thyroid swelling using clinicopathological and radiological examination.

Materials and Methods:

A prospective, observational study done on 70 patients who presented with thyroid swelling from March 2022 to February 2023 in the Department of Otorhinolaryngology and Head and Neck Surgery, Government Medical College Anantnag Kashmir. Pregnant females and other midline and lateral neck swellings were excluded from the study. The study was conducted in accordance with the principles of Helsinki Declaration 1975. A detailed history, general physical, systemic examination and local examination were done on all patients. All the patients were subjected to thyroid function tests, FNAC and USG neck. In the preoperative period indirect laryngoscopy was done for the assessment of vocal cord function and informed consent was taken from the patients about the risk of operation and post-operative complications. All the patients underwent thyroidectomy and histo-pathological examination of the specimen.

Results:

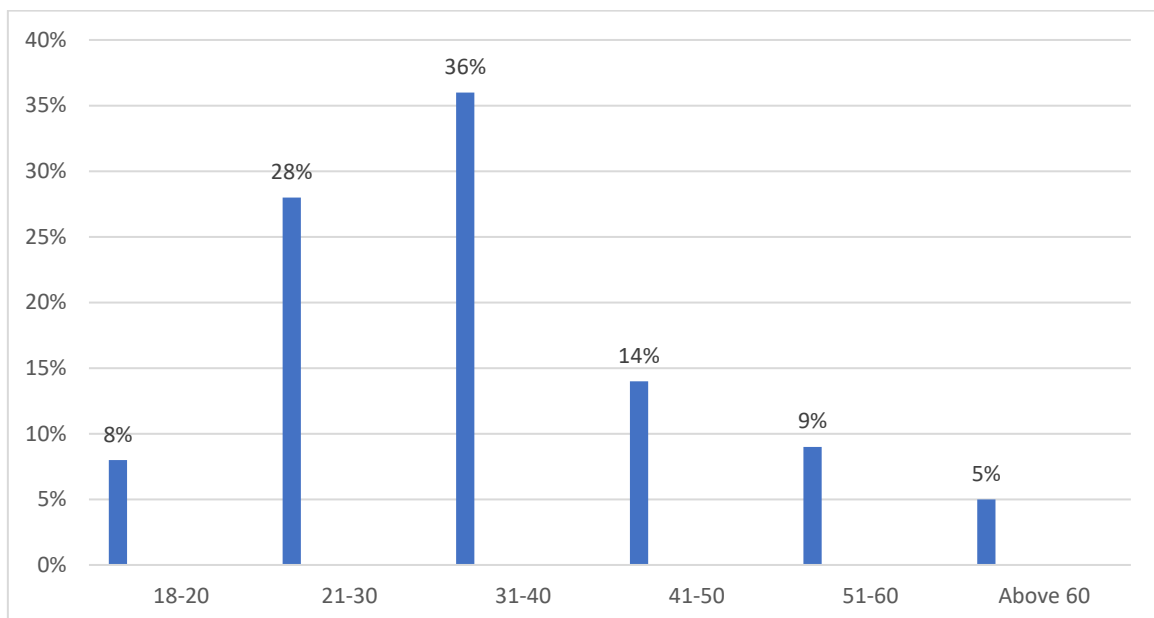


Figure 1 Age distribution

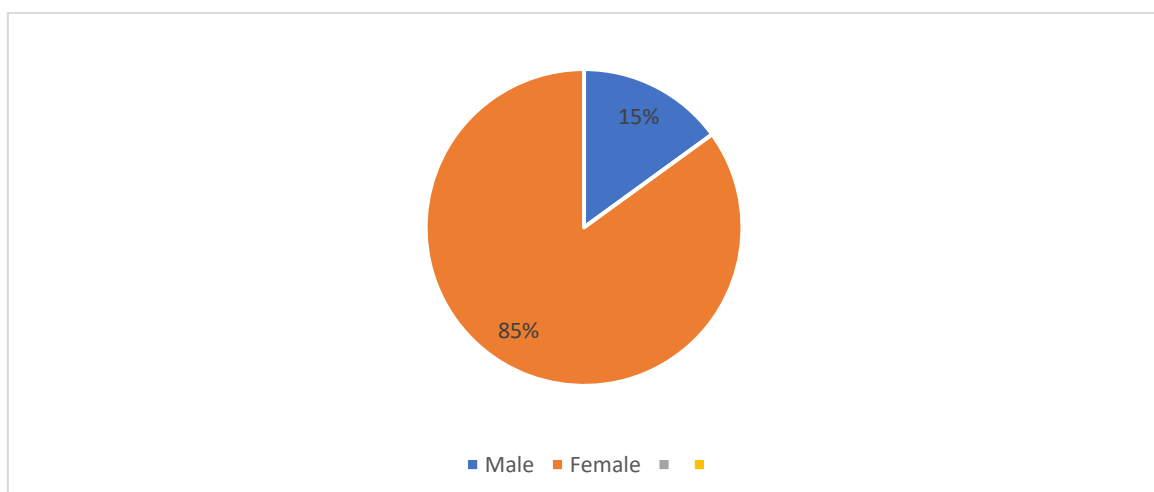


Figure 2 Gender distribution

Table 1 Duration of thyroid swelling

Duration	No. of patients	Percentage
<1 year	50	71.4
1-5 years	15	21.4
5-10 years	5	7.2
Total	70	100

Table 2 Ultrasound Neck

Ultrasound neck	No. of patients	Percentage
Non neoplastic	62	88.55
Adenomatous colloid nodule	42	60
Multi-nodular goitre	18	25.7
Follicular adenoma	2	2.85
Neoplastic	8	11.45
Heterogenous hypoechoic lesion	3	4.3
Suspicious for malignancy	2	2.85
Lobulated lesion	3	4.3
Total	70	100

Table 3 TIRADS (N=70)

Classification	TIRADS Category	No. of patients	Percentage
Normal thyroid	TIRADS-1	0	0.0
Benign	TIRADS-2	52	74.28
Probably benign	TIRADS-3	10	14.28
Suspicious malignant	TIRADS-4a	2	2.85
	TIRADS-4b	3	4.3
Probably malignant	TIRADS-5	3	4.3
Biopsy proven malignant	TIRADS-6	0	0

Fine needle aspiration cytology was done in all patients out of which non-neoplastic lesions were present in 56 (80%) patients and neoplastic lesions were present in 14 (20%). Non neoplastic lesions were further divided into adenomatous goiter, Hashimoto and lymphocytic thyroiditis, colloid goiter and colloid goiter with cystic changes which were present in 4 (5.72%) patients, 5 (8.6%) patients and 47 (67.14%) patients respectively. Neoplastic lesions were further divided into benign, malignant disease, and suspicious for malignancy which were present in 4 (5.72%), 7 (10%) and 3 (4.28%) patients respectively. Out of the 4 patients with benign disease, 3 (4.28%) patients had atypia of undetermined origin and 1 (1.43%) patients had benign thyroid nodule. Out of the 7 patients with malignant disease, 1 (1.43%) had follicular neoplasm, 1 (1.43%) had anaplastic carcinoma, 1 (1.43%) had medullary carcinoma, 1 (1.43%) had non-Hodgkin lymphoma and 3 (4.28%) had papillary carcinoma.

All the 70 patients underwent thyroidectomy and the surgery was limited to the extent and the type of disease. The specimen was sent for histopathological examination (Table 4).

Table 4 Histopathological examination (HPE) findings (n=70)

Histopathology	No. of patients	Percentage
Non-neoplastic (n=54)		
Nodular colloid goitre	43	61.43
Multinodular goitre	9	12.86
Lymphocytic thyroiditis	2	2.85
Neoplastic (n=16)		

Benign (Follicular adenoma)	3	4.3
Malignant		
Follicular carcinoma	2	2.85
Papillary carcinoma	5	7.14
B cell lymphoma	2	2.85
Papillary carcinoma follicular variant	1	1.43
Medullary carcinoma	2	2.85
Anaplastic carcinoma	1	1.43
Total	70	100

Specificity and sensitivity of ultrasound in detecting neoplasm: Out of 70 patients, 57 patients were found to be benign on histopathology and 13 malignant. On Ultrasound from these 57 benign patients 1 was malignant. Out of 13 malignant patients on histopathology, 6 patients were benign on ultrasonography. The sensitivity of ultrasound was 87.5%, specificity was 90.3%, positive predictive value was 53.8% and negative predictive value was 98.2%.

Specificity and sensitivity of TIRADS in detecting neoplasm: Out of 70 patients with respect to TIRADS, among the 57 histopathologic ally proven benign swellings, 50 patients had benign swelling, 7 patients were found to be probably malignant, and 2 patients were suspicious for malignancy on TIRADS. In 13 histopathologic ally malignant swellings 2 patients had benign swelling, 2 patients were probably benign, 6 patients were probably malignant and 3 patients were suspicious for malignancy on TIRADS. The sensitivity of TIRADS was 56.2%, specificity was 92.5%, positive predictive value was 69.3% and negative predictive value was 87.7%.

Specificity and sensitivity of FNAC in detecting neoplasm: Out of 70 patients, 57 patients are found to be benign on histopathology and 13 are malignant. On FNAC from these 57 benign patients, 4 patients were malignant. Out of 13 malignant patients on histopathology 5 patients were benign on FNAC. The sensitivity of FNAC was 66.7%, specificity was 91.3%, positive predictive value was 61.5% and negative predictive value was 93%.



Figure 3. USG=Enlarged left lobe of thyroid with heterogenous echopattern, solid as well as cystic component (FNAC= Suspicious of follicular neoplasm, HPE=Follicular Adenoma)

Discussion:

In our study the maximum number of patients were found in the age group of 31–40 years (36%). This was in accordance with a study conducted by Santosh et al. [11], who showed maximum number of patients in 21–30 years age group (37.4%). Another study done by Kumari et al. [12] found the highest incidence in the age group of 31–40 years (44.4%). This was likely because the thyroid swellings are more common in perimenopausal women. In our study, the number of female and male patients were 85% and 15% respectively. Previous studies have also shown the disease occurring predominantly in females. A study conducted by Wani et al. [13], Rout et al. [14], Amjad et al. [15], have shown a female to male ratio of 3.1:1, 2.3:1, 6.5:1 respectively. This was due to the fact that females have higher hormonal requirement especially during puberty, lactation, and during menopause. In our study, 15 (21.4%) patients presented with neck swelling ranging from 1 to 5 years duration and 50 (71.4%) patients presented with in less than 1 year duration and the remaining 5 (7.2%) patients had neck swelling from 5 to 10 years which is similar to the study conducted by Santosh et al. [11] in which (63.3%) patients presented with neck swelling of <1 year duration. Swelling lasting between 1 and 5 years duration was seen in (26%) patients. The remaining (10%) patients had swelling from 5 to 10 years. This study is similar to Padmawar et al. [16] conducted FNAC on 57 patients with thyroid swelling, out of which 51 cases (89.47%) were benign and 6 cases (10.52%) were malignant. Hariprasad et al. [17] conducted a study on 159 patients with thyroid swelling, out of which 51 cases (73.58%) were benign and (26.42%) were malignant. Studies conducted by Papini et al. [18] and Takashima et al. [19], have also shown that the appearance of micro calcifications is highly specific for malignancy with sonographic specificity of 93% to 95%. In the present study the sensitivity and specificity of ultrasound in detecting the malignancy were 87.5% and 90.3% respectively. All the patients underwent thyroidectomy and histopathological diagnosis was obtained. Out of 70 patients, non-neoplastic and neoplastic lesions were present in 54 (77.14%) and 16 (22.85%) patients respectively. Ultrasonography in the detection of neoplastic thyroid nodules revealed sensitivity ranges from 82 to 100%, specificity from 81 to 100%, PPV from 55 to 100%, and NPV from 93 to 100%. [20,21,22], Similar results were obtained in our study.

Out of 54 (72.14%) non neoplastic lesions, 43 (61.43%) patients had nodular colloid goiter, 9 (12.86%) patients had multinodular goiter and 2 (2.85%) patients had lymphocytic thyroiditis. Our study is similar to the study done by Basharat et al. [23], in which 55.5% patients had colloid goiter on histopathology. The diagnostic accuracy of FNAC ranged from 65% to 99% [24]. In our study the sensitivity and specificity of FNAC were 66.7% and 91.3% respectively and the diagnostic accuracy was 87.15%. These data suggest that FNAC is more specific than sensitive in detecting thyroid cancer and is a reliable diagnostic test.

Conclusion:

Thyroid swelling was most commonly seen in the age group of 31-40 years with female preponderance. Colloid goiter was the most common among benign diseases and papillary carcinoma was the most common among malignant diseases and the commonest ultrasonography scoring was TIRADS-2 followed by TIRADS-3. The sensitivity, specificity and diagnostic accuracy of FNAC were 66.7%, 91.3% and 87.15% respectively, which suggests that FNAC is more specific than sensitive in detecting thyroid cancer. It has been concluded that the evaluation of thyroid swelling should be based on combined opinion of clinical examination, ultrasound neck and FNAC and histopathological examination is the gold standard.

Conflicts of interest: There are no conflicts of interest

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