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Original Research Article

A Relative Assessment of the Occurrence of various Pathological Conditions Presenting as Thyroid Swelling: A Clinicopathological Study

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Abstract

Aim: The aim of the present study was to assess the relative occurrence of various pathological conditions presenting as thyroid swelling and the clinicopathological examination of swelling.

Material & Methods: A prospective hospital-based study carried out on 100 cases of thyroid swelling attending the Department of ENT having adequate diagnostic and treatment facilities during the period of 2 years.

Results: In this study of 100 subjects, maximum patients were in the age group of 31 to 40 years (33%), followed by 41 to 50 years (24%). The youngest patient in our study was 11 years while oldest was 74 years. Mean age of presentation was 40.88 years. 75 (75%) subjects were females while 25 (25%) subjects were male. All cases presented with swelling in front of neck (100%). Associated complaints were 7 (7%) subjects of bulky thyroid swelling complained of difficulty in swallowing, 4 (4%) subjects complained pain in neck, 2 (2%) subject presented with cervical lymphadenopathy and 1 (1%) subjects with hoarseness of voice. Most of the thyroid swellings were firm in consistency 47 (47%) followed by nodular 19 (19%), cystic consistency in 13 (13%) cases and soft consistency in 9 (9%) cases. Hard swellings accounted for 12 (12%) cases, most of which turned out to be malignant. On USG, Colloid nodule was found followed by Multinodular goitre, neoplastic etiology, solitary thyroid nodule and colloid cyst. FNAC findings were colloid goitre (61%), nodular goitre (19%), follicular neoplasm (10%), papillary carcinoma (9%) and medullary carcinoma (01%). The sensitivity, specificity, positive predictive value, and negative predictive value of FNAC for diagnosis of thyroid swellings were 56.64%, 100%, 100% and 92%, respectively.

Conclusion: FNAC is an easy, rapid, reliable, cost-effective, minimally invasive and readily repeatable technique for diagnosis of thyroid swellings. The common false negative diagnosis is seen in follicular pattern cases, cystic papillary thyroid carcinoma (PTC) and papillary microcarcinoma.

Keywords: Thyroid swelling, Thyroidectomy, Papillary carcinoma, FNAC, Thyroid HPE.

Introduction

A Thyroid swelling is defined as enlarged thyroid gland. Thyroid swelling can mean that all the thyroid gland is swollen or enlarged, or one or more swellings or lumps have developed in parts or part of thyroid gland. [1] The thyroid functions as an endocrine gland and is responsible for producing thyroid hormone and calcitonin, thus contributing to the regulation of metabolism, growth, reproduction, metabolic enhancement and serum concentrations of electrolytes such as calcium. [2] The thyroid has evolved to specialize in synthesizing and secreting thyroxine (T4) and tri-iodothyronine (T3) into the circulation. The regulatory process is thyroid stimulating hormone (TSH) dependent, which is secreted from the anterior pituitary and, in turn, is under the control of thyrotropin releasing hormone (TRH) from the hypothalamus. TRH and TSH both are regulated in a negative feedback loop by T4 and T3 in the circulation. [3] These hormones are directly related to body metabolism and play a particularly important role in brain maturation during fetal development. [4]

Thyroid swelling without any symptomatic manifestation is a common occurrence and could affect up to 5 to 20% patients in endemic areas swelling may be noticed by family members, friends or physician.5 It is generally associated with iodine deficiency. [6] Majority of thyroid swellings are nonneoplastic and do not always require surgical intervention. Less than 5% of

thyroid nodules are malignant.[7] In clinical ENT practice neck swelling is one of the common presentations. Enlargement of thyroid accounts for the significant number of cases. [8] The prevalence of thyroid swelling is more than 40 million in India and more than 2 billion in the world. [9] Goiter rate among primary school children had been reported to be 4.83%. [10] They are 3-4 times more frequent in women than men. [11] An increase in prevalence rate in women was observed particularly in age group 21-30 years which might be associated with infertility, pregnancy and other complications. [12]

Thyroid ultrasonography (USG), estimation of serum total T3, T4 & TSH and fine needle aspiration cytology (FNAC)are common diagnostic tests to assess the severity of thyroid nodules. Thyroid stimulating hormone(TSH) –Measurement of TSH has become principal test for evaluation of thyroid function in most circumstances. [13] A TSH value within the reference interval excludes majority of the cases of primary overt thyroid disease. [14] High-resolution ultrasonography (USG) is the most sensitive imaging modality available for examination of the thyroid gland and associated abnormalities. [15] Ultrasound scanning is non-invasive, widely available, less expensive, and does not use any ionizing radiation. The major limitation of ultrasound in thyroid imaging is that it cannot determine thyroid function, i.e., whether the thyroid gland is underactive, overactive or normal in function; for which a blood test or radioactive isotope uptake test is generally required. [16]

This study was intended to study the relative occurrence of various pathological conditions presenting as thyroid swelling and the clinicopathological and radiological examination of swelling.

Material & Methods

A prospective hospital-based study carried out on 100 cases of thyroid swelling attending the Department of ENT, Nalanda Medical College and Hospital, Patna, Bihar, India having adequate diagnostic and treatment facilities during the period of 2 years.

Inclusion Criteria: Patients with thyroid swelling, who are fit to undergo thyroid surgery, and willing to give consent to participate in the study.

Exclusion Criteria

Patients with thyroiditis on FNAC, patients with pubertal thyroid enlargement, hypothyroid or hyperthyroid patients, and patients unfit for surgery due to medical reasons.

Methodology

The principle investigator thoroughly examined all cases at the ENT department by taking a detailed history, general examination along with a system based otorhinolaryngological assessment. After clinical assessment, thyroid status was determined by estimation of T3, T4, TSH. FNAC, USG NECK was done. Complete hematological investigations were done. 100 patients of thyroid swelling were evaluated and the main outcome measures were the clinicopathology and sonological correlates. All the subjects were explained about the purpose of the study and were ensured that the information collected from them would be kept confidential and would be used only for academic purpose. Then written informed consent was taken from each subject. Other non-invasive procedure like X-ray chest PA view and soft tissue X-ray neck lateral view was taken to see any calcification or deviation of trachea and retrosternal extension. Preoperative indirect laryngoscopy or 70-degree endoscopy was done in all cases. During operation all operative findings were recorded meticulously and carefully, including macroscopic finding, visualization and isolation of parathyroid glands and recurrent laryngeal nerve, status of draining lymph nodes. All specimens were sent for histopathological study for a confirmed diagnosis. In the postoperative period all the patients were examined for any postoperative complications of immediate and delayed in nature and routinely before discharge, indirect laryngoscopy was done to see the vocal cord movement and their position. The patients were followed up on OPD basis for histopathological report.

Statistical Analysis: Kappa statistics was used to find Significant agreement between FNAC and postop HPE to determine benign and malignant lesions. k <0.05 was considered as statistically significant. Statistical software, STATA version 14.0 was used for data analysis.

Results

Table 1: Age and gender distribution

Age distribution (years)	No. of subjects	%
10-20	4	4
21-30	21	21
31-40	33	33
41-50	24	24

51-60	12	12
61-70	5	5
>71	1	1
Total	100	100
Gender		
Male	25	25
Female	75	75

In this study of 100 subjects, maximum patients were in the age group of 31 to 40 years (33%), followed by 41 to 50 years (24%). The youngest patient in our study was 11 years while oldest was 74 years. Mean age of presentation was 40.88 years. 75 (75%) subjects were females while 25 (25%) subjects were male.

Table 2: Complaints and Thyroid swellings

Complaints	**N**	**%**
Swelling of neck	100	100
Associated complaints		
Bulky thyroid swelling complained of difficulty in swallowing	7	7
Pain in neck	4	4
Cervical lymphadenopathy	2	2
Hoarseness of voice	1	1
Thyroid swellings		
Firm consistency	47	47
Nodular	19	19
Cystic consistency	13	13
Soft consistency	9	9
Hard swellings	12	12

All cases presented with swelling in front of neck (100%). Associated complaints were 7 (7%) subjects of bulky thyroid swelling complained of difficulty in swallowing, 4 (4%) subjects complained pain in neck, 2 (2%) subject presented with cervical lymphadenopathy and 1 (1%) subjects with hoarseness of voice. Most of the thyroid swellings were firm in consistency 47 (47%) followed by nodular 19 (19%), cystic consistency in 13 (13%) cases and soft consistency in 9 (9%) cases. Hard swellings accounted for 12 (12%) cases, most of which turned out to be malignant.

Table 3: Cytodiagnosis and its correlation with histopathological diagnosis of various thyroid lesions

FNAC	**No. of cases**	**Histopathological diagnosis**		**Statistical re-marks**
Nonneoplastic lesion				
		Colloid goitre	44	TN
		Nodular goitre	6	TN
Colloid goitre and with cystic	61	Thyroiditis	7	TN
changes		Follicular carcinoma	1	FN
		Papillary carcinoma	3	FN
		Nodular goitre	14	TN
		Thyroiditis	1	TN
Nodular goitre	19	Follicular carcinoma	1	FN
		Papillary carcinoma	3	FN
Total	80			
Neoplastic lesion				
		Follicular carcinoma	5	
Follicular neoplasm	10	Follicular adenoma	4	
		Nodular goitre	1	
		Papillary carcinoma	9	TP
Positive for malignant cells	10	Medullary carcinoma	1	TP
Total	40			

On USG, Colloid nodule was found followed by Multinodular goitre, neoplastic etiology, solitary thyroid nodule and colloid cyst. FNAC findings were colloid goitre (61%), nodular goitre (19%), follicular neoplasm (10%), papillary carcinoma (9%) and medullary carcinoma (01%).

Table 4: Sensitivity, specificity values of FNAC

Sensitivity	56.64%
Specificity	100%
Positive predictive value	100%
Negative predictive value	92%

The sensitivity, specificity, positive predictive value, and negative predictive value of FNAC for diagnosis of thyroid swellings were 56.64%, 100%, 100% and 92%, respectively.

Discussion

The primary concern is the biologic behavior of benignancy versus malignancy in a swelling so that the operative approach can be aptly modified. Thyroid swelling is by means of clinical, fine needle aspiration cytology, sonological, and histopathological examination. [17] Fine needle aspiration cytology (FNAC) is considered as the important investigation in diagnosis of thyroid swellings, however it has some limitations related to some aspects, mainly overlapping cytological features between benign and malignant follicular neoplasm, in detection of some papillary carcinomas because of associated thyroid pathology owing to low yield of cells and loss of histological architecture. [18,19] Invasive fungal sinusitis is subdivided into acute and chronic invasive fungal sinusitis. Some authors further subdivided chronic invasive sinusitis to granulomatous & non-granulomatous invasive sinusitis. [20,21] Many severe complications like nasal deformity, visual loss, cavernous sinus thrombosis, cranial invasion, death, etc. can be found in invasive fungal sinusitis. The incidence of morbidity and mortality of invasive fungal rhinosinusitis ranged from 20 to 80%. [22]

In this study of 100 subjects, maximum patients were in the age group of 31 to 40 years (33%), followed by 41 to 50 years (24%). The youngest patient in our study was 11 years while oldest was 74 years. Mean age of presentation was 40.88 years. 75 (75%) subjects were females while 25 (25%) subjects were male. Rios et al showed that 89% were females, while Godara et al, showed that 90% were females. [23,24] All cases presented with swelling in front of neck (100%). Associated complaints were 7 (7%) subjects of bulky thyroid swelling complained of difficulty in swallowing, 4 (4%) subjects complained pain in neck, 2 (2%) subject presented with cervical lymphadenopathy and 1 (1%) subjects with hoarseness of voice. Most of the thyroid swellings were firm in consistency 47 (47%) followed by nodular 19 (19%), cystic consistency in 13 (13%) cases and soft consistency in 9 (9%) cases. Hard swellings accounted for 12 (12%) cases, most of which turned out to be malignant. In 503 thyroid cases of Rao KM et al 75% firm, 5.3% cystic, 14.4% soft and 5.3% were hard in consistency. [25] In present study, FNAC showed 80% non-neoplastic and 20% neoplastic lesions which was almost similar to Shafiqul et al study which showed 78% neoplastic lesions. [26]

On USG, Colloid nodule was found followed by Multinodular goitre, neoplastic etiology, solitary thyroid nodule and colloid cyst. FNAC findings were colloid goitre (61%), nodular goitre (19%), follicular neoplasm (10%), papillary carcinoma (9%) and medullary carcinoma (01%). Papillary carcinoma was the most common malignant thyroid lesion in most of the studies. This was in cordance with the present study. Studies have shown that papillary carcinoma can occur at any age and rarely has been diagnosed as a congenital tumour. It is to be stressed that in most of the cases of papillary carcinoma diagnosed by FNAC were papillary carcinoma on histopathological examination also. [17,19]

The sensitivity, specificity, positive predictive value, and negative predictive value of FNAC for diagnosis of thyroid swellings were 56.64%, 100%, 100% and 92%, respectively. According to the study conducted by Papini E et al [27], the sensitivity, specificity, positive predictive value and negative predictive value of TIRAD was 37.5%, 75%, 11.54% and 93.24% respectively. Among 50 patients, the cytological and histopathological diagnosis was found to be different in 7 patients. Out of which benign diagnosis on cytology was converted to malignant in 6 (12%) patients and 1 (2%) patient, malignant cytology was converted to benign on histopathology. In a study done by Gupta et al [28] including 25 patients, benign cytological diagnosis was converted to malignant in 3 (66.7%) patients on final histopathological examination.

Conclusion

Females have greater preponderance for thyroid disease. USG can diagnose multi nodularity and intra thyroid lesion in better way than any other radiological modality. FNAC is simple, safe and cost-effective modality in pre-operative investigation of thyroid swellings with good

sensitivity, high specificity and diagnostic accuracy to differentiate between benign and malignant lesion. Malignant cases diagnosed on FNAC underwent total thyroidectomy at primary surgery, thereby obviating the need of revision surgery. Misdiagnosis was more with follicular neoplasms compared to other lesions. The scope and limitations of FNAC should be fully realized, especially in the interpretation of follicular neoplasms.

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