

Solitary Thyroid Nodule: A Clinical Study with Cytology and Histopathology Correlation in a Tertiary health care centre

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Abstract: Introduction: Solitary thyroid nodule is commonly encountered clinical problem. Now a days its incidence raised because of advanced imaging techniques. Thyroid nodules present a challenge in their diagnosis, evaluation and management.

Aims and Objectives: The aim of the study is to evaluate nodules whether they are benign or malignant and various treatment modalities to decrease morbidity.

Material and Methods: The evaluation begins with demographic factors, physical examination, appropriate investigations, cytological and histopathological correlation. 33 patients of all ages and sexes with clinical diagnosis of solitary thyroid nodule admitted in tertiary health care centre were studied.

Results: Out of 33 patients, 26 were female and 7 were male patients. Fnac was done in all 33 cases, out of 33 cases, 10 cases were diagnosed as Adenomatoid nodule, 18 cases as colloid nodule, 1 case as lymphocytic thyroiditis, 3 as follicular neoplasm/suspicious of follicular neoplasm and 1 as suspicious of papillary carcinoma. All the 33 patients were undergone different modalities of surgical treatment. On histopathology examination out of 33 cases, 7 were follicular adenoma, 22 were adenomatous / colloid goitre, 1 was lymphocytic thyroiditis and 3 were papillary carcinoma.

Conclusion: Preoperative evaluation helps us to minimize the extent of surgery and hence morbidity.

Keywords: Cytology, Histopathology, Solitary Thyroid Nodule, Thyroidectomy, Ultrasound Examination.

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I. Introduction

The term goitre (Latin, guttur = the throat) is used to describe generalised enlargement of the thyroid gland. A discrete swelling (nodule) in one lobe with no palpable abnormality elsewhere is termed an isolated (or solitary) swelling^[1]. The most important consideration in evaluating patients with thyroid nodules is whether the nodule is benign or malignant^[2]. The aim of the study is to review the age and sex incidence of solitary nodule thyroid to evaluate the various treatment modalities in solitary thyroid nodules with minimal morbidity, incidence of malignancy in solitary nodule thyroid and to review the cytological and histopathological correlation.

The single most important diagnostic evaluation for a thyroid mass is the fine needle aspiration biopsy. It is the safest, most cost effective, & most reliable technique available to differentiate between benign & malignant diseases of the thyroid^[3]. FNAC has decreased the number of unnecessary surgery by more than 50% & doubling the incidence of finding malignancy in resected specimens^[4].

II. Materials and Methods

The present study was conducted in a tertiary health care centre for a period of 2 years. 33 patients of all ages and sexes with clinical diagnosis of solitary thyroid nodule admitted in tertiary health care centre were considered as sample size.

The patients of both the sexes and all age groups presenting with solitary thyroid swelling clinically were included in the study. Patients with diffuse enlargement of thyroid gland and multi nodular goiters on clinical examination, Pregnant females, patients unwilling or apprehensive about being in the study were excluded.

Demographic data like age, gender, address and occupation were recorded in predesigned and pretested proforma. At admission detailed history was collected in every patient with attention to the symptoms of thyroid swelling in relation to duration of swelling and any recent increase in size or associated with pain, pressure symptoms and symptoms of primary or secondary thyrotoxicosis or hypothyroidism.

All base line investigations as per the predesigned and pretest proforma like Hb%, total and differential counts, blood urea, serum creatinine, serum electrolytes, were done at admission.

Special investigations like Thyroid profile, FNAC, X-ray neck, ultrasound of the thyroid swelling, Indirect laryngoscopy, ECG, Echocardiography were done preoperatively. Finally histopathology was done for all solitary thyroid nodule cases.

III. Results

The present study was conducted in a tertiary health care centre on 33 clinically solitary thyroid nodule patients. Of the 33 patients, 26 were female and 7 were male patients (Table 1). Most of the patients were in the age group 31-40 years (Table 2). Ultrasound findings of most of the patients is either solid nodule or cystic nodule (Table 3). FNAC was done in all 33 cases, out of 33 cases, 10 cases were diagnosed as Adenomatoid nodule, 18 cases as colloid nodule, 1 case as lymphocytic thyroiditis, 3 as follicular neoplasm/suspicious of follicular neoplasm and 1 as suspicious of papillary carcinoma.(Table 4). All the 33 patients were undergone different modalities of surgical treatment (Table 5). On histopathology examination out of 33 cases, 7 were follicular adenoma, 22 were adenomatous / colloid goitre, 1 was lymphocytic thyroiditis and 3 were papillary carcinoma (Table 6).

IV. Discussion

In this study out of 33 patients, 26(78.8%) patients were females and 7(21.2%) [Fig 1] were males with female to male ratio of 4:1. The prevalence of thyroid nodules appears to increase throughout life. Thyroid nodules are four times more common in women than in men. These findings were comparable with a study conducted by Aimelmunirtarrar et al in which female to male ratio was 2.52:1^[5]. 2736 patients with single thyroid nodules were investigated at the Alexandra Hospital. Females were more frequently affected than males, with a ratio of females to males of about 7:1^[6]. In a review article by NS Neki, HL Kazal on solitary thyroid nodule stated that solitary thyroid nodules are more common in females (6.4%) as compared to males (1.5%) and this predisposition exists throughout all age groups^[7]. In a study done by Gilberto V et al on Incidence of malignancy in thyroid nodules showed that out of 197 patients 182 were women and 15 were men^[8]. In a review article on solitary nodule thyroid by Ioana Zosin showed that the disease is more common in women (female to male ratio 4.5:1) and its incidence increases with advancing age^[9].

In this study, out of 33 patients, majority 12(36.4%) were in age group of 31-40yrs and 8(24.2%) were in 51-60yrs age group. A study done by Aimelmunirtarrar showed that majority were in age group of 31-40yrs (40%) and 21-30yrs (25%)^[5].

In this study, out of 33 patients 14(42.4%) had solid swellings on ultrasonography, 14(42.4%) had cystic swellings on ultrasonography, 5(15.2%) had mixed features. Half of patients with clinically apparent solitary nodules are found to have nonpalpable multinodular goiters on ultrasonography or surgical thyroidectomy^[10]. In a study done by Aimelmunirtarrar et al revealed 43 (71.67%) swellings were solid, 5(8.33%) were cystic and 12(20%) were mixed in nature^[5]. Ultrasonography can accurately detect nonpalpable nodules, estimate the size of the nodule and the volume of the goiter, and differentiate simple cysts, which have a low risk of being malignant, from solid nodules or from mixed cystic and solid nodules, which have a 5 percent risk of being malignant^[11].

In this study, out of 33 patients 3(9.1%) are malignant i.e papillary carcinoma thyroid. The clinical significance of solitary thyroid nodule lies in its malignant potential. The incidence of solitary nodule that is confirmed malignant on excision ranges from 8 to 33% with majority reporting incidence around 20%. In a study done by Aimelmunirtarrar et al, the incidence of malignancy in solitary thyroid nodule was 13.33%. Papillary carcinoma was the commonest lesion (50%) followed by follicular 25%, medullary and anaplastic 12.5% each^[5]. The incidence of differentiated thyroid cancer (papillary and follicular cancer and their variants) has gradually increased in the last few decades. In iodine-sufficient regions, as in the United States, the relative proportions of papillary and follicular cancer are approximately 85% and 15%, respectively^[12]. Higher proportions of follicular cancer are seen in areas of iodine deficiency and endemic goiter^[13]. A review of 568 cases of single thyroid nodule operated upon during the period 1960-72 is presented. The incidence of carcinoma was 12%. The incidence of carcinoma was higher in male patients and significantly higher in patients of over 60 years^[14]. Thyroid cancer is the most common endocrine neoplasm, and it is estimated that 44,670 new diagnoses of thyroid cancer (10,740 men and 33,930 women) were made in the USA in 2010 according to study done by Altekruse *et al*. This represents nearly a 2.5-fold increase since the early 1970s according to Davies and Welch. The reasons for the increased incidence are unclear, with potential explanations including increased screening, more widespread diagnostic testing of asymptomatic thyroid nodules, changing demographics, and changing environmental risk factors^[15]. The records of all patients who underwent thyroidectomy (412) from 1966 through 1971 were reviewed. Two hundred two patients were operated on for the presence of a nontoxic, clinically solitary nodule. Carcinoma was diagnosed in 58 of 202 patients (28.7%). In all patients under the age of 40 years, the incidence of malignancy was 35.7%. Because of the high incidence of malignancy (28.7%) in clinically solitary nodules, all such lesions should be removed by excision of the involved thyroid lobe followed

by frozen section examination and definitive treatment^[16]. In a study of 100 cases of Solitary Thyroid Nodules, 66% were non neoplastic and 34% were neoplastic. Among the neoplasms, 21% were malignant and 13% were benign. Among the malignant neoplasms, papillary carcinoma was the commonest in solitary nodule (13%)^[17].

In the present study all the patients with solitary nodule thyroid underwent FNAC. According to Bethesda system of classification, out of 33, 10(30.3%) had adenomatoid nodule, 18(54.5%) had colloid nodule, 1(3%) had lymphocytic thyroiditis, 3(9.1%) had follicular neoplasm or suspicious of neoplasm[Fig 2], and 1(3%) was reported as suspicion of papillary carcinoma. In the present study FNAC has good correlation with histopathology except in 3 cases which were found as follicular neoplasm on FNAC are found to have follicular variant of papillary carcinoma in one patient and in other there was a focus of papillary carcinoma and another had colloid goitre on histopathology. In a study done by Aimelmunitarrar et al, out of 60cases,49(81.67%) had no malignant cells, 6(10%) aspirates showed signs of malignancy while 2(3.33%) aspirates had suspicion of malignancy, which were later on histopathology confirmed as papillary and follicular carcinomas. In 3 cases (5%) the aspirate was inadequate and decision could not be made on FNAC^[5]. In a study done by Dr Anil Sunkara et al, out of 107 cases, 62 were diagnosed as colloid goitre, 27 were diagnosed as follicular adenoma, 6 were diagnosed as thyroiditis, 3 had follicular malignancy, 3 had papillary carcinoma, and 6 patients had inadequate material^[18]. In a study done by FaribaBinesh et al, out of 600 cases (91 male, 509 female) the cytological diagnosis were as follows: 526 (87.7%) benign, 28 (4.7%) malignant, 10 (1.6%) suspicious and 36 (6%) unsatisfactory. Between benign lesions, goiter and follicular adenoma and between malignant lesions, papillary cell carcinomas were the most common. Malignant nodules were more common in females than males (4.9% versus 3.3%)^[19].

The management protocol for a solitary thyroid nodule is not fixed; opinions differ among various authors. In this study out of 33 patients 16(48.5%) underwent hemi thyroidectomy, patients had either right or left hemithyroidectomies based on the side and tissue involved. 10(30.3%) underwent lobectomy[Fig 3], 3(9.1%) underwent subtotal thyroidectomy, 4(12.1%) underwent total thyroidectomy. In present study histopathology report showed that out of 33, 7(21.1%) showed follicular adenoma[Fig 4], 22(66.7%) showed adenomatous or colloid goitre, 1(3%) showed lymphocytic thyroiditis, and 3(9.1%) showed features of papillary carcinoma. All the patients who underwent total thyroidectomy were given thyroxine supplementation in the form of thyronorm or eltroxin tablet of dose 100mcg once daily. In a study done by Anil Sunkara et al on various treatment modalities in 107 cases of solitary thyroid nodule in central India showed that out of 107 cases, 11(10.28%) were discharged after aspiration because their nodules disappeared, 62(57.94%) underwent hemithyroidectomy,28(26.17%) underwent subtotal thyroidectomy, and 6(5.61%) underwent total thyroidectomy^[18].

In the present study there were no mortalities, and no patient developed post-operative complications like recurrent laryngeal nerve palsy, wound infection.

V. Conclusion

Preoperative evaluation of solitary thyroid nodule with various investigations helps us to determine whether the patient will require surgery and to identify malignancy. This will help us to decrease unnecessary extensive surgery and morbidity of the patient.

Table 1: Gender distribution

Sex	No. Of Patients	Percentage
Female	26	78.8
Male	7	21.2
Total	33	100
X ² =10.939	df = 1	'P' = 0.001

Table 2: Age and Sex cross tabulation

Age group	Female		Male		Total	
	No.	Percentage	No.	Percentage	No.	Percentage
11-20	3	11.5	0	0	3	9.1
21-30	4	15.4	2	28.6	6	18.2
31-40	11	42.3	1	14.3	12	36.4
41-50	3	11.5	1	14.3	4	12.1
51-60	5	19.2	3	42.9	8	24.2
Total	26	100	7	100	33	100

Table 3: Distribution of USG findings

USG findings	No of patients	Percentage
Solid swellings	14	42.4
Cystic swellings	14	42.4
Mixed pattern	5	15.2
$X^2=4.909$	df=2	P=.086

Table 4: Distribution of patients according to FNAC reports

FNAC Reports		No of patients	Percentage
Category I	Non diagnostic/satisfactory	0	0
Category II: Benign	Adenomatoid nodule	10	30.3
	Colloid nodule	18	54.5
	Lymphocytic thyroiditis	1	3
Category III	Atypia	0	0
Category IV	Follicular neoplasm/suspicious of follicular neoplasm	3	9.1
Category V	Suspicious of papillary carcinoma	1	3
Category VI	Malignancy	0	0

Table 5: Distribution of patients according to surgical modality of treatment.

Type of surgery	No. of patients	Percentage
hemi thyroidectomy	16	48.5
lobectomy	10	30.3
Subtotal thyroidectomy	3	9.1
Total thyroidectomy	4	12.1
	33	100
$X^2=13.182$	df=3	P=.004

Table 6: Distribution of histopathological reports

Report	No. of Patients	Percentage
Follicular adenoma	7	21.2
Adenomatous/colloid goiter	22	66.7
Lymphocytic thyroiditis	1	3
Papillary carcinoma	3	9.1
Total	33	100
$X^2=32.818$	df=3	P=.000

Fig 1: Clinical photograph of patient with solitary thyroid nodule



Fig 2: FNAC – H & E (4x) Suspicious of follicular neoplasm / follicular neoplasm

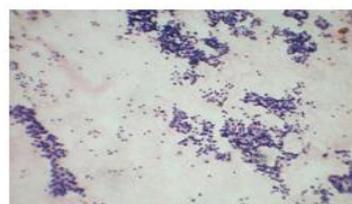
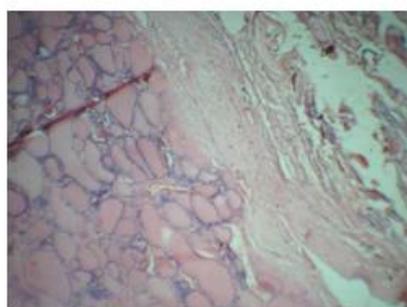


Fig 3 : Post operative lobectomy specimen



Fig 4: Capsulated lesion with colloid filled Follicles – Follicular adenoma



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