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Original Research Article

Solitary thyroid nodule: an overview of one year study at a tertiary care hospital

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ABSTRACT

Background: Thyroid nodules are a common finding in general practice. These nodules are either solitary or multinodular. In the present study thorough evaluation of all the cases presenting with a solitary thyroid nodule (STN) is done. The clear overview of prevalence of STN, associated risk factors, its distribution and its percentage of malignancy, clinic-pathological correlation and findings on ultra-sonogram.
Methods: A one year cross sectional study at a tertiary care hospital was done after ethical committee approval. All cases of thyroid with solitary thyroid nodule were included and socio demographic data, clinical examination and USG data was noted. Thyroid hormone profile, FNAC and HPE was performed for every case enrolled and data was noted. The data was analyzed using SPSS version 22.
Results: 350 cases were enrolled with 44.42% prevalence and 61.43% were females. Maximum age group was 31-40 years with swelling as the most common sign. 81.14% were euthyroid, 6.3% of cases had lymph node involvement. Micro calcification in 69.7% of nodules and 78.65 were solid. 40.3% of the STN were of colloid on FNAC and 6% were malignant. Malignancy on HPE was 14.6% and papillary carcinoma was the most commonest and follicular least.
Conclusions: All cases of STN require a thorough clinical approach supported by ultra-sonogram, FNAC and detailed HPE after surgery for evaluation of benign and malignant lesions. Fine needle aspiration cytology has become an invaluable, minimally invasive and reliable tool in the preoperative assessment of patients with suspicion of malignancy.

Keywords: Solitary thyroid nodule, Papillary carcinoma, Micro calcification, Euthyroid

INTRODUCTION

Thyroid nodules are a common finding in general practice with an estimated prevalence of 3-7% by clinical examination and 20-60% on ultra-sonogram. Most nodules are asymptomatic and are often discovered serendipitously by the patient or their primary medical practitioner when being examined for another problem. With wide spread imaging technologies and their advancement the incidence rates are still increasing.[1] The prevalence of thyroid nodules in south India is 12.2%.[2] The clinical importance of thyroid nodules is their chance in transforming into malignancy. These nodules are either solitary or multinodular. A solitary thyroid nodule can be defined as a goitre which on clinical examination appears to be a single nodule in an otherwise normal thyroid gland. The chance of a solitary nodule to turn malignant is higher (10-20%) than a multinodular goitre (5%). Hence a preoperative thorough evaluation is necessary to separate benign from malignant to select appropriate treatment strategies to avoid unnecessary extensive surgical procedures and diagnostic thyroidectomy which may lead to potential adverse effects such as hypothyroidism, hypocalcemia and so on. Hence a high

degree of suspicion is required in management and planning in a systematic manner. The incidence of malignancy in thyroid among the cases with solitary nodules is 5%. Hence in the present study thorough evaluation of all the cases presenting with a solitary thyroid nodule (STN) is done. The clear overview of prevalence of STN, associated risk factors, its distribution and its percentage of malignancy, clinic-pathological correlation and findings on ultra-sonogram.

METHODS

The present prospective cross sectional study was conducted by department of general surgery in association with department of pathology at a tertiary care hospital of south India. The study period was two years from August 2016 to July 2018. The study was approved by the institutional ethical committee and was conducted as per the protocol of the committee. All the thyroid cases reported to the OP and referred from other departments were enrolled in the study group. All the cases were thoroughly examined clinically and cases diagnosed with STN were included in the study. The study details were clearly explained to all the participants and a written informed consent was obtained from all the cases in the study. The socio demographic data of the study group was collected by interviewing and noted in a predesigned structured data sheet which includes age, sex, history of thyroid disease in family, history of radiation exposure and any history of thyroid medication. A thorough clinical examination and history of clinical symptoms were noted in a separate Performa which was prepared in relation with signs and symptoms of thyroid swelling and general routine examination.

All the cases enrolled in the study were subjected to routine biochemical and pathological investigations. Thyroid hormone profile which includes TSH, free T3 & T4 were estimated and noted for every case in the study. Fine needle aspiration cytology (FNAC) was performed and diagnosis was noted and categorised according to Bethesda classification. Ultra sonogram of the nodule in every case was performed and characteristics of the nodules which include size, central micro-calcification, echogenicity, vascularity and borders were noted. The plan and type of surgery was decided based on FNAC report, ultra sonogram findings and hemi-thyroidectomy/ total thyroidectomy was done and specimen sent for histopathological examination (HPE). The report of the HPE was noted and correlated with the FNAC findings. The final management was based on the HPE report based on malignancy or benign nature of the nodule. All the cases were regularly followed up thorough out the study period.

Statistical analysis

The data was entered initially in a Microsoft Excel spread sheet for correction. The corrected data was entered in SPSS software version 22 and analyzed. The numbers and percentages were calculated for qualitative variables, and the means and standard deviations for quantitative variables. Proportions were used to describe the data.

RESULTS

In the present prospective cross sectional study, a total of 788 cases of thyroid were observed and among them only 350 cases of STN were enrolled in the study. The prevalence of STN in our study was 44.42%. In the present study, majority of the cases were females (n=215; 61.43%) than males (n=85; 24.29%). Female to male ratio in the study was 2.53:1. Maximum cases in the study were between 31-40 years (47.1%) followed by 41-50 years (32.3%). Other age group constituted a total of 20.6% in the study. It was observed that as the age increases after third decade the prevalence of solitary thyroid nodule decreased. The mean age of the study population was 37.7±10.3 years, with a range of 20-74 years. The mean age of females in the study was 34.7±9.3 years and males were 38.5±8.5 years. The commonest sign was swelling in the thyroid region (100%) which was observed in all the cases of the study followed by Dysphagia (16.6%) and other less common symptoms were pain (5.7%) and hoarseness of voice (4%) (Table 1). The duration of symptoms was in the range from one to 6 months. In 6.3% of cases lymph nodes were palpable. In the present study, 81.14% were euthyroid, 17.14% were hypothyroid and 1.7% was hyperthyroid (Figure 1).

Table 1: Gender, age and clinical signs and symptoms of patients in study.

	N	%
Male	85	24.29
Female	215	61.43
Age group (in years)		
21-30	24	6.9
31-40	165	47.1
41-50	113	32.3
51-60	34	9.7
>61	14	4.0
Signs & symptoms		
Swelling in the thyroid region	350	100
Pain	20	5.7
Dysphagia	58	16.6
Palpable lymph node	22	6.3
Hoarseness of voice	14	4

Findings of ultra sonogram

The mean nodule size on ultra-sonogram was 20.14±8.6 mm. The characters of the nodules were as follows and are summarized in Table 2. Micro calcification in 69.7% of nodules, irregularity in 35.4% of nodules, hypoechoic in 69.7% of nodules, 16.9% were isoechoic, 13.4% were hyperechoic. 78.6% of nodules were solid and 21.4% were cystic. 22 patients had suspicious enlarged lymph nodes.

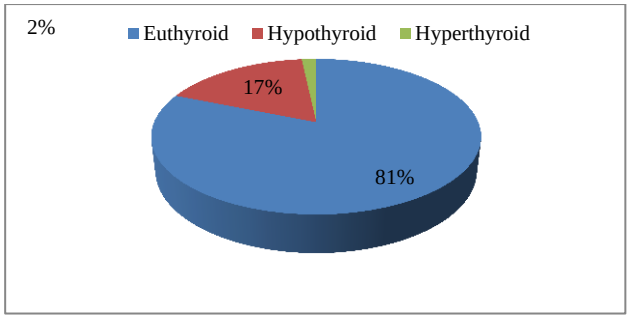

Figure 1: Thyroid hormonal status of study subjects in the study.

Table 2: USG findings of STN in the study group.

Ultra sonogram findings	No	%
Micro-calcification	244	69.7
Irregularity	124	35.4
Increase in vascularity	33	9.4
Hypoechoic	244	69.7
Isoechoic	59	16.9
Hyperechoic	47	13.4
Solid	275	78.6
Cystic	75	21.4
Lymphadenopathy	22	6.3

Table 3: FNAC findings of cases in the study.

FNAC report	No	%
Benign	50	14.3
Malignant	21	6.0
Malignant suspicion	48	13.7
Colloid goitre	141	40.3
Follicular neoplasm	40	11.4
Hurthe cell neoplasm	28	8.0
Non diagnostic cytology	22	6.3
Total	350	

FNAC findings

40.3% of the STN were of colloid on FNAC, 14.3% benign, 13.7% 'malignant suspicion', 6% were malignant, follicular neoplasm in 11.4%, Hurtle cell neoplasm in 8% and 6.3% were of non diagnostic cytology type. The results of FNAC were assessed as per Bethesda classification in to five classes (Table 3).

Table 4: HPE findings of solitary nodules in the study.

Histopathological findings	No	%
Papillary carcinoma	38	10.9
Follicular carcinoma	4	1.1
Medullary carcinoma	9	2.6
Follicular adenoma	130	37.1
Nodular colloid goitre	87	24.9
Nodular hyperplasia	44	12.6
Hashimoto's disease	38	10.9

On histopathological examination, malignancy was noted in 51 cases (14.6%) with majority of them being papillary carcinoma type (n=38/51) followed in order by medullary carcinoma (n=9/51) and follicular carcinoma (n=4/51). Other findings were follicular adenoma in 130 cases, Nodular colloid goitre in 87 cases, nodular hyperplasia in 44 cases and Hashimoto's disease in 38 cases (Table 4).

Table 4: HPE findings of solitary nodules in the study.

Histopathological findings	No	%
Papillary carcinoma	38	10.9
Follicular carcinoma	4	1.1
Medullary carcinoma	9	2.6
Follicular adenoma	130	37.1
Nodular colloid goitre	87	24.9
Nodular hyperplasia	44	12.6
Hashimoto's disease	38	10.9

Table 5: Management of cases in the study.

Surgical management	No	%
Hemi thyroidectomy	214	61.1
Subtotal thyroidectomy	54	15.4
Near total thyroidectomy	33	9.4
Total thyroidectomy	22	6.3
Total thyroidectomy + block dissection	14	4.0
Conservative management	13	3.7

Management

61.1% of cases underwent hemi-thyroidectomy, sub- total thyroidectomy in 15.4%, near total thyroidectomy in 9.4%, total thyroidectomy in 6.3% and total thyroidectomy with block dissection in 4% of cases (Table 5).

DISCUSSION

Thyroid nodules represent one of the common findings in the clinical practice. The causes of these are multifactorial where they range from family history to idiopathic. These nodules may be benign which may include the colloid goitre and the classic multinodular goitre. Hashimoto's disease and Grave's disease also represent rare causes of multinodularity. Malignant causes of nodularity in thyroid may include thyroid cancer, lymphomas and metastasis to the thyroid from other organs. Hence most of the studies recommend that all thyroid nodules whether solitary or multinodular should undergo a thorough clinical and ultrasonographic evaluation and follow up studies.

Thyroid nodules are common in females as observed in our study; these findings were similar to the findings reported earlier in many studies. However most of the studies earlier have reported even incidence is higher in females, but the rate of malignancy is higher in males.

Incidence is higher in females because of increased prevalence and cosmetic awareness among the females. The male to female ratio in our study was 2.53:1 whereas Kumar et al reported a female to male ratio of 5.6:1.[3] Maximum number of cases in our study was observed during the third decade of life which is similar to the findings in the study of Tai et al.[4] Swelling was the commonest sign which was observed in all the patients. Any signs of airway obstruction or engorgement of neck veins due to the nodule was absent in the study. Hoarseness of the voice was observed in 4% of the cases where in 6 cases was due to malignant infiltration with secondaries. 22 cases (6.3%) had palpable cervical lymph node enlargement with 12 cases were reported as malignant on FNAC and HPE. Similar observation were reported in the findings of Surriah et al.[5]

Our study observed that 81.14% of the cases who presented with STN were euthyroid and reports of our study were consistent with the findings of Brander et al.[6] 1.7% of the cases in our study were hyperthyroid which was similar to findings in the study of Udelsman and contrary to the findings of Tamhane et al who reported the cases of hyperthyroidism up to 11%.[7,8] In the present study, ultra sonographic findings were recorded which include size and number. Other patterns which were noted include the calcification, texture, echogenicity and infiltration into surrounding structures. Micro calcification and hypoechoic character was observed in 69.7% of cases. 22 cases presented with enlarged lymph nodes. These findings were consistent with the findings of Gharib who reported that micro calcification was the most common feature on ultra sonography in cases of STN.[9] Majority (78.6%) were solid and 21.4% were cystic which is contrary to the study findings of Leenhardt who reported that only 58% in his study were solid in nature.[10]

In our present study 40.3% of them were colloid in nature on FNAC, and only 6% were of malignant. Similar findings of our study were observed in the reports of Orlandi et al who reported that 47% were colloid and 8% were malignant.[11] Follicular neoplasm was observed in 11.4% of cases in our study by FNAC. This finding was similar to the finding of Oertel who reported 12.6% of follicular neoplasm in his study.[12] Our study reported 14.6% of STN as malignant by histopathological examination which is similar to the findings of Patnayak et al who reported 16.8% in his study.[13] Most common malignancy reported was papillary carcinoma followed by medullary and follicular carcinoma. However studies earlier reported Medullary as the most common type which suggests lack of consistency in reporting, error in interpretation may be the reason for variability. A study by Chetan et al reported the incidence of papillary carcinoma as high as 76% in his study which is similar to the findings in our study.[14] Other less common variants were follicular adenoma, colloid goitre, nodular goitre and Hashimoto's disease in our present study which is similar to the findings of many studies earlier. Majority (61.1%) of the cases underwent hemi-thyroidectomy which is most widely performed surgical procedure in cases of Solitary thyroid nodules either benign or malignant depending upon the sites of infiltration and extension into the surrounding structures.

To conclude, solitary thyroid nodules represent a wide range of thyroid disorders. The incidence of malignancy in cases of STN was 14.6% and the prevalence of STN in the present study was 44.42%. All cases of STN require a thorough clinical approach supported by ultra-sonogram, FNAC and detailed HPE after surgery for evaluation of benign and malignant lesions. All cases of STN with suspicious of malignancy on USG should be performed a mandate FNAC before further proceeding for surgical management. Fine needle aspiration cytology has become an invaluable, minimally invasive and reliable tool in the preoperative assessment of patients with suspicion of malignancy. Papillary carcinoma is the commonest type of carcinoma in cases of STN.

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