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To Study the Clinical Profile and Management of Solitary Thyroid Nodule: An Observational Analytical Study

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ABSTRACT

A Solitary Thyroid nodule is defined as a palpable, discrete swelling in otherwise apparently normal Gland. Solitary nodules are a matter of debate, since they are shown to have a wide range of clinical, radiological, and histological characteristics, necessitating a tailored, precise approach and care. The majority of thyroid nodules are benign and do not need to be removed surgically. But all are concerned whether solitary nodule is benign or malignant. So further evaluation of solitary thyroid nodule is important for deciding management protocol of solitary nodule of thyroid. Decision between conservative management or surgery depends on a thorough examination of clinical characteristics, risk assessment, and diagnostic tests of solitary thyroid nodule. This study is an attempt to evaluate clinical profile and management protocol for accurate diagnosis and appropriate management of solitary nodule of thyroid.

INTRODUCTION

Goitres are caused by enlargement of the thyroid gland was discovered by Hieronymus Fabriciys-ab-Aquapendente in^[3]. Kocher received the Nobel Prize in Medicine in 1909 for “work on the physiology, pathology and surgery of the thyroid gland^[3]. The thyroid has its beginning in the foramen caecum. Thyroid gland develops as an epithelial thickening of pharyngeal floor at the level of the 1st pharyngeal pouch towards the end of third week. This thyroid anlage might be classified as a diverticulum or a solid bud.

The genesis of thyroid gland is carried far cranial to the gland itself by elongation of embryo and cranial expansion of the tongue. The thyroid gland is connected to the foramen cecum, which travels through or anterior to the hyoid bone, through the thyroglossal duct^[4]. Thyroid disorders, such as the 'Solitary nodule, affect people all over the world, with rates ranging. In clinical practise, palpable thyroid nodules in Euthyroid individuals are common, affecting up to 7% of the general population and their incidence rises with age^[1]

Thyroid diseases are predominately limited to females in a 4:1 ratio^[1]. Solitary nodules are also more common in women. Thyroid nodules are frequent in people aged 15-69, with a peak occurrence in the 30s and 40s^[1]. Although carcinoma is not the most prevalent cause of solitary nodules, it accounts for a large number of them. In general, 10-20% of single nodules that are surgically removed are malignant^[5]. Thyroid solitary nodules can develop for a variety of reasons.

Adenomatous goitre, neoplasms and chronic thyroiditis are most prevalent causes of single thyroid nodules. Aetiology of nodule is determined by research population, gender, age of the patient and past history of ionising radiation exposure.

Aims and objectives:

- To study the demographic presentation of solitary thyroid nodule
- To study the role of ultrasound in diagnosing the solitary thyroid nodule
- To study the operative procedure preferred for management of solitary thyroid nodule
- To study the pathological outcome of solitary thyroid nodule

MATERIALS AND METHODS

Study place: this study was carried out at tertiary care hospital.

Study design: An observational analytical study.

Study period: study was conducted for the duration of 24 months (01st November 2019 to 31st October 2021.) after the approval of research committee and ethical committee.

Source of data: study was conducted in department of surgery, tertiary care centre.

Study population: Patients admitted in surgical wards, clinically diagnosed as Solitary Thyroid Nodule.

Sample size: 33.

Ethical clearance and confidentiality: The Institutional Review Board for Ethical Clearance of Tertiary Care Hospital approved the study's ethical conduct. All participants/subjects were informed of the study's methodology and objectives. All consenting patients/attendants were asked to sign a written informed consent form (in the language best understood by them). The information regarding each patient was kept confidential and was not revealed at any point of time. The information of the included subjects was used just for academic purpose and publication.

RESULTS

Conclusion were made after studying 33 patients with solitary nodule of thyroid.

Age incidence: Age of patient in this study ranges from 18 year to 65 yr with peak in 4th decade with mean age of 39.81 years.

Gender incidence: Solitary thyroid nodule found to be more common in Females. Total 29 were female and 4 were male with male Female ratio = 1:7.25.

Clinical features:

- All patients had swelling in neck
- None of the patient presented with dysphagia
- Out of total 33 patient 2 were having Lymphadenopathy

Duration of symptoms: Lowest duration is 15 days while highest of 20 years in this study.

Site of nodule: 18 patients had involvement of left lobe and 15 were having involvement of right lobe.

Size of nodule: Size varies from 1.5cm and 8cm. Large number of patients had size ranging from 2cm to 5 cm. In this study we didn't find any correlation between size of nodule and January 15, 2024 malignancy.

Table 1: Age incidence

Age in years	No. of patients	Percentage
18-20	01	3.03
21-30	08	24.24
31-40	10	30.30
41-50	08	24.24
51-60	04	12.12
61-70	02	6.06
Total	33	100

Table 2: Gender incidence

Gender	No. of patients	Percentage
Male	04	12.12
Female	29	87.87
Total	33	100

Table 3: Duration of symptoms

Duration	No. of patients	Percentage
<1month	04	12.12
1-3 months	06	18.18
>3-6 months	04	12.12
>6-12 months	04	12.12
>1-2 years	07	21.21
>2-5 years	06	18.18
>5 years	02	6.06
Total	33	100

Table 4: Site of nodule

Site of nodule	No. of patients	Percentage
Right	15	45.45
Left	18	54.54
Total	33	100

Table 5: Size of nodule

Size of nodule	No. of patients	Percentage
<1cm	00	00
1-2 cm	04	12.12
>2-3 cm	06	18.18
>3-4 cm	09	27.27
>4-5 cm	09	27.27
>5 cm	05	15.15
Total	33	100

Table 6: Thyroid functional status

Status	No. of patients	Percentage
Euthyroid	33	100
Hyperthyroidism	00	00
Hypothyroidism	00	00
Total	33	100

Table 7: FNAC reports

FNAC report	No. of patients	Percentage
Benign	22	66.66
Follicular neoplasm	08	24.24
Suspicious of malignancy	01	3.03
Malignant	02	6.06
Total	33	100

Table 8: Pathology of solitary thyroid nodule

Histopathology report	No. of patients	Percentage
Nodular goitre	07	21.21
Adenomatous goitre	13	39.39
Multi nodular goitre	08	24.24
Carcinoma	05	15.15
Total	33	100

Table 9: Type of carcinoma

Type of carcinoma	No. of patients	Percentage
Papillary carcinoma	04	80
Follicular carcinoma	00	00
Medullary carcinoma	01	20
Anaplastic carcinoma	00	00
Lymphoma	00	00
Total	05	100

Table 10: Surgical procedure performed

Surgery	No. of patients	Percentage
Hemi thyroidectomy	28	84.84
Total thyroidectomy	05	15.15
Completion thyroidectomy	03	9.09

Thyroid functional status: All patients studied were euthyroid.

FNAC reports: FNAC is the important evaluatory investigation. FNAC done in all 33 patients having solitary thyroid nodule. FNAC reporting is done by Bethesda system and categorised further. One case of papillary carcinoma and 1 case of Medullary carcinoma was diagnosed on FNAC and total Thyroidectomy was done which is confirmed on Later histopathologically.

Pathology of solitary thyroid nodule: In this study commonest cause of Solitary thyroid nodule found to be the adenomatous goitre accounting 39.39% followed by Nodular goitre accounting approximately 21.21%.

Adenomatous goitre is a broad entity which includes follicular adenoma^[6], Hurthle cell adenoma (01), Micro follicular adenoma (01), adenomatoid goitre^[5]. Out of 33 patients 5 were malignant from which 2 cases diagnosed on FNAC and all 5 were confirmed on histopathological examination and treated accordingly. 1 male patient having medullary carcinoma was having Metastasis so after surgery patient was referred for Radiotherapy.

Type of carcinoma: Out of total 5 carcinoma patients 4 had papillary carcinoma and one had medullary carcinoma. Postoperative histopathology of 3 patient in whom hemithyroidectomy was done revealed carcinoma, so completion thyroidectomy was done in these patients.

Surgical procedure performed: Total 28 patients undergone hemithyroidectomy and 2 patients diagnosed as Carcinoma on FNAC undergone total thyroidectomy. Ultrasound examination of 3 patients who presented as a solitary thyroid nodule suggestive dominant nodule in multi nodular goitre in whom total thyroidectomy done. Out of 28 thyroidectomy patients postoperative histopathology reveals carcinoma in 3 patients so, in these 3 patients Completion thyroidectomy done.

DISCUSSIONS

This is a observational analytical study done in tertiary care hospital in which evaluation of patients having solitary thyroid nodule was done to determine the underline pathology in solitary nodule of thyroid. The age ranges from 18 years to 65 years with peak being in 4th decade. This finding was similar to the study conducted by Shashikala *et al.*^[1] in 2019 and Priyadarshi *et al.*^[7] in 2013.

It has approximately 88% females and 12% male with female to male ratio being 7.25:1 this is consistent with Priyadarshi *et al.*^[7] having ratio of 7.5: 1. Mean age in this study was 39.81 years which are similar with

Kumar *et al.*^[8] in 2018 having mean age 37.05 years and Shashikala *et al.*^[1] in 2019 mentioned mean age of 35.5 years. All the patients in this study had a complaint of swelling in neck. Sarda *et al.*^[13] in his study in 1997 mentioned about swelling in all cases. Mandal *et al.*^[9] in 2017 mentioned as swelling as a most common symptom (100%) followed by pain (15.64%).

Solitary thyroid nodule usually doesn't present with pressure symptoms and if present is associated with malignancy due to local spread. In this study none of the patient had pressure symptoms in the form of dyspnoea, dysphagia or change in voice. In this study duration of symptoms ranges from 15 Days to 20 years with 21% patients having swelling in neck since last 1-2 years. Similar results reported by Shashikala *et al.*^[1] in 2019 mentioning 35% patients with symptoms for 1-2 years. Mandal *et al.*^[9] in 2017 reported 35% patients with symptoms within 2 years, 30% within 1 year and 27% within 5 years.

Ultrasound with Doppler of neck was done in all patients. Out of 33 patients three patients clinically presenting with solitary thyroid nodule shows multinodularity on ultrasound which later confirmed on histopathological examination as multi nodular goitre while out of total eight histopathologically proven Multi nodular Goitre patient Ultrasound missed diagnosis in 5 patients. From this Sensitivity and specificity of ultrasound to diagnose multi nodular goitre was 37.5-83.33% with PPV of 100% and NPV of 83.33%.

Paul *et al.*^[10] in 2016 mentioned about sensitivity and specificity of ultrasound of 81.8-94.8% with PPV of 85.7% and NPV of 93.2%. As ultrasound examination is operator dependant there may be variation in findings. FNAC is investigation of choice so in all 33 cases FNAC was done during study duration. Reporting was done using Bethesda system. Total 22 patient reported as benign on FNAC accounting (66.66%) followed by Follicular neoplasm in 8 (24.24%) patients. One case was reported as a suspicious of malignancy which later on turned out to be Multi nodular goitre on postoperative histopathology. Two cases diagnosed as a carcinoma on FNAC examination one each papillary carcinoma and medullary carcinoma for which total thyroidectomy done and later confirmed on postoperative histopathology.

FNAC missed 3 cases of carcinoma which were later diagnosed on postoperative histopathology one as a papillary carcinoma and 2 cases as a follicular variant of papillary carcinoma. On Comparing FNAC with Post operative histopathology FNAC show 40% sensitivity and 100% specificity to diagnose malignancy with PPV of 100% and NPV of 90.32%. In 2016 study by Paul *et al.*^[10] FNAC has sensitivity of 68.1%, Specificity of 91.3%, PPV and NPV of 75% and 88.3% respectively.

Histopathological examination is the gold standard investigation to diagnosed pathology of Thyroid nodule. In this study Hemithyroidectomy was done in 28 (84.84%) patients, total thyroidectomy was done in 5 patients 2 cases of carcinoma diagnosed on FNAC and 3 cases for Multi nodular goitre with dominant nodule. Post-operative histopathological examination was done in all patients. Out of 28 hemithyroidectomy patient 3 turned out to be carcinoma so completion thyroidectomy was done in these three patients.

In our study commonest cause of solitary thyroid nodule was adenomatous goitre accounting 39.39% followed by nodular goitre of 21.21%. Adenomatous goitre entity includes follicular adenoma (06), hurthle cell adenoma (01), Microfollicular adenoma (01) and adenomatoid goitre. Gupta *et al.*^[12] in 2010 drawn observations which had 56% colloid nodule, 16% follicular adenoma, 16% as papillary carcinoma, 4% as hurthle cell adenoma, 4% as hurthle cell changes with capsular invasion and 4% as Hashimoto's thyroiditis. Shashikala *et al.*^[1] in 2019 reported 57.5% multi nodular goitre, 26.25% adenoma, 12.5% carcinoma and 3.75% as a colloid goitre on histopathology examination.

Incidence of malignancy was 15.15% in this study which is consistent with Chetan *et al.*^[11] in 2013 with incidence of malignancy being 16.5%. Mandal *et al.*^[9], Kishan *et al.*^[2] and Shashikala *et al.*^[1] shows incidence rate of 21%, 11.4-12.5% respectively. Incidence of papillary carcinoma found to be 80% among all carcinoma patient. This finding was consistent with Gupta *et al.*^[12] in 2010 who reported Incidence of 80%. Paul *et al.*^[10] in their study in 2016 reported incidence of papillary carcinoma accounting 68.1%.

Summary: It is a observational analytical study done in "department of general surgery" at tertiary care centre. The aim of this study was to study clinical profile namely demographic factors which includes age and gender distribution, clinical features, investigations and management of solitary nodule of thyroid. Thirty three patient having solitary nodule of thyroid examined and observations made as follows:

- Mean age in this study was 39.81 years with peak being in 4th decade
- Total 88% patients presented with solitary nodule of thyroid were female and 12% were male with more prevalence of solitary nodule of thyroid in females
- Swelling in neck was noted in all 100% patient with discomfort on neck movement noted in 24% patient
- Duration of symptoms ranges from 15 days to 20 years with maximum duration of swelling in 1-2 years noted in 21% patient

- All patients enrolled in this study were euthyroid
- FNAC reported 66.66% patient as benign and 24.24% patient as follicular neoplasm. One case reported as suspicious of malignancy turned out to be multi nodular goitre also two cases of carcinoma diagnosed on FNAC and later confirmed on histopathology
- Hemithyroidectomy was most commonly done in 28 (84.84%) patients followed by total thyroidectomy in 5 (15.15%) patient. Completion thyroidectomy indicated in 3 patients who had hemithyroidectomy due to malignancy on postoperative histopathology
- Histopathology reported 13 (39.39%) patient as. Adenomatous goitre followed by 08 (24.24%) as a multi nodular goitre and the nodular goitre in 07 (21.21%) patients
- Out of 33 patient 5 patient were having malignancy on histopathology with incidence of malignancy reporting 15.15%

CONCLUSION

Solitary thyroid nodule is a common problem encountered in surgical departments and has got high malignant potential. In this study we have focused on determining underlying pathology of solitary nodule of thyroid. We found that prevalence of solitary nodule of thyroid was higher in female patient with peak incidence in 4th decade. Majority of patient that is 28 patient had benign disease while 5 patient had malignancy. Most common type of malignancy found to be papillary carcinoma.

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