

# Clinicopathological Study of Solitary Nodule of Thyroid – A Prospective Study

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## Abstract

**Introduction:** Thyroid nodules are a common clinical problem and are noted much more commonly on imaging examinations than are apparent by palpation. Fine-needle aspiration cytology (FNAC), which yields a cytology specimen for analysis, is the standard test to determine whether or not surgical removal of a detected nodule is recommended.

**Aim:** Our study aims to evaluate the clinicopathological aspects of solitary thyroid nodule.

**Materials and Methods:** This prospective single-institutional study was conducted in the Department of Surgery, Tirunelveli Medical College. A total of 50 patients with solitary thyroid swelling were included in this study. All the patients underwent thyroid surgery after thorough family history, clinical examination, and FNAC. The histopathological reports were evaluated and correlated with the clinical diagnosis and the results were statistically analyzed and discussed.

**Results:** Out of the 50 patients, majority were females and only four were male patients. Peak incidence was observed in the age group of 30–40 years. Most patients presented with symptoms of swelling (50%), followed by pain (8%), dysphagia (4%), change of voice (4%), and difficulty in speech (4%). Swelling was located mostly in the right lobe (74%) followed by the left lobe (26%). On FNAC examination, many were present with colloid nodular goiter (64%), followed by simple colloid goiter (20%), thyroiditis (6%), follicular adenoma (4%), follicular neoplasm (4%), and cystic lesion (2%).

**Conclusion:** From this study, we concluded that solitary thyroid nodule is present most commonly in females, most of them are benign with adenoma being common among them seen in the front of the neck. FNAC is a useful tool in the pre-operative diagnosis of the solitary thyroid nodule.

**Key words:** Fine-needle aspiration cytology, Goiter, Histology, Solitary thyroid nodule

## INTRODUCTION

A thyroid nodule is defined as a discrete lesion within the thyroid gland that is radiologically distinct from the surrounding thyroid tissue.<sup>[1]</sup> Iodine intake, in both insufficient and excessive quantities, confers a higher risk for the development of thyroid nodules.<sup>[2]</sup> Another important risk factor is exposure to ionizing radiation in childhood.<sup>[3,4]</sup> Thyroid nodules are common in both hyperthyroid and euthyroid patients and they are present in half of all thyroid glands that are subject to careful

pathologic examination. More than 80% of all patients with thyroid nodules are women. Palpable thyroid nodules can be detected in 1.5% of men and 6.4% of women between the ages of 30 and 59.2 years. The prevalence of thyroid nodules increases from near zero at age 15 years to 50% by about 60–65 years of age.<sup>[5]</sup>

Thyroid nodules more than 1 cm are usually palpable. They are examined for site, size, tenderness, consistency, mobility, fixity to surrounding structures, and lymphadenopathy. A firm to hard, painful, rapidly growing nodule, fixed to surrounding structures and associated with lymphadenopathy and local pressure symptoms are suggestive of malignancy. The most cost-effective initial diagnostic method appears to be fine-needle aspiration; the specificity and sensitivity of this procedure are excellent.<sup>[6,7]</sup> It can usually determine if the nodule is a macrofollicular lesion (which is benign), a microfollicular or cellular lesion (which may or may not be cancerous), or a papillary malignancy.

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Incidentalomas, that is, nodules <1 cm detected incidentally on imaging of neck are not usually biopsied. The risk of thyroid cancer among patients with incidentally discovered thyroid nodules is similar to patients with palpable nodules. The life expectancy of patients with tumor that is smaller than 1 cm in diameter is the same as that of the general population.<sup>[8]</sup>

Fine-needle aspiration biopsy (FNAB) is advisable in all patients with palpable solitary nodules more than 1 cm in diameter, in patients of multinodular goiter who have discrete hypofunctioning nodule within the goiter, or a nodule of uncertain functional status that is growing or a cystic nodule after fluid has been removed. The prevalence of carcinoma in these nodules is similar to that in solitary nodules.<sup>[9]</sup> Biopsy is also indicated in patients of thyrotoxicosis having hypofunctioning nodules. In about 75% of cases, the nodules are benign. Malignancy is detected in about 4% of the cases. Of the remaining cases, roughly half will have indeterminate or suspicious results; the other half will lack a diagnosis because of inadequate tissue sampling. When the result is non-diagnostic, a repeat aspiration should be done. This study was conducted to find out various factors affecting solitary thyroid nodule such as age, sex, and clinical parameters and also to know about the correlation of fine-needle aspiration cytology (FNAC) and histopathology in diagnosing them.

### Aim

The aim of our study is to evaluate the clinicopathological aspects of the solitary thyroid nodule.

## MATERIALS AND METHODS

This prospective single-institutional study was conducted in the Department of Surgery, Tirunelveli Medical College. A total of 50 patients with solitary thyroid swelling were included in this study. Detailed information about the demographic details, present and past history of the thyroid was obtained. Informed written consent was obtained from the patients. All the general examination, physical examination, clinical examination, thyroid swelling examination, and laboratory investigation such as thyroid profile, FNAC, X-ray of the neck-anteroposterior, and lateral views, chest X-ray, and indirect laryngoscopy were done before going for surgery. Patients with previous thyroid surgery and those who have had an FNAB in the last month and patients with clinically non-palpable nodule discovered at ultrasonography (USG) (incidentalomas) were excluded from this study. All patients underwent surgery, and the final diagnosis was based on the results of the histopathological examination of the removed thyroid gland tissue.

Thyroid nodules that were easily palpable were aspirated by a cytopathologist, and non-palpable thyroid nodules were aspirated under ultrasound guidance by an endocrinologist or radiologist. Most of the solitary nodules were aspirated with 2–6 passes. For multiple nodules dependent on nodule number and size, 2–4 passes were applied to each biopsied nodule. The aspirated contents were expelled onto glass slides. The slides were air-dried and stained with Giemsa stains and cytopathologist immediately checked the samples for adequacy. Samples were defined as sufficient when six or more clusters of follicular cells with each group containing at least 10 follicular cells were present on the slides. The aspiration samples were classified by the cytopathologist as malignant, benign, inadequate, or follicular lesion.

## RESULTS

The study comprised 50 patients with a clinically palpable solitary nodule of the thyroid. Patients ranged in the age group of 16–65 years. The youngest was 16 years old, the oldest was 65 years with a peak incidence in the 30–40 years age group [Figure 1]. There were a higher proportion of females with only 4 male cases and 46 female cases. The most characteristic presenting symptom was swelling in the anterior view of the neck in 100% of cases. The following common symptom included pain (8%), dysphagia (2%), change of voice (2%), and dyspnea (2%) [Figure 2]. Toxic symptoms were not seen in any of the cases. There were no symptoms of metastasis. A visible swelling moving up with deglutition was seen in all cases. The location of swelling was in the right lobe (74%), left lobe was involved in 26%, and isthmus in none [Figure 3]. The preferential location of the lesion in the right lobe is probably due to the reason that the right lobe is a little larger than the left lobe in 80% of the cases. All the cases had a smooth surface and were firm in consistency in 45 cases, whereas they were soft inconsistency in 5 cases. All cases had free mobility without evidence of fixity to any surrounding structures. There was no tracheal deviation in any of the cases. None of the patients has clinical lymph node enlargement. This indicates that it is quite difficult to predict malignancy in a solitary nodule of small size on a clinical basis alone. Myxoedema was not present in any of the patients. FNAC revealed that 64% of cases of colloid nodular goiter and 20% was simple colloid goiter [Figure 4]. FNAC reported two cases of malignancy which turned out to be benign on HPE.

## DISCUSSION

Thyroid nodules are common, occurring in approximately 4–7% of the population.<sup>[10]</sup> However, thyroid cancer occurs in fewer than 5% of thyroid nodules.<sup>[10]</sup>

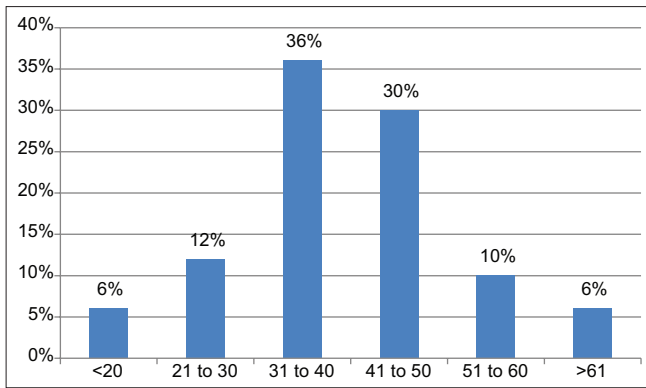


Figure 1: Age distribution

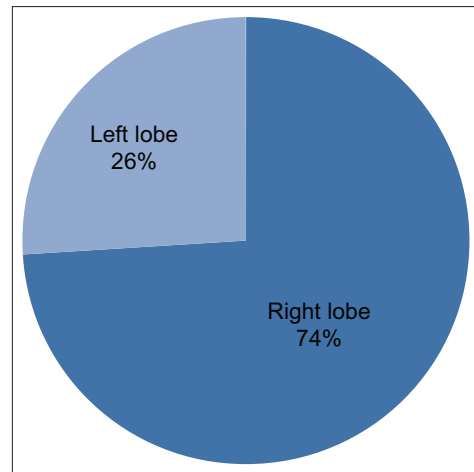


Figure 3: Location of swelling

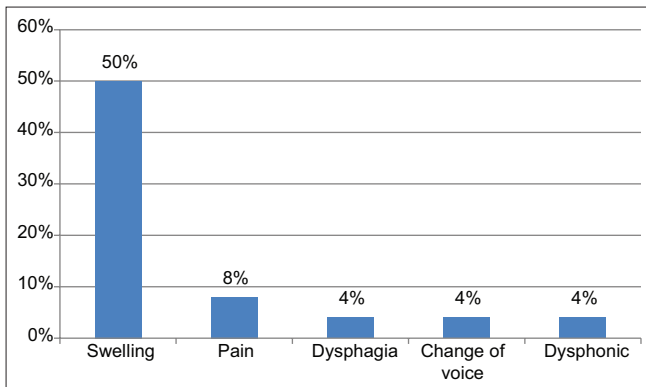


Figure 2: Presenting figures

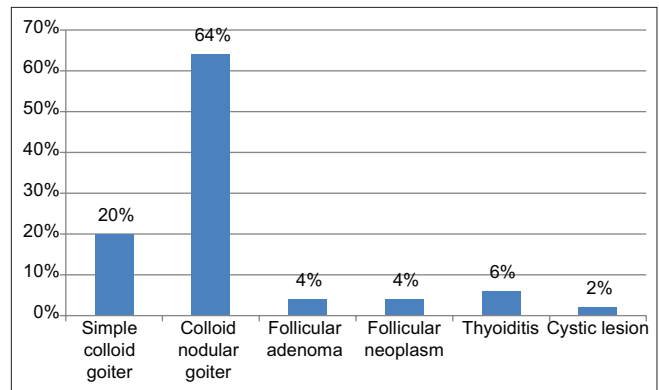


Figure 4: Distribution of fine-needle aspiration cytology

Conventionally, the approach to the solitary thyroid nodule consisted of clinical examination, radionuclide scanning, USG, or response to thyroid suppression therapy to differentiate between benign and malignant lesions. FNAB of thyroid nodules has emerged as a much more accurate diagnostic study for determining benign and malignant nodules. It is safe and accurate and has been shown to be superior to clinical assessment, USG, or thyroid scan in predicting malignancy.<sup>[6]</sup> In recent studies, FNAB has an incidence of false-positive findings ranging from <1% to 9% and false-negative findings from 0% to 4%.<sup>[11]</sup> Hashimoto's thyroiditis probably is the most common cause of false-positive FNAC results. The use of FNAB has resulted in a dramatic decrease in the number of patients with solitary nodules requiring operation and an increase in the yield of malignancy in patients undergoing thyroidectomy.<sup>[12,13]</sup>

In our study, thyroid nodules are more common in females compared to males. The incidence is more in areas of iodine deficiency. Christensen *et al.* conducted a survey of thyroid disease in 477 middle-aged women selected at random in an urban area where goiter was not endemic. The overall occurrence of thyroid disease was estimated to be 16.2%.<sup>[14]</sup>

In our study, out of the 48 benign cases, 32 were diagnosed to be colloid goiter while in the study by Fai *et al.*, it was 34 cases of colloidal goiter out of 54 benign cases.<sup>[15]</sup> The most common symptom among all patients in our study was swelling in front of the neck followed by pain. Similar observation was done by Nazmul-Huque *et al.*<sup>[16]</sup> where he found that thyroid swelling was the most common presentation in all cases (100%). Furthermore, majority of the patients were from the 31 to 40 years' age group (36%) in this study. This result is comparable to the results obtained by Venkatachalapathy *et al.*<sup>[17]</sup>

Aspiration of a thyroid nodule with a thin needle by an experienced clinician followed by cytological examination by a trained cytologist provides highly useful information in the assessment of solitary thyroid nodules. The procedure is safe, simple to learn, inexpensive, and is the single most cost-effective initial diagnostic tool in the workup of thyroid nodular disease. Best care will be delivered to the patient if a thorough history and clinical findings are correlated with aspiration cytology reports and other investigative procedures.

## CONCLUSION

From this study, we concluded that solitary thyroid nodule is present most commonly in females, most of them are benign with adenoma (colloid nodular goiter) being common among them seen in front of the neck. Thus, FNAC is a most useful tool in the pre-operative diagnosis of solitary thyroid nodule. However, as it cannot distinguish between follicular adenomas and follicular carcinomas, it can be used in conjunction with USG and color flow Doppler to detect malignancy in such cases.

## REFERENCES

- Haugen BR, Alexander EK, Bible KC, Doherty GM, Mandel SJ, Nikiforov YE, *et al.* 2015 American Thyroid Association management guidelines for adult patients with thyroid nodules and differentiated thyroid cancer: The American Thyroid Association guidelines task force on thyroid nodules and differentiated thyroid cancer. *Thyroid* 2016;26:1-133.
- Zhao W, Han C, Shi X, Xiong C, Sun J, Shan Z, *et al.* Prevalence of goiter and thyroid nodules before and after implementation of the universal salt iodization program in mainland China from 1985 to 2014: A systematic review and meta-analysis. *PLoS One* 2014;9:e109549.
- Ron E, Brenner A. Non-malignant thyroid diseases after a wide range of radiation exposures. *Radiat Res* 2010;174:877-88.
- Schneider AB, Ron E, Lubin J, Stovall M, Gierlowski TC. Dose-response relationships for radiation-induced thyroid cancer and thyroid nodules: Evidence for the prolonged effects of radiation on the thyroid. *J Clin Endocrinol Metab* 1993;77:362-9.
- Mazzaferri EL. Management of a solitary thyroid nodule. *N Engl J Med* 1993;328:553-9.
- Ashcraft MW, Van Herle AJ. Management of thyroid nodules. II: Scanning techniques, thyroid suppressive therapy, and fine needle aspiration. *Head Neck Surg* 1981;3:297-322.
- Rojeski MT, Gharib H. Nodular thyroid disease. Evaluation and management. *N Engl J Med* 1985;313:428-36.
- Braverman LE, Utiger RD. *Werner and Ingbar's the Thyroid*. 9<sup>th</sup> ed. Philadelphia, PA: Lippencott Williams and Wilkins; 2005.
- Belfiore A, La Rosa GL, La Porta GA, Giuffrida D, Milazzo G, Lupo L, *et al.* Cancer risk in patients with cold thyroid nodules: Relevance of iodine intake, sex, age, and multinodularity. *Am J Med* 1992;93:363-9.
- Gharib H, Goellner JR. Fine-needle aspiration biopsy of the thyroid: An appraisal. *Ann Intern Med* 1993;118:282-9.
- Griffies WS, Donegan ED, Abez ME. The role of fine needle aspiration in the management of the thyroid nodule. *Laryngoscope* 1985;95:1103-6.
- Wool MS. Thyroid nodules. The place of fine-needle aspiration biopsy in management. *Postgrad Med* 1993;94:111-2.
- Dwarakanathan AA, Ryan WG, Staren ED, Martirano M, Economou SG. Fine-needle aspiration biopsy of the thyroid. Diagnostic accuracy when performing a moderate number of such procedures. *Ann Intern Med* 1989;114:2007-9.
- Christensen SB, Ericsson UB, Janzon L, Tibblin S, Trelle E. The prevalence of thyroid disorders in a middle-aged female population, with special reference to the solitary thyroid nodule. *Acta Chir Scand* 1984;150:13-9.
- Fai CH. Dorothy law aspiration cytology in management of solitary thyroid nodule. *J Hong Kong Med Assoc* 1986;38:87-8.
- Huque SM, Ali MI. Histopathological pattern of malignancy in solitary thyroid nodule. *Banglad J Otorhinolaryngol* 2012;18:5-10.
- Venkatachalapathy TS, Sreeramulu PN. A prospective study of clinical, sonological and pathological evaluation of thyroid nodule. *J Thyroid Disord Ther* 2012;1:2.

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